DISRUPTIVE LEARNING AND OPTIMAL FLOW: GAME JAMS IN HETEROTOPIC AFFINITY SPACE

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A thesis submitted in partial fulfilment of the requirements of the University of the West of England, Bristol for the degree of Doctor of Education.

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23rd December 2022

ABSTRACT

Game jams are intensive, time-bound videogame-development events where students, professionals, and hobbyists form teams to create games against the clock. Jams are popular, offering accessible, informal learning environments which promote teamwork, problem solving, technical skills and high levels of participant satisfaction.

The Foundry is an award-winning environment developed to enhance the agency, risk-taking, and problem-solving of technology graduates through digital projects and participative events. Its design drew upon a case-study of MIT's "Building 20" alumni, and Owen Barden's concept of "heterotopic affinity space" which combined Foucault's *heterotopia* with Gee's *affinity space*, creating an informal learning space at odds with the institution around it. As the only dedicated campus jam site in the UK, it offers an amplified experience compared to traditional university computing labs.

This mini-ethnographic case-study explores the disruptive behaviour and engagement of Foundry participants during the 2019 Global Game Jam. Through audio interview, video observation and reflexive thematic analysis, it concerns learners, learning processes and educational spaces. Taking-up an interpretivist perspective, it offers inductive exploration of disruptive and transgressive behaviour in heterotopic affinity space, and the effect the space has on individuals and groups.

Research has recently aligned game jams with affinity space theory, but does not yet consider the effect of physical or heterotopic affinity space on participants undertaking technical development. This thesis does not seek to establish *why* spatial or technological aspects of the Foundry elicit disruptive behaviour, or to develop generalisable specifications to revitalise classroom pedagogy elsewhere. Instead, it forms an explorative "first foray" to gaps in knowledge around game jams, physical campus affinity spaces and the effect of heterotopia on engagement.

The significant original contributions of this thesis are its conceptualisation of "lateral moments" as an analytical tool for off-topic behaviour, and the development of a model to situate them within wider *phases of heterotopic affinity space engagement* (PHASE). Operationalising these contributions, disruptive individual and group behaviours are identified as proximal to flow experience, leading to conclusions which consider the extent to which disruptive behaviour in heterotopic affinity space can be considered a positive pedagogic phenomenon conducive to the optimal experience of "flow".

Findings carry implications for researchers in game studies and the educational sciences, specifically those involved with game jams, hackathons, affinity space, learning engagement, or the design of educational spaces.

ACKNOWLEDGEMENTS

This thesis was only possible due to the remarkable friends, colleagues and family members who supported me through this, the most challenging project I have undertaken.

To my supervisory team of the utmost regard, it was a privilege to be supervised by you.
You changed how I think about the world:

Harriet	For the ways you think about human interactions and spaces we create.
Neil	For always finding words to explain concepts and being the best “bad cop”.
Nigel	For holding me to account and trusting me to crack on as ultimatums loomed.
Richard	For stepping in as my director of studies as I fought to complete this thesis.

Carina	For the friendship, sanity checks and writing retreats which got me through part one of the EdD programme - something I did not think I was capable of.
Kevin	For co-developing the Institute of Coding bid and carving out time within it so this study might come to pass.
Luke	For your solidarity and support throughout our Institute of Coding project, and for developing the Foundry events which made this study possible.
Jenna	For the Foundry admin you took from me so I could conduct this study. I will not forget your helpful “you should be writing” blackboard messages.
Leo	For your work to sustain Foundry projects despite a global pandemic and the hurdles you faced while I concluded this research.
Tim	For ensuring my doctoral study remained a priority and supporting my studies.
Jane	For your timely reminder of why I signed up, and for unlocking my ability to write.

And finally, my wife Kasia:

For putting up with me, an unfinished house, a fire engine and five large cats these past six years. You believed in me and spurred me on so this thesis could be completed before our son was born.

Without you my doctoral journey would have been incomplete.

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CHAPTER 1: Introduction:

The significant and original contribution to knowledge of this thesis is that it positions the seemingly disruptive, off-topic behaviour accentuated by heterotopic affinity space to be a positive pedagogic phenomenon. Analysis defines such occasions of emergent behaviour as “lateral moments”, and as meaningful states of individual and group activity. Findings are further developed through discussion of a model to situate on-and-off-topic work of individuals and groups during game jams, so phases of engagement during such events (and in such spaces) may be further investigated.

Through observation, interview and reflexive thematic analysis of the 2019 Global Game Jam, this study explores the elevated (mis)behaviour and engagement of individuals and groups (of “jammers”) in the unique Foundry space at the University of the West of England, Bristol. This thesis is the first study to examine the impact of heterotopic affinity space on game development events known as game jams, and the first to consider engagement through flow (Csikszentmihalyi, 1975b) in a physical affinity space (Gee, 2004). The model developed translates recent claims that flow is important for learning engagement in virtual affinity spaces (Savva & Souleles, 2020) to the realms of physical campus space for the first time.

In this chapter I introduce the reader to the context for this research (videogame development events, informal learning spaces and the Foundry itself), provide my rationale for a study of jam events within physical heterotopic affinity space (including issues of concern and opportunities in the field), before moving to the specific research aims of this thesis. Because of the inductive, interpretivist nature of this educational research in social sciences, I also supply a summary of my ontological and epistemological positions (Holmes, 2020), before concluding with a thesis map and a short summary of important terms required to engage this work.

1.1 Research Context

Videogames and game jams are recognised digital approaches towards improved learning engagement in education research. Relatedly, online game-development communities have been key to the development of affinity space theory. This research resides at the nexus of these two domains, focusing on participative videogame making events known as game jams held within a disruptive on-campus heterotopic affinity space.

The following sub-sections provide important context to this explorative study. In keeping with an inductive rationale (and an interpretivist perspective), I began with no set hypothesis or problem statement from which results might be deduced. Instead, I was starting from a position of seeking to understand the nature of distracted behaviours I witnessed and their effect on participant engagement. No prior work existed to explain the effects of a physical affinity space, or if transgressive behaviour beyond acts of self-expression (Barden, 2016) were a positive or negative phenomenon.

Videogame Development Events

Videogames are a pervasive medium and cultural phenomenon that have continued to gain significance for over sixty years. First recognised as a learning intervention fifty years ago, (Abt, 1970; Vogel, 2006), gaming culture has grown and diversified against a backdrop of declining traditional print media and television (Joseph, 2015; Johnson & Woodcock, 2019; Littleton, 2015). There are now three billion gamers worldwide, with revenues of over $180 billion (£130 billion) for 2021 (Wijman, 2021).

The primacy of successful videogames lies in their interactivity (Crawford, 2003) and their ability to respond to unique player inputs intelligently; suspending disbelief and fostering deep immersion that keeps players engaged. Educators have long recognised the potential for game mechanics as pedagogic interventions that increase engagement. In education, much is made of the power of "serious games" or "gamification" to improve the attention and attainment of learners (Abt, 1970; Bogost, 2007; De-Marcos et al., 2014). More recently researchers have also realised the practice of game development itself can enhance learning engagement (Fowler et al., 2013b; Meriläinen et al., 2020).

Videogames can be imported to educational contexts because good games, much like successful lessons or teachers, keep participants challenged, engaged, and motivated. Effective game mechanics sustain extensive periods of engagement through a psychological state known as flow (Csikszentmihalyi, 1975b; Callele et al., 2005; Abuhamdeh, 2020) (colloquially known as being "in the zone"). During flow, all track of time is lost, and skills are balanced with game challenge by design. Play usually ends because a game is not sufficiently challenging, leading to boredom; or challenge

becoming overwhelming, leading to anxiety (Beard, 2015). In both cases further engagement is endangered, and if unaddressed, can lead to commercial failure[1]. Thus, a major role of game design is to achieve accessible difficulty curves (Crawford, 2003) facilitating the most flow from the broadest range of players, irrespective of ability or prior achievement.

Game development is unique in software engineering due to its multidisciplinarity. Games require 2D or 3D art assets, audio programming, sound effects, dynamic music, animation, acting, performance-capture and voice acting, not to mention cutting edge computer science concepts, such as artificial intelligence, physics simulation, networking and security. Across these aspects, maximum player engagement is a primary goal, with successful studios placing emphasis on collaboration, teamwork, and iterative software development (Kanode & Haddad, 2005).

Game jams are intensive, time-bound, videogame-making events where students, professionals, and hobbyists form teams to develop games against the clock. Jams have become popular as informal learning events offering high levels of satisfaction and achievement (Petri et al., 2015; Shin et al., 2012; Wearn & Mcdonald, 2016). During game jams, knowledge is constructed through active engagement (Papert & Harel, 1991; Petri et al, 2015), while collaboration, problem solving and technical skills are fostered (Faas et al., 2019; Fowler, Ni & Preston, 2018; Smith & Bowers, 2016).

Research increasingly recognises game jams as learning interventions, where participants can develop science, technology, arts, engineering and mathematical (STEAM) competencies in pursuit of experimental game demos (Meriläinen et al., 2020). Game development (or “gamedev”) offers research opportunities for the study of intensive software development and collaboration in virtual and physical spaces not bound by age or ability. These principles are common to the settings Gee defined as affinity spaces (2004, 2005), which were subsequently expanded on by Gee and Hayes (2012) and Hayes and Duncan, (2012).

Jams compress a game development process of weeks, months or even years down to a matter of hours, where productivity often stems from ad-hoc participant approaches, and the avoidance of formal gamedev methodologies (Borg et al., 2019). Jams align with affinity spaces as sites of informal learning, as jammers have complete control over the tools, processes, and the allocation of responsibilities. Jams are also powerful because unlike curriculum-based group-projects, jammers retain strong individual and team identities throughout the event and are invested in the final games presented (Farhan & Kocher, 2016).

[1] Particularly in the era of “free to play” games, which harness a “retention economy” (Kriel, 2015).

Before adoption by games education and more recently by games industry, jams were social gatherings for hobbyists dating back to 2002, seven years before the first Global Game Jam (Preston et al., 2012). Jams have also recently been recognised as relevant continuing professional development by the games industry and remain a popular activity worldwide (Farhan & Kocher, 2016; Smith & Bowers, 2016).

Several activities interact to galvanise jammers and teams at the start of a jam; firstly, each team's selection and customisation of space as a base of operation for the event, secondly, the decision about what each team's game concept should be; and thirdly, how they should address "the theme" of the jam (only revealed immediately before the jam begins). The final activity is a discussion of technical constraints such as the tools and platforms the game will be built with and played on, including any optional goals suggested by organisers known as "modifiers" that enhance the scope and/or difficulty of a jam.

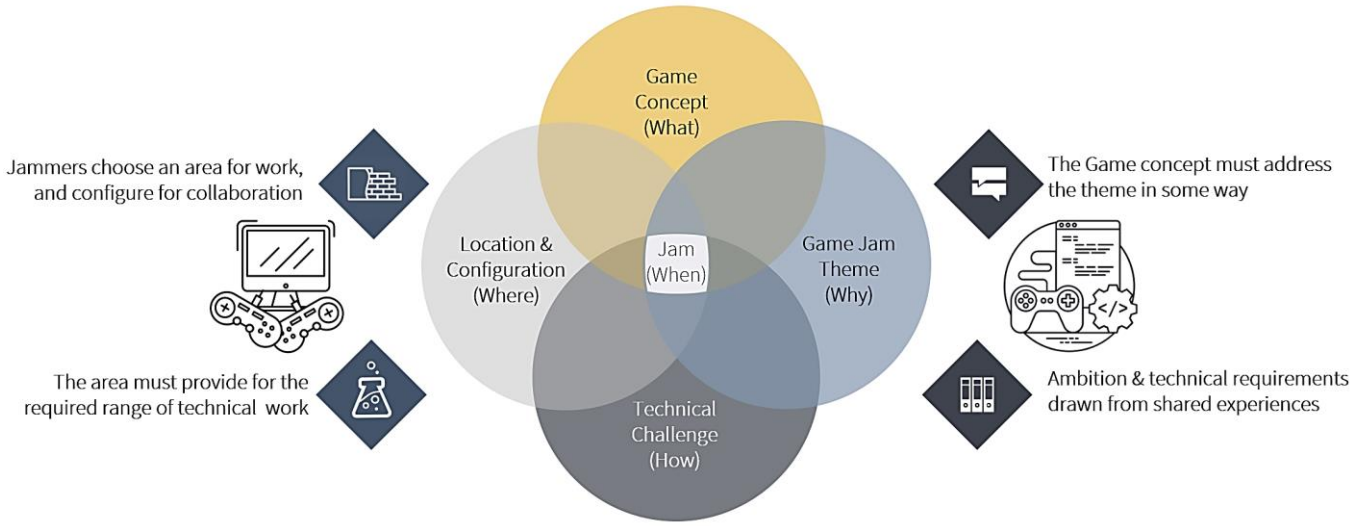


Fig.1 Diagram showing the "what, why, how, where and when" for teams at the start of a Jam.

Although there are hundreds of game jams annually, with often noteworthy aims of addressing societal issues and overcoming global challenges, jams are easily differentiated by the unique constraints of each event. For example, the "Zero Hour Game Jam" takes place in only the single "lost hour" during the switch to daylight savings time each autumn, while the "Train Jam" is a 52-hour rail-crossing from Chicago to San Francisco. The largest and most well-known game jam is the Global Game Jam (GGJ), where students, professionals, and hobbyist members of the public can register to attend "jam-sites" across major cities worldwide (Fowler et al., 2013a).

Since 2009 the GGJ has grown from an inaugural event of 1650 participants to an annual event of nearly 47,000 jammers from 113 countries by 2019, with over 9000 video games created in 48 hours (Kultima, 2019). Jams provide enviable collaborative learning opportunities, difficult to achieve or sustain in mainstream education (Shin et al., 2012; Kankainen, Kultima & Meriläinen; Meriläinen et al., 2020). But where facilitated, jams result in challenging, project-based learning opportunities, where diverse teams experience heightened levels of engagement, enjoyment, and attainment (Wearn & Mcdonald, 2016).

Informal Learning Spaces

Gee's affinity space (2004) considers virtual and physical sites of informal learning, where learners have affinity with each other and the space in pursuit of shared goals (Duncan, 2010). Gee defines affinity space as "a place or set of places where people affiliate with others based primarily on shared activities, interests, and goals, not shared race, class, culture, ethnicity, or gender" (2004, p.67). The theory is similar to "communities of practice", but places emphasis on *space*, and not *community*. Gee and Hayes state that Lave and Wenger's theory did not cater for the communities that mattered to today's adolescence (Aljanahi, 2019), and that their theory did not hold up well to "geographically distributed, technologically mediated, and fluidly populated social groupings" of the kind of interest to game studies and new literacies (Gee & Hayes, 2012, p.106), and was not suitable for online sites (Aljanahi, 2019).

Production of games and creative media is common in affinity space, where Gee's original work observed online game modification or "modding" communities as prospective affinity spaces. Subsequent research maintains common threads of constructionist learning (Ackermann 2004; Stager 2013) and game development (Hayes & Duncan, 2012), while Jackson incorporates the notion of jams as affinity spaces within educational institutions (2016).

Owen Barden found need to develop a hybrid notion of affinity space to suspend the norms of a dyslexia support workshop. The learning space "changed from being merely exclusionary, to one which was still segregated yet also disruptive and transgressive" (Barden, 2016, p.231). In conceiving heterotopic affinity space, Barden realised heterotopia could not alone "adequately account for the shared learning endeavour", while affinity space alone could not "adequately account for the otherness of the space" (Barden, 2016, p.222).

The Foundry

Prior to this study, I led a project which developed a new informal campus space. Designing the Foundry was an affecting and powerful journey that changed how I considered institutional spaces. The innovative aspect of the project was that it harnessed Barden's heterotopic affinity space (2016) to invert institutional norms and foster improved learner agency. The UWE-funded first phase and the Institute of Coding funded second phase builds pre-date this study but are important to its context. While the intention and specifics of the space are expanded upon in the next chapter, I provide a short summary here to assist readers unfamiliar with disruptive learning spaces.

Building 20 (B20) was a famously disruptive R&D space and "temporary structure" constructed during WWII to house nuclear, aerospace, plastics, acoustics and electronics research at the Massachusetts Institute of Technology (MIT) campus (Campbell, 2017). It gave the world BOSE speakers, the atomic clock, and even the hacker movement, producing nine Nobel Prize winners throughout its 55-year existence. Alumni include Seymour Papert (who studied under Piaget, and whose theory of constructionism features in my epistemology) and Noam Chomsky - who famously disputed behaviouralist psychology in lieu of cognitive science, researching the language of children through play and the role of political disruption in scientific life (Joseph, 2002; Radick 2016; Stager, 2013).

B20 was important to the Foundry, because its alumni gave testimony to how the space affected their behaviour and gave them the agency to modify[2] and disrupt it (Peterson, 2011). B20 was loved because incumbents felt the agency to knock down walls, punch out ceilings and configure the space without fear of reprisal, and little of the regulation of other MIT lab spaces (Beam, 1996). B20 can be seen as physical heterotopic affinity space; its construction contravened building regulations, it appeared at odds to the campus around it, and it was a space where students and researchers interacted as equals (Ibid, 2006; Campbell, 2017; King & Reed, 2020).

Fig.2 The former Student Union Bar before the phase one Foundry pilot.

[2] Anecdotes from "Building 20 denizens" includes tales of risky experiments, how holes in the roof were blown, and how vials of chemicals "disappeared" only to appear in other experiments elsewhere.

The Foundry interprets heterotopic space as such that can "simultaneously and paradoxically affirm and distort our sense of reality", where "resistance, contestation, transgression and the disruption of dominant culture and power" (Barden, 2016, p.224) are implicit. Designs to realise this interpretation resulted in a physical space that improved agency, risk-taking and problem-solving, towards "intrapreneurial" tech graduates demanded by industry (Shadbolt, 2016; QAA, 2018; Reed & King, 2020).

The Foundry was built in the derelict footprint of the former student union, and its features were drawn from alumni descriptions of B20 (Beam, 1996; MIT, 1998; King & Reed, 2020). The space retained period features and would harness "design paradoxes" such as "open-but-closed"[3], and distressed surfaces revived by removing decades of grime to expose the fabric of the original building.

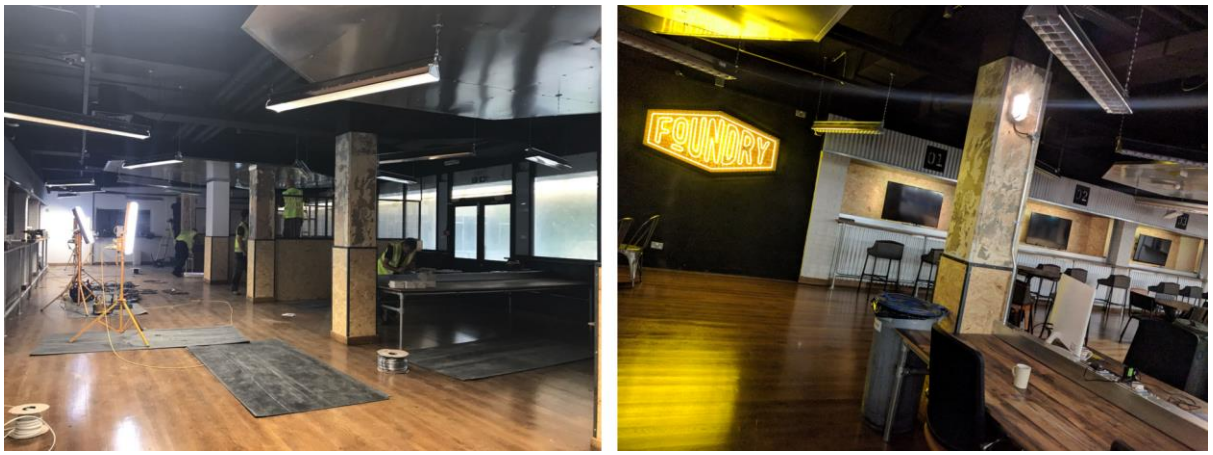


Fig.3 Distressed, exposed surfaces meet iron, furnace (neon) and stainless.

The Foundry pilot (phase one) was completed in 2018, establishing a space where students, staff and industry worked as equals. Projects were completed to a high standard and learners grasped technical challenges more readily than in traditional lab spaces (Reed & King, 2020; King & Reed, 2020). Realisation that learners engaged more readily in heterotopic affinity space highlighted the prospect that learner perceptions of formal education and academic regulation (FEAR) was constraining behaviour in standardised computing labs.

The pilot condoned notions that physical *otherness* of space (Barden, p.226) could be architecturally mediated on campus, and that effects of formal education and academic regulation could be mitigated by design. Funding for phase two was secured in partnership from the Institute of Coding; the Foundry becoming lead deliverable for the "Innovative Spaces" work-package.

[3] For example, there were not walls, but metal grates which made walls permeable.

Fig.4 Phase one in 2018, prior to Institute of Coding investment.

The £1.2M project added the remit of widening participation in coding and digital skills, complimenting the Foundry premise of addressing the agency, risk-taking and problem-solving skills of technology graduates. While phase one established a precedent of avoiding conventional institutional build process (and using academics, instead of architects with little pedagogic understanding), phase two would leverage those precedents to expand the space and diversify activity within it. We considered ways the space could impact learners directly through stimuli (e.g., ideation), context (atmosphere/interior), and workflow (semiotics/engagement) to increase the *affectiveness* of the space (Kultima & Alha, 2017).

The resulting phase two design added new work zones, murals, and artefact-based symbolism (Davis, 1984). The intentional *otherness* of the space was embellished to feel conducive and professional, yet playful, through further "design paradoxes". The Foundry was set further at contrast with the campus during phase two, where larger events (and their affinity spaces) would be hosted. The 2019 GGJ was the first event in this new expanded space (Reed & King, 2020).

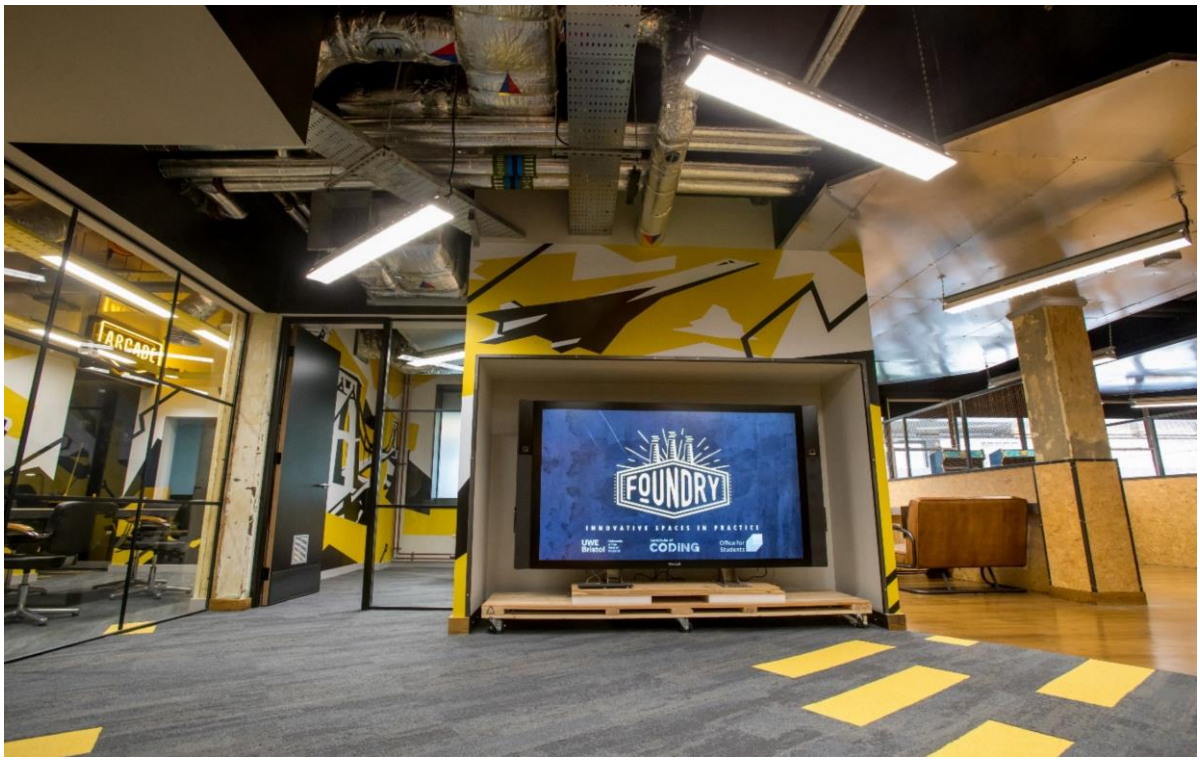


Fig.5 Phase two introduced more radical elements through additional design paradoxes.

The Foundry harnesses Barden's (2016) binding of Foucauldian heterotopia as a behavioural *otherness* with Gee's concept of affinity spaces of informal learning (2004). Conceptually, it leverages this concept through an experimental aesthetic and its design as a space of contrast. The Foundry explores the promise of physical heterotopic campus affinity space and is similar to the game design construct of *safe* but *dangerous* play (Crawford, 2003), where learners are exposed to the "dangers" of real world industry, but afforded the scaffolding to survive. This study centres on the informal learning present in game development that is magnified by game jams (Gee & Hayes, 2012; Jackson, 2016; Meriläinen et al., 2020) and the accentuated disruption that occurred when they are hosted in the Foundry.

1.2 Study Justification

The notion that physical heterotopic affinity space should be further investigated as an educational environment emerged from during the 2018 Foundry GGJ event where I had been surprised by jammer interactions. It was by far the most behaviourally complex jam I had witnessed and - having organised nearly seventy jams at the time of writing - it appeared that the behaviour of individuals and groups was often unrelated to project goals and such that it might have been prevented by staff in more formal campus spaces. This unexpected off-topic behaviour, combined with jammer preference for

the Foundry over traditional spaces, and the more complete[4] and highly regarded games that emanated from it lead me to need to understand whether jams and jammers were being positively affected by heterotopic affinity space.

The prospect that increased disruption did not hinder overall jammer attainment was a catalyst for this study. For the upcoming 2019 GGJ, I wanted to understand the specifics of how jammers used the space, what disruptive behaviours emerging in the Foundry actually were, and how they affected overall engagement.

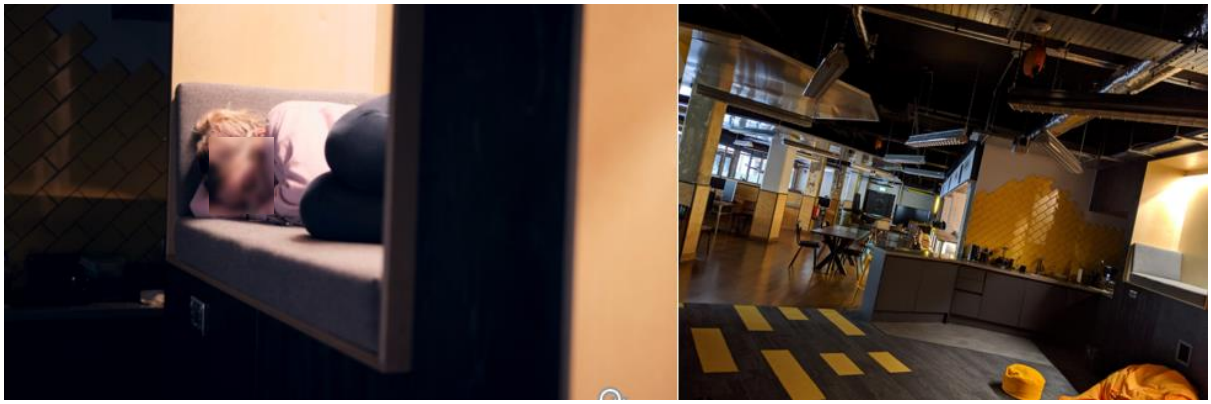


Fig.6 Left: A jammer rests during the event. Right: A view from the phase 2 kitchen post-event.

Opportunities

There have been calls for research to understand how affinity spaces might be leveraged by formal education (Barden, 2016; Bommarito, 2014; Gee & Hayes, 2012; Jackson, 2016) and the idea that campuses should become more like affinity spaces (Bommarito, 2014; Hayes & Duncan, 2012; Gee, 2018) or *connected* like affinity spaces (Beemt et al., 2016; McKenna, 2017). Jackson acknowledges the ways affinity spaces are developed and sustained remain "an important question" for "learning sciences, as the process of sustaining such sites requires considerable effort" in terms of "the site's focus, content, and positive social interactions" (2016, p35).

Despite research suggesting Gee's physical affinity spaces are as significant as online ones (Aljanahi, 2019; Gee, 2005), there is very little research into the real-world form. Only Barden, Bommarito and Jackson consider steps towards their inclusion as educational settings, and research beyond these studies almost exclusively tends towards treatment of affinity spaces as online spaces or communities, despite Gee's protestations to the contrary (Gee, 2005; Gee & Hayes, 2012; Gee, 2017).

As such, affinity space is overused as a pseudo-classification for online groups (Bommarito, 2014; Lammers et al., 2012, p.47), with affinity space researchers pursuing the virtual, not physical,

[4] Jammers present completed games at the end of the event. 2/3 games voted by the audience in 2018 and 2019 came from the Foundry, which housed 1/6 of jammers on campus. Games created are summarised in the appendix.

conception. Game development websites are frequently discussed in affinity space research, yet no study has looked at the effects of physical affinity space on engagement, or the impact of their different designs. No affinity space research embraces game jams, or flow, or the impact of off-topic behaviour beyond Barden's politically transgressive behaviour (2016).

Similarly, no game studies research considers how learning spaces might affect jam engagement. This is surprising, not only because the goal of educators is to curate optimal conditions for learning (Arya et al., 2013), but also because flow has primacy in game design (Chen, 2007; Basawapatna, Repenning, Koh & Nickerson, 2013), and only those who "have situated themselves in an optimal environment" can experience it (Chan & Ahern, 1999, p.152).

The digital artefacts and their processes of creation say much of the intention and potential of an affinity space (Barden, 2016; Jackson, 2016), while jammers are seldom heard in game studies as anything other than interpreted empirical responses. This study seeks to explore jammer experience of heterotopic affinity space, in search of occasions where content (or its generators) are subverted, manipulated, or become an otherwise significant and unexpected focus of attention.

Ultimately, it seeks to understand if heterotopic affinity space can function as an impactful on-campus learning space, through the medium of a weekend-long game jam –a microcosm of full-scale games development curriculum so research in this field might be further operationalised.

Significance

The study of affinity space is of significant interest to digital literacies and education researchers interested in game development (Harvey & Pence, 2021; Lammers, Curwood & Magnifico, 2012). The focus here on jam *engagement* through flow (Csikszentmihalyi, 1975b) in a physical setting also extends interest towards the field of positive psychology and learning spaces.

This research carries implications for the future of learning spaces, games development and student (learning) experience. The context is a backdrop of informal education freely accessible and increasingly available outside of formal institutions. It is significant as the first study to develop connectivity across affinity space, game jams and flow theory, with the potential to transpose their implications. It is also significant as it studies behaviours emerging from jamming in less formal space.

Considering jammers as learners, game development as learning (Meriläinen et al., 2020), and affinity space as conducive settings for that learning (Harvey & Pence, 2021; Jackson, 2016), this thesis addresses its research aims, and generates new understanding of the agency and engagement of heterotopic affinity space. Its broadest implication is its simplest; that "bad" behaviour in disruptive spaces may not be bad at all, and should be reconceived.

Original Contribution

Two significant original contributions of this thesis are developed. Firstly, a conceptual lens to interrogate behaviour emerging within heterotopic affinity space which locates flow. Secondly, a model that situates on-and-off-topic behaviour within a model for affinity space engagement. The first is the conception of previously unseen "emergent behaviours" as moments of lateral, off-topic activity accentuated by heterotopia. Lateral moments are triangulated across coding, observation, and jammer responses as distracted individual and group activity symptomatic-of and in-proximity-to flow and/or deliberative group activity. Lateral moments are a conceptual tool developed to query specific events during game jams in heterotopic affinity space. They appear to be important events, occupying periods both pre-and-post flow, which in less-heterotopic space might otherwise be filled with boredom or anxiety (Nakamura & Csikszentmihalyi, 2014).

Lateral moments not only portray a re-interpretation of off-topic activity, but also the manner in which jammers avoid negative emotions such as boredom or anxiety (Abuhamdeh, 2020) by accessing "other spaces" less-condoned in formal settings. Lateral moments appear at first glance to be non-productive individual and group distractions of various forms but are symptomatic of increased engagement and the manifestation of a meaningful lateral step to a moment of *otherness* which exists between on-topic individual and group work. Lateral moments are further corroborated by the second major outcome of this thesis, a recursive "phases of heterotopic affinity space engagement" (PHASE) model which positions the *connectedness* of on-topic affinity-space activity, aside the *otherness* of off-topic heterotopic activity (defined as lateral moments). Inspired by Bommarito's situated model of affinity spaces (2014), it is also a significant departure from it. Instead of a tool for classifying affinity spaces, it instead situates phases of behaviour *within* affinity space.

Bommarito was concerned by staid interpretations of affinity space, and sought to "dislodge such spaces from their moorings" and begin "widening the scope of the inquiry" (2014, p.411). The PHASE model is compatible with this thinking, positing lateral moments as Foucauldian mirror-states (Foucault, 1998) and off-topic reflections of on-topic activity where behaviour considered unconducive in formal settings can be seen as productive. Compatible with affinity space and heterotopic affinity space, PHASE reveals lateral moments manifest when on-topic states deteriorate avoiding negative post-flow emotions in more-heterotopic spaces[5]. The PHASE model is not a prescriptive cycle but a means of considering flow and the shifting states and accentuated behaviours of game jams in heterotopic affinity space.

[5] Heterotopias are not absolute, spaces are only more or less heterotopic (Barden, 2016; Foucault, 1998).

1.3 Aims & Objectives

Observing the jammers during the 2018 Foundry GGJ inspired this research and provided key motivations for this study. I sought to explore gaps in knowledge around game jams as learning affinity spaces, campus-based heterotopic affinity spaces, as well as the effects of heterotopic affinity space on participant behaviour and engagement. It is concerned with learners, learning process, and learning setting.

The *aims* of this study were to:

1. Understand more about disruptive behaviour manifesting during Foundry jams.
2. Explore if prevailing disruptions/distractions during Foundry jams could be classified.
3. Investigate how emerging individual and group behaviours might influence engagement.

My first aim addresses the thought that became my rational for this study; "just what is this seemingly un-conducive Foundry jam behaviour that is less evident elsewhere?" (perhaps considered "bad behaviour" in more formal spaces). My second aim looks to examine the specifics of behaviour arising, and to consider the classification or delineation of behaviour as a basis for analysis. My third aim is to consider the effect this behaviour has on participants in terms of optimal experience known as "flow" (Csikszentmihalyi, 1975b; 1997).

These aims speak to a need for more research to understand the pedagogic utility of campus affinity spaces. The context for these aims is developed in the next section, but I infer here a concern that traditional computing labs and even flexible technology-enhanced active learning (TEAL) spaces (Dori & Belcher, 2005) are poorly suited to prepare students for 21st century digital careers, and that institutionalised spaces may not foster the same agency and engagement during game jams – with the latter increasingly recognised for their educational potential (Grace, 2016; Jackson, 2016; Meriläinen, Aurava, Kultima & Stenros, 2020).

Further development of these aims resulted in the following final research questions:

1. How do jammers engage with physical heterotopic affinity space?
2. What behaviours emerge while jamming in heterotopic affinity space?
3. How does "flow" present for jammers in heterotopic affinity space?

1.4 Researcher Positionality

Life experiences and education influence the way a people view their world, and the same applies to academic research. Positionality provides a space to critically reflect and interrogate motivations, assumptions, and decisions, especially as to why certain perspectives or experiences are examined, while others are ignored (Holmes, 2020). I elaborate here on my professional practice to provide the reader a lens through which my epistemological position (and this research) can be better understood (Williams, 2014).

I joined UWE Bristol as an academic in 2006 to commence development of their games technology course, having worked as a game designer prior to this time. After four years of programme leadership, and six years managing the creative technologies cluster, I re-focused on research, and by 2016 was an Associate Professor with a number of completed "serious games" (Abt, 1970) research projects. I remain an active member of the Games Technology BSc and MSc award teams and continue to lead commercial game development modules; where individuals, groups and entire cohorts work together on commercial projects. To date, I have organised and attended nearly seventy game jams and completed over twenty serious games[6], including a game for ClairCity.eu which engaged thousands of citizens across six countries – the largest EU project of its kind (Sardo & Fogg-Rogers, 2020).

This study proved to be a significant exploration of my professional identity, leading me to acknowledge how much games and their development practices have implicitly and explicitly shaped the pedagogic positions I hold and my professional practice as a game developer. I began my academic career versed in the mechanics of videogame engagement; however, seventeen years later, the virtual and physical mechanics of learning engagement in games and spaces are my primary focus. Previous work to develop the Foundry is my identity of game-designer-turned-academic brought to bear. My construction of games has also become the constructionism of learning games and spaces. This position inspires my research design and my analytical approach, resulting in outcomes which isolate emerging behaviours of interest so their social-spatial (interactional) impacts may be understood (Tudge & Winterhoff, 1993).

Deweyan constructivism (of which constructionism derives) frames learning as a product of playful experimentation and authentic enquiry (Halverson & Sheridan, 2014). Game development is Papertian (Sheridan et al., 2014), as it exhibits both construction and play (Hasse, 2001). Constructionism provides a strong foundation for problem-solving and fabrication when seen as "learning by constructing knowledge through the act of making something shareable" (Martinez & Stager, 2013,

[6] Serious games are digital games that have additional goals beyond entertainment. If normal games have a mission of entertainment, serious games also have "intended effects" such as education or social change (Caserman et al., 2020)

p.21), where acts of dissemination are a recognised source of participant reflection (Shin et al., 2012). To understand what was previously explained as simply “learning by doing” (Arrow, 1962; Guevara-Villalobos, 2011) computer programming is a pure form of constructionist learning (Papert, 1991), which like the process of game development, offers heightened emotional engagement to that of traditional instructional methods (Csikszentmihalyi, 1975a, 1975b; Kiili, 2005).

Once considered an educational niche, constructivist approaches are now widely endorsed and commonplace due to major advances in the affordability, availability, and accessibility of technology (Jackson, 2016; Papert, 1993; Reiber, 2003). Tinker and Thornton (1992) consider constructivist learning environments those where learning occurs through active engagement and scaffolding, where encouragement and the resources to construct new knowledge exist. Constructivism, while not removing the role of the educator entirely, considers learner interactions “in a domain and the relationship of this interaction [as] with the person’s prior knowledge” (Reiber, 2003, p.583).

Freire’s concern of the banking model of education, where “A instructs B” via transmission, is increasingly replaced by constructivist approaches, and spaces where students and instructors develop knowledge together (Reiber, 2003). Constructivism provides structure for learning that is indirect, where knowledge is constructed from experience, and learners are central to the process (Petri et al., 2015). At its core lies the notion meaningful learning is creative (Daskolia & Kynigos, 2012).

Papert’s constructionism derives from Piaget's constructivism; an evolutionary concept “more interested in constructing personal experience than about acquiring information” (Petri et al., 2015), where ideas are transformed by new media then decompressed by learner-minds through self-directed engagement (Neo & Neo, 2009; Papert, 1993). Constructionism aligns with acts of making something shareable (aligning both game jams and affinity space) where “communication about their work, the process of learning itself with peers, teachers, and collaborators, is an indispensable part of a student's learning” (Petri et al., 2015, p.2).

Papert, himself an MIT and B20 alumni, is credited with creating the first software to engage learners with coding. LOGO was developed in the 1960s, long before his more spatially-mediated work on “makerspace” (from which hackathons and game jams of this study are descendants). LOGO had a “low threshold and no ceiling” (Papert, 1993) and was accessible to novices and children, but also capable of complex operations by the more experienced. Papert was one of the first to advocate “software enhanced learning” which “provide[d] contexts for dialogue and interaction within the classroom, the schools, and the community leading to the social construction of knowledge” (Petri et al., 2015, p.2) aligning with the project-based learning of game jam affinity spaces (Jackson, 2016).

1.5 Dissertation Structure

The thesis map below separates this study into four section-themes. See also the interactive research design model in Chapter 5 for more detail and how I utilised Maxwell's interactive research design.

Fig.7 Thesis map of chapters by themes and research phase.

1.6 Key Terminology

Here I summarise terms discussed or expanded on in this thesis. For flow, affinity space and heterotopia, see my literature review and theoretical framework for more detail.

Emergent Behaviour

The focus of this study is on observing what is different about jammer behaviour in the Foundry heterotopic affinity space. Through observation and interview, the term emergent behaviour denotes unusual, seemingly unruly or distracting activity that appears unique or accentuated by the space I sought to explore. Emergent behaviour is a generalisation which pre-dates the notion of "lateral moments" later defined by my analysis.

Agency & Intrapreneurship

Agency from a standpoint of learning behaviours might be considered akin to videogame agency. How much of what the player/learner desires to do is condoned by the game/setting as an activity? Learners are constrained by formal settings, while less-institutionalised spaces foster reflexivity, identity, resilience, and improved agency (Choi, 2014). Meanwhile, graduate agency exists at an intersection of government policy and industrial strategy. The Foundry is an attempt to develop industry-ready graduates with flexible attitudes to learning, self-regulation and self-improvement (Bradbury, 2019). But agency is not used to describe these skills themselves.

The graduate enterprise and employability skills with which the Foundry aligns, are known as *intra*preneurship, and their definition makes industrial expectations of our graduates explicit. "Intrapreneurship is the application of enterprising behaviour[s], attributes and skills" (QAA, 2018, p.8) within corporate and public-sector organisations, that creates value for the individual and the organisation (p.12) that should be incorporated in the student learning journey (p.18).

FEAR-less & FEAR-full spaces

Formal education (and) academic regulation (FEAR) is a phrase defined during the Foundry Project predating this study. It supposes learner-agency is limited by prevailing *conditions* in and *of* an educational space. The more readily a space is perceived by learners as "institutional" (e.g., standardised fittings, controls, and lighting) and "regulated" (e.g., formal signage with rules and policies), the less likelihood the space is agentive. The intention of the Foundry as a physical heterotopic affinity space was to create a FEAR-less space, and an environment which condoned and elevated project agency and engagement.

Connectedness (Affinity Space)

In game studies when there is discussion of video game engagement, the phrase connectedness is often used to speak to the psychological relationship between players and game software (Przybylski et al., 2010). It is also a phrase used in jam research for the sense of connected community between jammers and staff or site organisers (Arya et al., 2013) or the *connectedness* with the wider gaming community (Preston et al., 2012). While these definitions are true, and to some extent apply to this study, here I intend its simplest form; the *connectedness* that individuals experience in an affinity space (Honeychurch & Patrick, 2018), their connection to artefacts during acts of construction (Ackermann, 2004) and how people become connected through affinity with others in virtual and physical spaces (Gee, 2017).

Otherness (Heterotopia)

A central theme of this thesis and also the previous Foundry project, was the work of Owen Barden to blend heterotopic *otherness* with Gee's *connectedness* of affinity space:

"*To call a space a heterotopia is to describe the overall otherness of that space, rather than to offer a detailed description of what goes on there*."

(Barden, 2016, p.226)

Foucault believed heterotopias all contain some form of deviance (Foucault, 1998), and that fear drove people to build heterotopias "in order to both protect and to be protected from things" (Pitsikali & Parnell, 2019, p.2). Barden talks of heterotopias as spaces of transgressive or political behaviour (2016, p.213), where the term literally translates to "other spaces", within which behaviour contests prevailing social norms (Pitsikali & Parnell, 2019; Foucault, 1998). *Otherness* for this study means the *otherness* of space and behaviour arising.

CHAPTER 2: Research Context

"If game sites, which are artificial constructs, can be affinity spaces, it does not seem unreasonable to describe a purposively constructed educational site as a heterotopic affinity space".

(Barden, 2016, p.234)

The intention of this chapter is to introduce the reader to a rich seam of prior work that resulted in the Foundry. It also establishes this research context in terms of its strategic behavioural, spatial, and pedagogic backgrounds respectively, as well as the challenges faced during the project and why Foundry jams became a focus of this study.

2.1 Behavioural Rationale

The creative industry within which the games industry resides is the UK's fastest growing economic sector, and one responsible for a hundred billion pounds of revenue annually (more than the UK automotive, aerospace, oil and gas industries combined). UK creative industries also provide more than two million jobs, seven hundred thousand more than financial services (Julian & Lydford, 2018).

Concerns prevail that education is not readying graduates for industry, set to a backdrop of declining student numbers, and a general perception that education is not adapting quickly enough to rapid technological change (EDGE, 2018). In computing subjects there has been criticism that graduates from technology subjects lack the requisite "soft skills" to succeed in the real world (Davenport, Hourizi, Hayes & Crick, 2019; Shadbolt, 2016; Witty, 2013) and calls more widely for universities to address a widening "digital skills gap" (Bazzlegette, 2017; Shadbolt, 2016). For games technology, the often-purported talent shortage is exacerbated by a significant lack of placements, due to overwhelming demand and lack of supply. The courses on which I teach faced similar challenges, despite being industry accredited and award-winning degree programmes (TIGA, 2017, 2020).

Graduate employability is an established strategic goal for the marketised, performance-driven higher education sector, and it is common to see institutions promoting graduates with the knowledge, skills, and capabilities to succeed in the 21st century world of work (Butcher et al. 2011; UWE, 2020). Yet technology graduates remain some of the most under-prepared for the volatile, unpredictable, complex and ambiguous world or work (Kornelsen, 2019), with degrees perceived by industry as doing little to develop graduate skills and identity beyond key technical competencies (Holmes, 2001; Hinchliffe & Jolly, 2010).

While educators should be mindful of the influence of governmental agendas in their practice, sometimes even ardently-politicised objectives can provide opportunities for progressive education (Jackson, 2016). It was through enterprise, graduate employability and digital skills agendas of the UK government that the Foundry came to exist.

For several years prior to creating the Foundry I had been working to bring paid, real-world opportunities into games curriculum, founding a "serious games" (Abt, 1970) studio I named PlayWest. The studio in terms of students engaged and financial income was a success, securing over £400k of project work in just two years, spawning a further six studios in other technology areas, becoming known as the Enterprise Studio Network (Reed & King, 2020).

As more enterprise studios developed, I recognised certain symptoms of engagement across them all, leading to the realisation we needed a new setting for paid external work:

1. Projects held in timetabled labs and classrooms relied more heavily on academic intervention.
2. Work in such spaces resulted in less productivity and students would be likely to "plod not play"[7], especially compared to projects situated on industry premises.
3. Game projects had less "oil" and "juice[8]" resulting in somewhat-less polished builds.
4. There was little in the way of student-student collaboration across projects unless mediated.

(King & Reed, 2020)

Games technology students had ample access to computer software and hardware, but only through legacy computer science lab-spaces. Manifest rows of identical computers, with layouts optimised for capacity not flexibility, with little to scaffold learner agency and identity. Traditional spaces are constrained in their development by institutional process, with their rigidity compounded by the scale of our modular provision, often despite the best efforts of managers (Nelson, 2020). The *formality* of these *educational* spaces and their perceived *academic regulation* became the key consideration of the Foundry project (FEAR-less space).

Standardised computing labs do not get the best from our students, nor give them authentic industry experience. Students in traditional labs were unknowingly restrained by internalised authority, which blunted the agency required by industrial opportunities. Where students undertook work in computing labs there was only muted enthusiasm, but when activity moved to industrial settings, increased agency and professionalism manifested.

[7] "Plod not play" is a design term meaning over reliance on saving, or players avoiding risk (Crawford, 2003).
[8] Colloquial design terms: Oil refers to the overall "slickness" of game states. Juice refers to layers of audio-visual polish make games appear and feel greater than the sum of their parts.

There was also little ownership of products developed, where in the worst cases, students were ambivalent to the expectations of stakeholders, placing academics betwixt students and industry in a manner contrary to the intentions of those projects, or in either of the other parties' interests (Reed & King, 2020). While students entirely *phoning it in* was rare, early projects and commercial game jams in labs were often seen as doing *pretend* work for industry (King & Reed, 2020), or simply as extracurricular coursework, even though projects were paid opportunities.

The most regimented computing labs rendered students with the least ownership and most ambivalence to their work. Learners would fail to ask for help if they hit technical problems, even if reminded to do so, and even talented students could fail to see the point of work beyond the minimum required. Engagement in our TEAL spaces (technology enhanced active learning) was better (Dori & Belcher, 2005) and showed some improvement in ownership and engagement compared to labs of 30-40 computers. This marginal difference galvanised the Foundry approach as a space which scaffolded enterprise skills. It posited that the scale and quality of student engagement with industry was based not on technology availability, but of the environment in which it was undertaken and for creative technology students, their institutionalised learning spaces were generic and ambivalent to the expectations of industry.

The Foundry was not a call for open access learning space. It was recognition that while we apply rigorous standards to our curricula, we rarely stipulate such detail in the conception of learning environments. Foundry posited a space which mirrored credit level descriptors that learning should be "complex and unpredictable", "within specialised contexts" and a setting where students can "act with initiative in decision-making" and "accepting full accountability for outcomes" (SEEC, 2016, p.12). It proposed a technology project and event space where learners would co-develop knowledge, agency and graduate identity through meaningful acts of construction (Daskolia & Kynigos, 2012; King & Reed, 2020).

Success in creative technology requires what is colloquially referred to as *soft skills* in collaboration, communication, negotiation, reflection and resilience. These are especially relevant to the games industry, where pressurised software development circumstances known as "crunch" are well documented (Edholm & Lidstrom, 2016; Cote & Harris, 2021). Risk-taking and problem-solving within organisations has recently become known as intrapreneurship (QAA, 2018). Intrapreneurs are in effect entrepreneurs without their own business, but with the same drive and enthusiasm to develop new concepts, ideas and practices (Alam et al., 2020; QAA, 2018; Neessen et al., 2019). Digital Intrapreneurs are inspiring individuals who can tackle difficult strategic or technical problems (QAA, 2018) who develop when given the space and autonomy to experiment and risk-take without fear of

reprisal (Deloitte, 2015; QAA, 2018). The notion of digital intrapreneurship was a key strand of the Foundry business case, because it satisfied institutional, industrial and strategic skills agendas.

The Foundry today is a space for technology innovation through projects and events under the guise of digital intrapreneurship. It is an environment where learner agency, risk-taking and problem solving is fostered through it being heterotopic affinity space; where institutional norms are suspended. The Foundry provides an on-going, off-grid space where staff, students and stakeholders work as equals in pursuit of common goals and creative success (Gee, 2005; Reed & King, 2020).

Games technology students benefit notably from the Foundry[9], with interns talking positively of its benefits in terms of industry projects and events (Reed & King, 2020). The Foundry appears prominently in UWE Bristol's strategic vision for 2030 (UWE, 2020), helping an increasing number and diversity of learners (Reed & King, 2020) to defeat the graduate paradox[10].

2.2 Spatial Rationale

In response to the marketisation of higher education, tuition fees and increased competition, many institutions have commenced major campus re-development programmes to make them more attractive places to learn and work (Nelson, 2020). Improvements commonly headline as "improving the student experience", but such spaces rarely address graduate needs in terms of agency and identity (Hinchliffe & Jolly, 2010).

Researchers have long-discussed the connection between active engagement and learning (Prince, 2004), finding it the "glue" that bonds positive student experience together (Kuh, Kinzie, Schuh, Whitt & Assoc., 2010). Education pursues the promise of progressive learning spaces that will improve engagement and attainment (Barrett et. al., 2015; Marone, 2015; Rieber, 1996; Rands & Gansemer-Topf, 2017; Rigby & Przybylski, 2009; Stager, 2013, Sutherland & Fischer, 2014), yet many institutions continue to deploy labs, seminar rooms and lecture theatres in modern, but ultimately corporate veins that do little to inspire. Similarly, the design intentions of "shared" campus spaces, such as informal learning zones can be misunderstood and even contested by different groups (Shortt et al., 2020) due to their lack of explicit (or implicit) purpose.

There is an emerging body of work exploring characteristics of classroom design that promotes increased attainment (Barrett et al., 2015; *Heschong Mahone* group; 1999, 2003), but it is far from addressing the need for learning spaces which enhance constructivist approaches (Alesandrini & Larson, 2009; Ben-Ari, 1998; Brown 2006; Laurillard et al., 2013; Petri et al., 2015; Jones & Brader-

[9] 26 Foundry alumni are now working for the UK's largest game studio, while its serious games studio PlayWest achieved a TiGA award for best educational initiative in 2020.
[10] Refers to where entry level graduate jobs are not accessible without prior paid industry experience.

Araje, 2002; Halverson & Sheridan, 2014; Rieber, 1996; Sutherland & Fischer, 2014; Swan, 2005; Waldron, 2009; Herrington, 2000).

There is little overlap between architects involved in the design of university spaces and pedagogic researchers. A sentiment persists that architects do not care what people think or feel about the use of their buildings post-occupation (Nelson, 2020)[11]. Others say architects do not want to look back to see how their creations are used as it is too painful, especially where buildings are not used as intended (Brand, 2012). But this lack of reflection stimies the progression of sites so important to human activity and wellbeing (Watson, 2020).

King (2016) outlines increasing demand for new learning spaces in higher education, and how such demand coincides with emerging research on the design of spaces to enhance collaborative learning; citing the research of Souter et. al. (2011), Fox and Lam (2012), Rafferty (2012) and Sundberg (2013) as leading-edge examples. Barrett et al. (2015) and Derval (2010) claim demand for "sensory-sensitive" spaces has been overlooked while Lynne et. al (2012) stresses a need for pedagogically informed designs as "a blend of physical, online and mobile spaces" (King, 2016, p.160).

The Foundry design-intention was to enhance collaboration, foster intrapreneurship and scaffold professional identities. Seeking a FEAR-less design where institutional norms were less prevalent and students could explore knowledge, practice and their attitudes to work (Reed & King, 2020). Success meant disrupting long-established institutional process because the Foundry did not fit the pre-set of "meeting room, computer lab, TEAL space or lecture theatre" on the forms provided by the estates department, with little opportunity to detail the pedagogic requirements of the space beyond types of desks and audio-visual equipment.

The Foundry posited a home for technology projects that would enhance the digital intrapreneurship of learners (QAA, 2018; Reed & King, 2020). Affinity space would lend completed artefacts "real purpose in the world, as opposed to projects that are developed to demonstrate knowledge to the teacher" while "creativity, collaboration, communication and critical-thinking" were scaffolded (Jackson, 2016, p.10). The controversial aspect of the Foundry concept was its suspension or reduction of institutional norms through *otherness* of that of standardised classroom settings (Barden, 2016; Foucault, 1998). The notion of design-paradoxes was introduced to build-in heterotopic effect.

The first entry in the appendix features an 8-page report detailing the design and build of the Foundry and its major features from conception to completion and its opening by the Universities Minister.

[11] The Architects Journal found post-occupancy evaluation was "always" done by just 4 % of architects, and "frequently" by only 22%.

2.3 Pedagogic Rationale

Seymour Papert's constructionism (Harel & Papert, 1991) features significantly in my epistemological position. Papert (who studied under Piaget) saw how problems could be more effectively solved through play and construction, developing the LOGO programming language and the turtle-shaped robots that children of the 1970's and 1980's may remember years before mainstream democratised coding approaches. It was profound to discover Papert was himself a B20 resident, and that the space had influenced his theories of constructionism, makerspace and microworlds (Papert, 1980; Halverson & Sheridan, 2014).

If Papert's constructionism and B20 were the catalysts of the Foundry design, so was Barden's hybrid concept of "heterotopic affinity space" and his setting of "a physical classroom in a Sixth Form College" and a virtual "group Facebook page" (2016, p.223). The Foundry would take this a step further through heavily customised virtual and physical environments in order to further distance itself from the institutional and societal norms and spaces beyond it. The Foundry exists at the far end of a continuum of progressive learning spaces, having not fallen foul of "cookie-cutter" informal spaces colloquially dubbed "Starbucks classrooms" (Delzer, 2015 Cymerman, 2016). The following section expands the Foundry's pedagogic context.

Freire's Pedagogy of the Oppressed

Freire's opposing theories of cultural action align strongly with the Foundry's conception of "FEAR-full" versus "FEAR-less" spaces. His work on "antidialogics vs dialogics" where "the former is an instrument of oppression and the latter as an instrument of liberation" and his characterisation of an educational battle between "conquest, divide and rule, manipulation and cultural invasion" vs "cooperation, unity, organisation and cultural synthesis" (Freire, 1993, p.68) provoking the striking kind of difference heterotopic affinity space might seek to condone.

Freire believed authentic education should not be "A" teaching "B" hierarchically, but "A" learning with "B" (1970, p.93), because a "liberating education consists of acts of cognition, not transferrals of information" (ibid, p.79). He also believed the more knowledge transmission learners experienced, the less they would develop the critical consciousness to make them "world transformers" (ibid, p.73), arguing that problem-posing education was the future, not prevailing systems of learning as one-way transactions. Importantly, he believed learning was mediated by the space in which it occurred, and that settings should reflect "a world which impresses and challenges both parties (learner and instructor), giving rise to views or opinions about it." (Ibid, p.93).

Barden's heterotopic affinity space holds true to Freire's thinking on progressive education because it offers learning where "people teach each other, mediated by the world", not where learners are "cognisable objects" to be "owned by the teacher". Heterotopia further disrupts such power imbalance, rendering "arguments based on 'authority'" invalid, where Foundry learners experience *connectedness* in shared pursuit, "responsible for a process in which all grow" (Barden, 2016, p.80).

Freire felt education had been reduced to banking transactions. Students were vaults and teachers made deposits, while students waited obediently to receive and memorise before a new deposit commenced (Freire, 1970, p.72). 21st century learning may be somewhat removed from this extreme, but such practices are still commonplace in computer science, so it remains important to consider where the power in a classroom resides, be it with the teacher or influenced by the fabric of the space.

Affinity Space as FEAR-less Space

Formal education and academic regulation (FEAR) is a phrase I developed during the Foundry project to give a name to the long shadow of decades, if not centuries, of institutionalised spatial practice and the perceived or implied constraints on learners. FEAR stifles learning agency in ways that Freinet, Freire, Foucault, and more recently Gee, have been opposed. Many campus spaces can be seen as FEAR-full spaces, running contrary to notions that new institutional designs improve student experience, while contemporary architectural practice continues to minimise the "messy inconvenience" of human interaction (Watson, 2020).

Affinity space provides opportunities for academics and institutions to connect high-quality informal learning material that exists beyond the reach of formal education (Beemt et al., 2011; Gee, 2018). Informal learning spaces should be of interest to all educators given the unassailable amount of time students connect with them outside of formal settings (Abrams & Lammers, 2017, Gee,2005, 2018; Gee & Hayes, 2012). Virtual and physical affinity spaces support the learning of "newbies and masters and everyone else" where there is a focus of "common endeavour" (Gee, 2004). Barden's heterotopic adaptation of affinity space presents a stimulating opportunity for affinity-led learning in more FEAR-less settings by design.

"In an affinity space, people sometimes lead, sometimes follow, sometimes mentor, sometimes get mentored, sometimes teach, sometimes learn, sometimes ask questions, sometimes answer them, sometimes encourage, and sometimes get encouraged. In nurturing spaces, even the highest experts view themselves as always having more to learn, as members of a common endeavour, and not in it only for themselves. They want others to become experts, too. There is, as some of our interviewees reported, a desire to give back to others in the space."

(Gee & Hayes, 2011, p.29)

Institutionalised space "orients students toward passivity and compliance with rigid rules", and "undercuts the potential effects of an instructional system that is designed to emphasize active learning, higher order thinking, and the social construction of knowledge" (Brophy, 2006, p.40). FEAR-full spaces risk "closed-system humans", where institutions and the wider world imply control over learners extrinsically "pushed around" by their physical or socially controlled surroundings (Jackson, 2016, p.12), and who are not free to explore n*ew* and unexpected "ways of doing" *(*Ackermann, 2001*).*

Education is entering a phase of evolution where it requires spaces that sit between the institutional formality of the past, and the informality of spaces beyond it, invoking real-world implications and blurring the "formal and informal" and the "public and private" (Shortt, 2015), where learners are free to explore, hack, disrupt and subvert norms without perceived FEAR. In progressive spaces such as these, the "teacher-of-the-students" and the "students-of-the-teacher" would cease to exist (Freire, 1993).

The purpose of affinity spaces often derives their identity, and they do not tend to restrict access at certain times or to certain people. This is a complex challenge for physical institutional affinity spaces, as resources cannot be given and continually re-allocated to informal practices unless they are able to demonstrate benefit (Jackson, 2016), especially when they do not fit within established academic business or are not generalisable.

Affinity space offers uncontested and informal "belongingness" in an environment given purpose by its activity (Bommarito, 2014; Pellicone & Ahn, 2014). There is debate that upon their deterioration (Gee & Hayes, 2012), the purpose of an affinity space may faulter, shift or evolve (Bommarito, 2014). This thesis comes to consider these shifts, less condoned in formal settings (Lammers et al., 2011, p.69) as accentuated by heterotopia.

Barden's heterotopic affinity space (2016) is an important central construct for this thesis, harnessing Foucault's concept of heterotopia (1967; 1998) combined with Gee's affinity space (2005). Crucially, achieving what Gee and Hayes (2012) fear cannot be done, and others hope might be possible

(Jackson, 2016) – that informal learning spaces beyond education, might be better connected or embedded within it (Beemt, Akkerman & Simons, 2011; Bommarito 2014).

Heterotopic spaces are sites of intensity, incompatible with the wider world, but they have a transformative effect on those within them (Barden, 2016; Foucault, 1998). It is through Barden's hybrid concept that Gee's affinity space can be viewed as the *connectedness* or shared purpose of a space, while Foucault's otherness fosters agency and disruption.

"in school, roles are not reciprocal. Teachers teach, mentor, and lead, while students learn, get mentored, and follow. Despite the occasional assertion that teachers are learners, rarely is it assumed that teachers will learn anything directly from their students, nor do students expect to teach their teachers or anyone else, for that matter."

(Gee & Hayes, 2012, p.29).

Progressive institutions are well-placed to offer real-world opportunities attractive to learners (Gee, 2005; Jackson, 2016), but Gee and Hayes (2012) recognise significant challenges remain in creating opportunities for informal learning within formal education. If learners act with more agency in affinity space, and even more agency and disruption in heterotopic affinity space, we need to begin to consider how some part of our new campuses might begin to condone, connect, or contain more informal learning.

Affinity space supports Freire's belief that education should be reciprocal and "world-mediated" not institutionally or hierarchically sanctioned. He felt people were "uncompleted beings", "conscious of their incompletion" and open to filling gaps in their knowledge (1993, p.163) through environments that are "active" moving "toward ever new possibilities of fuller and richer life individually and collectively." (1993, p.32).

There is recognition that practice has shifted to constructivism (Brophy, 1999; Dollard & Christensen, 1996; Garrett, 2008), but constructivism without reciprocal constructivist space risks "an oxymoron; a curriculum that urges problem solving and critical thinking, set in spaces derived from a management system that requires compliance and narrow obedience" (McCaslin & Good, 1992, p.12). Data is lacking on the effectiveness of new spatial configurations, leaving educators behind the curve "in creating and managing socially complex learning environments" (Martin, 2004, p.406), while others continue to promote standardised computing labs as innovative learning and teaching approaches (Bukhatwa 2014; Saadon et. al., 2011). When we omit the focus of what spaces should be about (Gee, 2005), we leave it open to conflict and "raised tensions" about "divisions of labour, identity and professionalism" (Shortt et al., 2020, p.39).

If the instructional goal for constructivism is to foster learning where knowledge is "co-constructed by the teacher and students rather than transmitted directly by the teacher" (Garrett, 2008), there is a need for institutional spaces which support informal knowledge construction (Brophy, 1999, p.49). Such dynamics prevail in affinity space, where shared leadership, passion, nurture, and reciprocal learning are familiar to participants, who at different times and in different ways pursue diverse arrays of shared interest (Gee & Hayes, 2012).

2.4 Game Jam Learning

"Game jams are energized, fast-paced get-togethers of developers and artists [coming together] to make digital games [which] have recently emerged as a way to generate and inspire novel game ideas and new ways of thinking." (Chatham et al., 2013). During game jams, an individual's work is repeatedly integrated into wider group projects, and those game projects are then presented after a deadline to complete them has passed. In this regard, game jams can be considered a modern equivalent of Freinet's students individually composing works on a printing press, before coming together for editing, group discussion and final presentation as a team effort (Legrand, 1993).

Jams have a profound effect on participants, where a high-uptake of industry-standard tools (Borg et al., 2019) and a learning "honeymoon of success" follows jammers back to the curriculum. In terms of personal development, 96% of GGJ attendees 2011-2012 believed their skills had improved significantly during the two-day event (Fowler et al., 2013a)[12]. Fowler et al. summarise game jams as providing a focused experience where participants learn important hard and soft skills (ibid, p.1). They also provide a list of characteristics common to most game jams I summarise below:

1. The goal is to develop small experimental games within a limited timeframe.
2. All games developed must share a common theme, previously unknown to participants.
3. Events are generally open to anyone who can contribute to the development of a game.
4. Team formation prior to the event is discouraged, and team size is usually less than five.
5. Jams encourage game-making for any device, and teams choose their own platforms.
6. Some locations have final presentations with prizes voted for by an audience or panel.

[12] Borg et al., found industry standard software like "Unity 3D" was used by 78% of jammers during the 2017 GGJ.

As a jam approaches deadline, jammers are often asked to upload a build of their game, highlighting the "constructing knowledge through the act of making something sharable" of constructionism (Martinez & Stager, 2013, p.21). Games being publicly available also increases jammer motivation to complete an entertaining game, recognised as a form of reflective learning (Shin et al., 2012). Recent work establishes jams as suitable for adoption in education as "broad-spectrum learning interventions", recognising them as a potential "paradigm for both formal and informal learning" (Boulton et al., 2016) where creativity and competence is heightened powerfully beyond what is available in classroom settings (Meriläinen et al., 2020).

Jams provide exciting, unconventional "demand-pull" learning conditions, proven to increase the performance of both skilled and un-skilled participants (Fowler et al., 2013b; Preston et al., 2012) in safe spaces where experimentation and exploration is condoned (Tetrault & Reaume, 2011). Jams are learning affinity spaces of shared interest rather than traditional curriculum approaches (Hagel et. al., 2012). There has been increasing interest in both affinity spaces and game jams for learning (Faas et al., 2019; Lammers et. al., 2012; Savva & Souleles, 2020).

In "Towards Affinity Spaces in Schools: Supporting Video Game-Design Partnerships as Twenty-First Century Learning", Renee Jackson (2016) explores the potential uptake of affinity spaces in mainstream education through the mechanism of co-curricular game jam events. The use of jam spaces should have primacy in the minds of progressive educators, especially given the history of "active learning" (Rands & Gansemer-Topf, 2017) and "pedagogies of engagement" (Edgerton, 1997, p.36) that align constructivism (and constructionism) of the open school movement. Pedagogues such as Piaget, Papert, Dewey, Freinet and Freire considered new tools and settings that facilitated interactions and helped learners make sense of the world and find their voice (Ackermann, 2004).

Gee (2012) explains what it is about videogames and, by extension, game development, that makes them powerful affinity spaces. In doing so, he comes close to defining a form of procedural, interactive pedagogy, where learning is derived not only from software's ability to respond to a player's input while playing (Crawford, 2003) but also by implication the learner's ability to respond to a game's requirements.

Gee provides 12 justifications for why games “teach” so well, which I summarise below:

1. Games focus on well-ordered problems, not facts and information
2. Games give players good tools with which to solve problems.
3. Games have clear goals, but encourage players to rethink their goals regularly.
4. Games lower the cost of failure, so players explore, experiment, take risks and try new styles of play and learning.
5. Games put performance before competence and experiences before words and tests. Player experiences give deep meaning to texts read later, that resource their play and learning.
6. Games give copious feedback and assess progress continually, ensuring players are well prepared for challenges on the levels ahead.
7. Games connect playing and learning to social interaction and mentoring via collaborative and competitive play, and interest-driven fan sites where players extend and articulate their knowledge, even producing new knowledge and designs.
8. Games ensure that players face new problems each level, challenging the routine mastery developed through practice on the last level (“the cycle of expertise”).
9. Games use narrative to create engagement through stories that make players purpose clear, and allow players to create their own stories through choices made in game.
10. Games hold everyone to the same high standard, but allow players to reach these standards in different ways and amounts of time.
11. Games offer “preparation for future learning.” and similar/harder games played later will show you what players have learned or how they do with problems in life.
12. Gamers must think like designers to understand how game “rule systems” work in order to achieve their goals. Players can go further and even “mod” the game & create new levels.

(Gee, 2012, p.236)

2.5 Previous Foundry Jams

Research has begun to recognise the setting of a jam is contingent to the learning opportunities within it (Auravaa et al., 2021; Meriläinen, 2019), but few jam settings are on par with the personally affective "affinity spaces" popularised by online game development communities (Gee, 2017) or physical game studio locations (Kultima & Alha, 2017). University computing labs remain the most popular GGJ locations due to 24-hour operation, specialised hardware and software tools, and the availability of fast internet (Fowler, Khosmood & Arya, 2013; Fowler, Khosmood, Arya & Lai, 2013; Wearn & Mcdonald, 2016).

The start of jams are often "boisterous explosions of creativity" (Jackson, 2016), which is why researchers have tended to focus on the "*what is our game idea*?!" period of conceptualisation at the start of every jam in great detail (Ibid, 2016; Ramadan & Widyani, 2013) or more often broad-spectrum post-event jammer surveys (Arya, Chastine, Preseton & Fowler, 2013; Borg, Garousi, Mahmoud, Olsson, Stalberg, 2019; Wearn & Mcdonald, 2016; Zook & Riedl, 2013). This study instead concerns jammer agency, behaviour and engagement, and the implications of game jams in heterotopic affinity space.

I consider myself familiar with game jam affinity spaces and their capacity for powerful informal learning through construction (Ackermann, 2004; Gee & Hayes, 2012; Jackson, 2016). But the primacy of the Foundry design had been focused on intrapreneurship through technology projects. The remit of technology events introduced during phase two, received less attention, with no specific design-consideration given to game jam events.

The 2018 GGJ (one year prior to this study) was the first jam held in the phase one Foundry. Nothing could have prepared me for the energy, enthusiasm and seemingly unrelated behaviours that emerged (and continued in subsequent jams in the months leading to my data collection)[13]. The surprising uplift in energy and disruption I witnessed did not ebb away after the initial stages, and neither did the occurrence of unrelated, sometimes unruly behaviour. It was this activity that became the focus of this thesis and my study of the 2019 GGJ. I wanted to understand what was different about jamming in FEAR-less space.

The 2018 jam does not form a formal part of my data collection, but its implications fuelled a growing curiosity to understand more about jammer behaviour, and what disruptive jam activity might mean for engagement, attainment, and the extent to which that heterotopia was the catalyst.

[13] In 2019, the Foundry hosted 678 learners in game jams and hackathon events, supported the creation of 167 student-led digital artefacts. In 2019, the Foundry was at one point the UK's largest GGJ sites, with over 200 participants (Reed & King, 2020).

CHAPTER 3: Literature Reviews

Here I explore the literature of Gee's affinity space, Foucault's heterotopia and Csikszentmihalyi's flow. Previously unconnected in research, this chapter identifies gaps, visualised as a gulf between these concepts from which a theoretical framework emerges. On one side, affinity spaces (Gee, 2005) and Foucault's heterotopia (1998) combine as Barden's heterotopic affinity space (2016). On the other, the optimal experience and positive engagement known as flow (Csikszentmihalyi**,** 1975b; Chen, 2007). Each side is prominent in game studies and educational research, and both are framed as progressive approaches (Fjællingsdal & Klöckner, 2017; Gee & Hayes, 2012; Marone, 2015).

But despite affinity space emerging from study of online game communities, and flow demarcating deep engagement in both games and learning (Chen, 2007), there is no literature on flow *and* physical affinity spaces. Flow and affinity space has recently coalesced in the design of online educational experiences (Savva & Souleles, 2020), but more work is required to connect such spaces and experiences to education (Auravaa et al., 2021; Beemt et al., 2011; Bommarito, 2014; Meriläinen et al., 2019). There is no research on jammer flow experiences, only passing mentions of flow as a jam design goal (Zook & Riedl, 2013) or productivity mechanism (Grace, 2016). Neither is there research on flow during game development, or any connection between it and affinity space in literature. Gee shunned communities of practice to focus on the semiotics of informal learning spaces, so now affinity space must consider learning engagement to highlight its benefits to mainstream education.

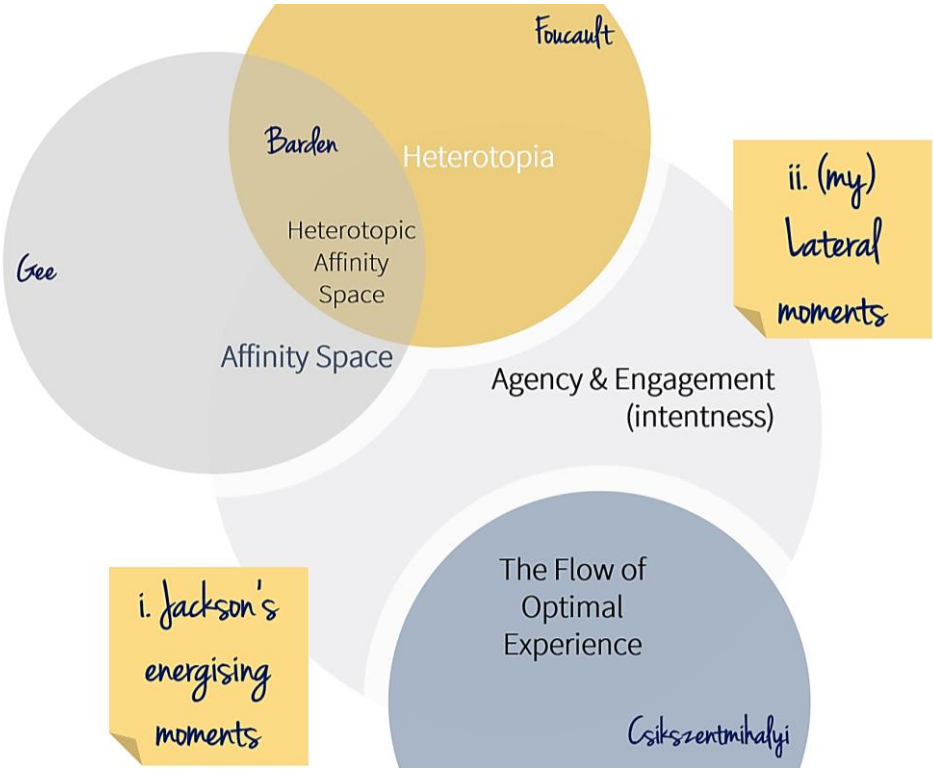


Fig.8 The gap between Gee, Barden, Foucault and Csikszentmihalyi demarcates my area of enquiry.

The diagram on the previous page visualises these yet un-bridged concepts. The diagram at the end of this chapter connects these constructs through the findings of this review and provides scaffolding for my theoretical framework. The post-it notes on the former (see Fig.19) refers firstly (i) to Jackson's "energising moments", as it was Jackson who first considered jams *as* affinity spaces for education[14]. The second note demarcating the site of my analysis (ii). I foreshadow it here to illustrate a continuum of "conducive to disruptive" moments from affinity-space to heterotopic affinity space as a site of exploration which runs along the gulf between these un-bridged constructs.

3.1 Affinity Space

Gee (2005), introduces affinity space as an important development for educators interested in levels of engagement less-witnessed in formal settings. Affinity spaces are "a different and arguably more powerful vision of learning, affiliation, and identity" where "learning becomes both a personal and unique trajectory through a complex space of opportunities and a social journey as one shares aspects of that trajectory with others" (Ibid, p.231). Affinity space is also where "newbies, masters and everyone else share(s) common space", there are "many different forms and routes to participation" and "lots of different routes to status" exist (Ibid, p.20).

The 21st century workplace is undergoing tremendous technological changes which will require workers to maintain constant skills-development and self-adaptation to stay competitive across multiple occupations (Barany & Foster, 2021; Binkley et al.,2012). Learning must become adaptive (Kaplan, Sinai, & Flum,2014) and lifelong (Foster, Shah, & Barany, 2017). This world of work is already closer to affinity space than formal education through "loosely organized social and cultural settings in which the work of teaching tends to be shared by many people, in many locations, who are connected by a shared interest or passion" (Gee, 2018, p.8). Videogames can foster and sustain especially nurturing affinity spaces that promote deep and active learning (Gee & Hayes, 2012; Gee,2018). Online videogame development spaces are significant as sites of transformational learning, identity exploration and development (Barany & Foster, 2021).

Affinity *spaces* require organisation and clear purpose because that purpose informs how participants interact. Opposing notions of "community", Gee believed it was the affordances of an environment of an activity that was key, and that varying degrees of participation should be supported and condoned as valuable activity. Affinity space was an attempt to escape from now diluted applications of Lave and Wenger's "communities of practice" (1991) across ever-widening contexts and social formations. Gee felt phrases like "group", "community" and "membership" had become eroded, and placed too

[14] But in her study learners did not make the games (although democratised "no-code" game design software exists), so her students cannot entirely be considered jammers, having not experienced flow from development.

much emphasis on people and hierarchy as opposed to their interactions and activities within space associated with that activity (Duncan, 2013; Hayes & Duncan, 2012).

Affinity spaces are collaborative learning spaces where people come together of their own volition to contribute, learn, and grow around a shared interest. Gee (2005) re-casts the idea of communities of practice in terms of affinity spaces, meaning to side-step limitations of Lave and Wenger's work (ibid, 1991; Wenger 1998). Communities of practice are based on notions of membership and transition, but Gee argues this places binary constraints on participation - you are either a member or non-member. He argues conceiving structures of apprenticeship creates unnecessary boundaries and linearity of progression. He replaces the priority of *community* with that of the *space* that hosts it where people engage of their own accord.

There is increasing interest in the potential of affinity spaces (Barany & Foster, 2021) reciprocal to the move to learning through construction - rather than dealing with complications of membership that may barricade dynamic learning. This may be why more research has been into the virtual form, as "online affinity spaces offer their participants the opportunity to participate pseudonymously, or even anonymously, a feature that makes "membership" difficult to establish and belonging a moot point" (Devane, 2012 p.183).

Calls continue for more research into developing affinity spaces for education (Bommarito, 2014; Ellcessor & Duncan, 2011; Gee & Hayes 2012, Jackson 2016). Connectivity between them offers potential to maintain the relevance of formal education because "young people today enter more and more affinity spaces during the course of their daily lives" and "what these young people see in school may pale by comparison" to the "non-school aspects" of their learning lives (Gee, 2005, p29).

Institutional learners confined by classrooms and pre-defined activities visit affinity spaces away from school (Gee, 2004; Marsh, 2021), yet despite the interest in "taming" them for mainstream education (Jackson, 2016) and attempts to make them more accessible (Bommarito, 2014), institutional affinity spaces remain rare (Gee & Hayes, 2012, p.30). Research into virtual affinity spaces like internet forums and social sites has been significant (Aljanahi, 2019, Curwood, 2013; Lewis, 2014) but only a small number of studies have applied affinity space to physical spaces[15], despite their receiving equal billing in Gee's original definition (2004).

[15] Barden, 2016; Jackson, 2016; Lammers & Van Alstyne, 2019; Marsh, 2021 are some of only a handful considering physical settings.

A. Principles of Affinity Space

Barden (2016) introduces Gee's theory seeking to make classrooms and learning spaces more characteristic of affinity spaces, listing Gee's features of affinity space (p.227) I summarise below:

1. Firstly, that spaces need *content* and context, or "something that the space is about".
2. Secondly, that the space should feature "generators" - mechanisms that provide content for the space (e.g. people, software, an event, even a twitter hashtag).
3. Thirdly, that affinity spaces require "portals", or something through which people can access content and explore (e.g the steel doors of the Foundry or online portals). Portals can be generators and vice-versa.

Gee provides more detail to what affinity spaces require in terms of learning features that lend themselves to wider adoption of affinity space. In "Situated Langueage and Learning; a Critique of Traditional Schooling" Gee (2004) introduces then expands on the concept. Hayes and Duncan (2012, p.8) feel his intent here was to develop the potential of his theory (and not to exhaustively list or require all such features) which is summarised below:

> 1. Common endeavour, not race, class, gender or disability is primary.
>
> 2. Newbies and masters and everyone else share common space.
>
> 3. Some portals are strong generators.
>
> 4. Content organisation is transformed by interactional organisation.
>
> 5. Both intensive and extensive knowledge are encouraged.
>
> 6. Both individual and distributed knowledge is encouraged.
>
> 7. Dispersed knowledge is encouraged.
>
> 8. Tacit knowledge is encourages and honoured.
>
> 9. There are many different forms anr routes to participation.
>
> 10. There are lots of different routes to status.
>
> 11. Leadership is porous and leaders are resources .
>
> (Gee, 2004, p.85)

Affinity spaces can be websites, game communities, virtual worlds, competitions, events and "bricks and mortar" physical spaces like the Foundry. Any space or website organised to structure social interactions of varying types and degrees of participation which coalesce around shared purpose, might be said to be affinity space[16]. As the theory matures, Gee and others have sought to avoid the problems of over-application (Bommarito, 2014) by refining new variants of affinity space.

B. Types of Affinity Space

Gee has used online game development group discourse to continually develop affinity space theory (Gee & Hayes, 2012), first analysing "Age of Mythology" game "modding" websites to understand engagement and enthusiasm less present in formal education where interactions between participants of different ages and experience levels could not be satisfactorily explained via "communities of practice" (Lave & Wenger, 1991; Wenger, 1998). Gaming affinity spaces were a sensible choice for Gee, as many young adults are involved in gaming and their resulting communities (Baf, Strnak & Debeljuh, 2015; Hayes & Duncan, 2012; Gee & Hayes, 2012)[17] .

Affinity space is used to describe an increasing range of environments "real or virtual, where people bond primarily to a shared endeavour" (Barden, 2016, p.227). The strongest examples remain constructionist, where creative technology is harnessed and digital media is co-created (Barden, 2016; Gee, 2018, Jackson, 2016). However, affinity space now faces some of the same challenges Gee felt communities of practice were stymied by, such as under or over-application (Bommarito, 2014).

McKenna (2017) believes affinity spaces are virtual learning environments available to existing education, despite Gee's warning the two would remain distinct until schools underwent systemic change (2013, p.177). McKenna's empirical approach found 83% of the characteristics of affinity spaces were present in a distance learning platform. Such approaches fail to consider the informal, and emotional states of affinity spaces, such as their passion or nurture (Gee & Hayes, 2012). While Beemt et al. (2011) argue informal media activities should not remain separate to education, but that research is required into how education might best connect to them.

In terms of game design, after micro, macro and at meta-level, you are *beyond* the game; designs here exist to motivate players to return to the game. Gee also recognised this meta-level community engagement, binding games and affinity spaces more tightly still (Gee & Hayes, 2012, p.129). Game studios create interest-driven spaces for players across virtual worlds, websites and social media. They are invaluable as they extend the life of their products and provide invaluable sources of ideas and

[16] The GGJ event at the core of this study is a powerful affinity space nested within the Foundry for its duration.
[17] Baf, Strnak and Bebeljuh found that 41.7% male 66.7% female students spent up to 1 hour a day playing online video games (2015, p.96)

feedback. Increasingly common is provision of resources to help players produce their own content for games. Gee & Hayes (2010; 2012) considered these meta-game level-spaces as *passionate* affinity spaces.

Use of *space,* as opposed to *community,* avoids "communities of interest" (Weisband et al., 1995; Wellman et al., 1996) in the same way affinity space avoids the issues of membership in Lave and Wenger's "communities of practice" (1991). But not all internet groups and websites with community are passionate affinity spaces, and Gee and Hayes (2010; 2012) have sought to expand the range of affinity spaces further, to include *nurturing* affinity spaces in particular.

People interact in passionate affinity spaces because of their desires, not because of shared backgrounds (age, status, gender, ability, sexual orientation, race, ethnicity, or values) unless they are integral to their passion. Not everyone needs to have passion for the shared interest, but they must respect that passion, as the people who have it are the "attractors" for that space (Gee, 2017). In a passionate affinity space, people earn status and influence because of their accomplishments, not because their wealth or status outside of it influences it. The space offers everyone the same opportunity to produce, learn, mentor or lead and not just follow.

Nurturing affinity spaces were developed through study of "The Sims" online game spaces. Nurturing affinity space is a stronger fit for educational settings and also game jams. Gee and Hayes (2011) argue nurturing spaces perform over and above previous affinity spaces because learning "becomes deep, and often life changing when it is connected to a nurturing affinity space." (p.22). When examining nurturing affinity spaces beyond formal education, it is hard not to become concerned about current notions of collaborative learning, as they have so few features of affinity space. Affinity space research still lacks clarity on how physical spaces might best be initiated and sustained over time (Jackson, 2016). Gee and Hayes provide the following attributes of affinity space as an" ideal feature set", including both passionate and nurturing elements, acknowledging physical spaces might tend towards more of less of these features summarised overleaf:

1. A common endeavour for which at least many people in the space have a passion (not race, class, gender, or disability is primary).
2. Affinity spaces are not segregated by age.
3. Newbies and masters and everyone else share common space.
4. Everyone can, if they wish, produce and not just consume.
5. Content is transformed by (social) interaction.
6. The development of both specialist and broad, general knowledge are encouraged, and specialist knowledge is pooled.
7. Both individual and distributed knowledge is encouraged.
8. The use of dispersed knowledge is facilitated.
9. Tacit knowledge is used and honoured, and explicit knowledge is encouraged.
10. Many different forms and routes to participation can exist.
11. There are many different routes to status.
12. Leadership is porous and leaders are resources.
13. Roles are reciprocal.
14. Individually proactive learning that does not exclude help, is encouraged.
15. Everyone receives encouragement from audiences and/or feedback from peers at different times.

(Gee & Hayes, 2012, p.23

Some features present hurdles for institutional adoption. Learners rarely have opportunity to share a common, passionate endeavour - even less so within systemic modular approaches, timetables and assessments, leaving little room for learner freedom and new ways of doing (Willingham, 2009). Grouping by age and/or ability is also a challenge, as formal education segregates by age or qualifications. Nurturing affinity spaces support newcomers with little technical skill, but formal learning rarely allows learners to seek out other cohorts.

Fixed curricula and regulated pedagogy is problematic for affinity adoption, especially if students are not given freedoms available outside formal education. Institutional learners also rarely have opportunity to become subject experts (this happens after graduation). More widely, it is not standard practice for students to write textbooks, or to teach their teachers; yet in nurturing affinity space this is de-facto the case. Assessment practices are similarly intransient. Individual knowledge is valued, but distributed knowledge is considered grounds for plagiarism, and valid knowledge is often that only of preordained texts.

A parallel with communities of pracice is the extent to which people participate peripherally, but in affinity space far from it being a linear progression; goals and drivers change, and people alternate from mentor to mentee (Gee & Hayes, 2012). In nurturing affinity space these fluctuations can be wider still (Hayes & Lee, 2012), suggesting there is work to be done if we are to import or connect the benefits of media-literate spaces to formal education (Beemt et al., 2011; Jackson, 2016), let alone re-conceive our physical spaces.

Affinity space allows people to earn reputation for being good at different things. Some might be recognised for content creation, while others might be known for management of the space (Gee & Hayes, 2012). Nurturing affinity spaces provide even broader variation, with more routes to status and increased acceptance of those who want no status whatsoever. In this regard, less-nurturing, more passionate spaces are somewhat tougher, where expectations or thresholds of acceptance are higher, such as with elitist affinity space (Bommarito, 2014; Gee & Hayes, 2012).

In formal education, academics have other roles, such as administration or management, but leaders in affinity spaces are temporal enablers of participation, and do not *control* the space or *enforce* hierarchy. Nurturing affinity spaces foster respect for those with advanced skills and those who generate content. In affinity space, learners sometimes lead, sometimes follow, yet experts in that space always feel they have more to learn. They are “not in it only for themselves”, they “want to give something back” and to make others experts too (Gee & Hayes, 2012, p.29).

Affinity spaces (like games) encourage proactivity and experimentation. “Failing fast” and iterating is often key to success, while asking for help is not detrimental to identify. Nurturing affinity spaces encourage collective problem-solving, and are more tolerant to wide-ranging ability than other affinity spaces. Increasing use of professional language and technical terms is fostered by all, and there is acceptance of newcomers asking even redundant questions (Hayes & Lee, 2012). Nurturing affinity spaces also offer support and encouragement from audiences both within and from beyond the space, (everyone may be audiences or participants at different times). For nurturing spaces visitors are welcomed, but in less-nurturing spaces, audiences may be considered unwelcome (Gee & Hayes, 2012, p.30).

Gee and Hayes (2012) believe most aspects of nurturing affinity space translates to face-to-face settings, but are concerned that “institutional constraints, pre-existing status differentials, and even geographical boundaries” may prevent participation. They warn affinity spaces can deteriorate over time, calling for research “to support learning in areas we care about as educators and citizens, locally, nationally and globally” (Ibid, 2012, p.30).

C. Education & Affinity Space

Affinity spaces are powerful progressive learning environments (Jackson, 2016) wherein "students are free to move and share at their own pace as they move from one experience to the next" (p.66). This aligns with progressive education and constructivist perspectives as learners assemble knowledge through experience. Dewey (1998) considers learning as moments that occur when interacting with the environment physically and socially. A Dewian perspective views learners as letting the world into their being through their senses in real-time. These captured experiences mix with past experiences and inform future actions (much like games played and re-played that shape our understanding of the world over time). We never cease to engage, the process of discovery is never-ending, as with affinity spaces learners explore possible journeys, both physically and socially.

Dewey was interested in students having freedom to make their own decisions. Much today is made of the notion of "student experience", but research does not consider learning agency, at least to the extent classroom experiences can be damaging reinforcements of existing knowledge (Jackson, 2016, p.66) with many "considering institutions as closed, unchangeable systems" (Ibid, p.174). A reorganisation of the "musical notes" of education is required (Guattari, 2007, p.181).

Traditional curriculum does not align well with re-considering teacher-driven learning and assessment (Flores, 2016), but there is ongoing development of alternative assessment instruments for technology literacy (Blikstein et. al., 2017) demarcating a shift from students being taught *about* technology to one where they can master it. This assessing the *use of* as opposed to *knowledge of* is an important factor for the uptake of affinity spaces.

Marsh et. al., (2017) highlight a general shift towards problem-solving and design-based social learning, while Smith & Smith (2016) cite a growing consensus that *learning by doing* opens new possibilities for merging formal and informal education (Rees et al., 2015). There is also growing institutional recognition that new learning practices are required for work in the digital economy (Craddock, 2015; Sheridan et. al., 2014).

Despite an uptick in learner-led education, the shared sentiment remains that powerful informal learning will not come to formal education any time soon unless the hierarchical processes of assessment and accountability can be challenged in the near-term. There have been other approaches such as "Teaching as Designing" (Zimmerman et. al., 2007; Kilbane & Milman, 2013), but this contains nothing particularly new for the rich studio traditions creative and technical disciplines already engaged in construction (Peppler & Bender, 2013; Boyer & Mitgang, 1996) or a continuing body of work on makerspace (Marsh et. al., 2017).

The intentional design of space is often to encourage collaboration or construction; a striking parallel to both Papert's makerspaces (ibid, 2017) and Gee's nurturing affinity spaces (Gee & Hayes, 2012), where acts of making are a "theoretical and physical embodiment of constructivism" (Roffey & Sverko, 2016, p.3) that open up learning trajectories. In "Learning and Creativity in Design-Oriented Affinity Spaces" Marone (2015) specifically considers learners becoming designers and producers (not just consumers) of games in affinity space, where participation increases the development of higher order thinking (Hayes, 2008; Hayes & Games, 2008). Squire (2011) also contends game-based-learning as an iterative process that improves problem-solving, collaboration and design thinking (Duncan, 2010, 2012; Kafai, 1995; Kafai & M. Resnick, 1996).

If we look to the 21st century skills agenda, and now mature notions of Papertian "makers" and "makerspaces" (or jammers and jams, or hackers and hackathons), we see that "learning by doing" is well established in early years education, and there is growing interest in constructionist learning as "making" beginning to affect the design of educational settings. But it will be some time before such practices are common-place in institutions beyond showcase spaces libraries or creative studio-based subjects (Blikstein, 2013; Gershenfeld, 2005; Marsh et. al, 2017).

The possibilities of affinity spaces and the rigidity of academic spaces might seem incompatible (Gee & Hayes, 2012). After all, people elect to enter affinity space through a portal, while marketised education can less harness the passions and interests of anyone, as enrolled learners still have to learn the things that educated people ought to know (Hirsch, 1987). "Too often, this leads to everyone knowing next to nothing, or at least nothing very deeply" (Gee & Hayes, 2012, p.31) and a fundamental failure to recognise that people do not learn deeply without passion or persistence. Not connecting affinity space to education brings the phrase "university of life" worryingly close to defining the freedom and opportunity of anyone accessing such spaces beyond institutions, despite movements such open education (Gourlay, 2015).

Progressive learning spaces in education should have unconstrained access to powerful tools (Papert, 1991), be well connected to other spaces and sites of useful knowledge and advice. They should encourage both general and specialised knowledge that people within can develop and share (Gee, 2005; Jackson, 2016). People in nurturing affinity space feel knowledge generated is not just their own, but part of the space and creates relationships between them. Expertise resides in the space, and there is always something new to learn or someone new to learn from, whatever their level of expertise.

3.2 Heterotopia

Heterotopia is derived from the Greek words “heteros” (another) and “topos” (place), translated as “other spaces”[18]. Heterotopias are alternative spaces, where boundaries of normalcy are transgressed or overturned (Nelson, 2010, p.14), and places that somehow mirror, distort, and disrupt what is around them (Foucault, 1998, p.178). Foucault introduces heterotopia in “of other Spaces” (1967), which has had numerous translations (i.e. Foucault, 1984, 1986, 1998, 2008) leading to an expanding body of work, despite criticism that Foucault’s theory was sketchy, open-ended, ambiguous or incomplete (Johnson, 2013).

Foucault juxtaposes heterotopia with utopia, but there has been some debate to whether such terms are mutually exclusive (Hetherington, 1997; Johnson, 2013). He initially defines heterotopias as real, physical or augmented spaces that can be accessed geographically, stating utopias are unreal (Foucault, 1998). Foucault also considers heterotopia as space that can contain other spaces within; citing examples of gardens and cinemas as places through which viewers can be transported to a multitude of worlds (Haghighi, 2020)[19].

Heterotopias of crisis and deviation are the two main kinds that Foucault (1984) speaks. Crisis heterotopias are described as privileged, sacred or forbidden places, where the *crises* are deviations from societal normalcy. Foucault gives examples of care homes for the elderly, boarding schools for the adolescent, and psychiatric hospitals for those deemed at odds with society (Haghighi, 2020; Zufar & Sari, 2021). Crisis heterotopias are reflections of the societies in which they exist, and access is reserved or restricted to people deemed to be in crisis. Over time, this conception has given way to heterotopias of deviation (Foucault, 1998) where behaviour is different or disruptive to the norm. He illustrates this switch by defining “the elderly” as a societal crisis but prescribes their idleness of old age as a deviation from productive society’s expectations. From either definition, “Heterotopia can be read as a construct by which to chart the various forms of communication between people, space and culture in modern society” (Nelson 2010, p.17). Later, Foucault gives us another sub-type, compensation heterotopias. These create “other, another real space, as perfect, as meticulous, as well arranged as ours is messy, ill constructed, and jumbled” (Foucault, 1984, p.8) which counterpoint society at large.

Heterotopia remains popular in research, with several significant publications on the topic each year (Johnson, 2013). Foucault’s theory continues to provoke responses from architects and geographers

[18] Beyond the realms of geography, architecture, philosophy and sociology, heterotopia retains medical usage as a phrase referring to a tissue growth in an a place other than expected (Lax, 1998).
[19] In this light, the Foundry transports participants to the “world” (or affinity space) of the GGJ.

in particular (e.g. Teyssot 1998; Urbach 1998; Kronick, 2010; Pitsikali & Parnell, 2019) where heterotopia is leveraged as a tool of spatial analysis (Defert, 1997; Nelson, 2010)[20]. However heterotopia is significant to fields as distant as entrepreneurship (Hjorth, 2005; Steyaert, 2010), education and childhood (Haghighi, 2020; McNamee 2000; Nelson 2010). There are also parallels to affinity space and constructionism because heterotopias are defined more "by the actions which take place inside their boundaries" and that "communal act(s) of building, generated with the construction of an engaged architecture of participation" is important (Kronick, 2010, p.8).

Heterotopia research can be summarised as falling into three main forms:

1. Studying a specific case using Foucault's examples and asserting them as heterotopia.
2. Adding to a rapidly growing list of types of heterotopia to assert a specific spatial example.
3. Harnessing heterotopias effects to reconceptualise contemporary settings[21].

(Haghighi, 2020, p.309).

As well as the spatial relevance of heterotopia to the Foundry, Topinka (2010) reminds us heterotopias are "understood as sites of resistance," that are both separate and connected to other spaces (p.55), leveraging forms of paradox[22] and producing "new ways of knowing" (p.54) through clashes with dominant order (p.60). Foucault believed that "knowledge does not exist, except as a product of combat" (p.64). Topinka also suggests heterotopia destabilises, deconstructs and then re-makes laws which govern knowledge, while remaining connected-to but disrupting-of the dominant order.

Similarly, Haghighi believes heterotopias "call existing orders into question; they contest given classifications; and by doing so, they produce an intense battleground in which the creation of an alternative view (but still intertwined with the existing power relations) becomes possible" (2020, p.314).

[20] The design of an affective physical space of increased agency and intrapreneurship (né entrepreneurship) led to the introduction of heterotopia during the Foundry project.
[21] Foundry taking this third approach, leveraging heterotopia to rethink the design of a contemporary educational setting, correcting the perceived "damage" to learners caused by FEAR-full spaces.
[22] It is from design paradoxes such as open but closed, hard but soft, warm but cold, playful but serious, homely but industrial and others were considered.

A. Principles of Heterotopia

Foucault (1998) provides six principles of heterotopia which retain research currency today (Nelson, 2010; Haghighi, 2021; Zufar & Sari, 2021) which I summarise below:

1. Heterotopias are places for people who do not follow societal norms;
2. These may be for people removed, for those perceived to be peripheral and others.
3. The function of heterotopias may change over time[23];
4. This is true also of affinity spaces (again presenting challenges for educational adoption).
5. Heterotopia juxtaposes incompatible spaces within a single place and disrupts order;
6. E.g. Gardens as a heterotopia, with plants from many spaces (Foucault 1998).
7. E.g. Foundry as an incompatible University space of operational & spatial paradoxes[24].
8. A break from traditional perceptions of time (that describes as accumulation or transition).
    - E.g. the cemetery sees transitions of death and loss the body, but accumulates many lifetimes.
    - E.g. Libraries accumulate knowledge over time.
    - This also aligns heterotopias with flow as both disrupt perceptions of time.

9. Heterotopias are not freely accessible and feature open and closed states[25];
10. Access requires permission or completion of rites of passage.
11. E.g. military training for barracks, crimes for prison, tickets for fairgrounds, or religious rituals (Haghighi, 2020; Nelson, 2010).
12. Heterotopias create illusory spaces that expose real spaces (or) are perfect real spaces starkly different to other imperfect real spaces[26];
13. Heterotopias are either removed from an original, disorganised, and unmanageable real world (or) a new space that is painstakingly thought-out and perfectly organised (Nelson, 2010).

B. Applying Heterotopia

Heterotopia has intrigued generations of scholars with its complexities and its potential for application across diverse fields (Reese, 2020; Haghighi, 2020). But Foucault's theory has also been widely deemed to be abandoned or incomplete (Johnson, 2013; Caliskan, Ribeiro & Tumturk, 2020). Such positions exist because Foucault does not return to the concept, even when later discussing the social-spatial organisation of institutions (Johnson, 2013). Heterotopia also never resurges in any of Foucault's

[23] Bommarito's work is developed as an outcome of this literature review in my theoretical framework.
[24] The Foundry was "owned" by the library, but managed by an academic not the professional service; creating a paradox maintaining its existence.
[25] "Open but closed" was the first design paradox developed during the Foundry project.
[26] Perhaps the most significant issue with Foucault's heterotopia - problems here arise later re. clashes between conceptions of heterotopia and utopia, and the extent to which heterotopias are mirrors.

major works that followed, despite many appearing compatible (e.g., prisons in Discipline and Punish, 1977). Others however believe his giving permission for the theory to be published as his death neared, condones a view that heterotopia was significant and meaningful to him - if unfinished (Francis, 2018; Reese, 2020; Sudradjat, 2012).

In either light, the void for interpretation left by an incomplete theory has been filled by researchers in a variety of ways beyond the three kinds given by Haghighi. Heterotopia is often used as a metaphor as opposed to a framework (Bazin & Naccache, 2016), while attempts to further progress the theory have resulted instead in broader generalisations (Johnson, 2013).

Dehaene & De Cauter (2008) develop a "general theory of heterotopia", but it goes so broad in its spatial interpretation that it renders Foucault's defining points redundant (broadening-out heterotopia to include places of rest, refuge and play). Heterotopias to some remain a source of confusion and debate, but in attempting to pull the lens so far out to encompass the entire contemporary world and its holiday resorts, gated communities, and wellness hotels; it misses an opportunity to fortify Foucault's original thinking, instead opening it up to further criticism (Johnson, 2013).

Interestingly, rather than loading everything on heterotopia, Lefebvre in "The Urban Revolution" (2003) chooses an alternative path, expanding on virtual and paradoxical characteristics by articulating them across three forms which summarised here:

1. Isotopies – "identical spaces" which can be mapped, quantified, and compared.
2. Heterotopies – "other spaces" of difference and ambiguity both excluded and interwoven.
3. Utopias – "non-places" and imagined spaces of consciousness.

David Harvey is the staunchest critic of Foucault's heterotopia (Harvey, 2000) accusing Foucault of complacency and naivety, and of making value judgements about ever-expanding lists of places (Johnson, 2013). Both Harvey (2009) and Genocchio wonder if everything might possibly be an exemplar heterotopia (1995, p.39). Johnson deems this list of places as a "cottage industry", and is left wondering "are we not led into the realm of the everyday rather than the different? Where do we draw the line?" (2013, p.793). But be it the "thinking out loud" of an unfinished theory, or an intentional act to sew paradox and disruption, while not succinct; Foucault leaves us with six principles and numerous examples of heterotopias with which to work.

Harvey's reading of Foucault does not consider the spatial usefulness of his approach to using heterotopia as a conceptual lens of analysis (Saldanha 2008; Sudradjat, 2012). Foucault deploys this across topics such as madness, health, discipline and security (Johnson, 2013). Heterotopia also

continues to inform architectural practice many decades after his death (Sudradjat, 2012, p.28). Ultimately, this breadth of interpretation effects whether one considers heterotopia to be working towards sustaining a social formation, or ideal of some kind, or aiming to disrupt or propel one forward (Saldanha, 2008).

Harvey also accuses Foucault of anti-utopianism (2000, 2009, 2012), which leads to another of the debates arising from the application and/or generalisability of heterotopia (in this case inflamed by Foucault's sixth principle). Whether a result of translation, work-in-progress theory or intentional paradox, his definition of heterotopia is that of an absolute state. But notions of absolute utopia in literature appear to come from a failure to conceive what Foucault was trying to articulate about heterotopia and utopia:

"Utopias are sites with no real place. They are sites that have a general relation of direct or inverted analogy with the real space of Society. They present society itself in a perfected form, or else society turned upside down, but in any case these utopias are fundamentally unreal spaces."

(Foucault 1984, p.3)

And he is clear that attempts to enact (unreal) utopias will result in (real) heterotopias:

"There are also, probably in every culture, in every civilization, real places—places that do exist and that are formed in the very founding of society— which are something like counter-sites, a kind of effectively enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted. Places of this kind are outside of all places, even though it may be possible to indicate their location in reality. Because these places are absolutely different from all the sites that they reflect and speak about, I shall call them, by way of contrast to utopias, heterotopias."

(Foucault 1984, p.4)

Foucault is not stating heterotopias are "effectively enacted utopias" (this would be a misreading), but that utopias and all real places from society are "represented, contested and inverted" in heterotopia, and that heterotopias are removed from cultural ideals once rendered concretely. This does not mean that utopias do not exist, or that all heterotopias contain utopic premeditation, only that utopian ideals might be intended, but can never be made concrete in heterotopia[27].

Heterotopia is etymologically linked to the more familiar term utopia, which Foucault cites as a theoretical counterpart to heterotopia. According to Foucault, both utopias and heterotopias are

[27] Many of Foucault's examples of heterotopia actually some aspect of utopia (Johnson, 2012 p.1) or utopian ambition.

external sites that "have the curious property of being in relation with all the other sites, but in such a way as to suspect, neutralize, or invert the set of relations that they happen to designate, mirror, or reflect" (Foucault, 1984, p.3). Whereas utopias are unreal, fantastic, and perfected spaces. Heterotopias in Foucault's conception are real places that exist as "counter-sites", simultaneously representing, contesting, and inverting conventional sites. Heterotopia presents a juxtaposition, a relational space; a site that represents incompatible spaces and reveals paradoxes, suggesting a shift from binary conceptions of space (Sudradjat, 2012, p.29).

Researchers often imply that radical approaches to democratise and open up education for all are achievable, and concrete, despite the utopian promises they proposition. Gourlay (2015) contends that utopian intentions "while appearing to oppose large-scale operations of power in fact reinforce a fantasy of an all-powerful, panoptic institutional apparatus" which "reinforce rather than challenge utopic thinking, fantasies of the human, and monolithic social categories, fixity and power" which instead result in heterotopias of desire (p.310). The risk of damage by overly simplistic application of utopian thinking (Van Leeuwen, Verkoren & Boedeltje, 2012) and a need to rationalise "fantasies of monolithic social categories, fixity and power" (Gourlay, 2015) speaks to the utility of heterotopias to be intentionally or unintentionally disturbing (Johnson, 2012; Topinka, 2010) places of change (Pitsikali & Parnell, 2019) that need not be at "wild edges of society" (Saldanha, 2008 p.2081).

Heterotopias bring about change because they are "threshold spaces between the real social world and the perfected but unreal world to come", where "what connects these spaces to the world that can be glimpsed in the mirror they create" (Wanenchak, 2019, p.1). For instance, heterotopia has been leveraged to understand why the neoliberal peace-making policies of the west have failed in the middle east; where it is heterotopias, not utopias, which hold the key to sustainable (if uncomfortable) peace (Van Leeuwen, Verkoren & Boedeltje, 2012). For learning spaces, heterotopias nudge us beyond binary constructs (e.g. open *OR* closed, private *OR* public, sacred *OR* profane), towards "intermediate experience", "somewhere between the real and the unreal." (Foucault, 1998, p.179) where educational playgrounds of the mind and microworlds might flourish (Clements, 1989; Papert, 1980).

C. Heterotopia & Education

In the Pedagogy of the Oppressed (1970) Freire talks about formal education as the "banking system" where everything is highly regulated and "knowledge is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing" that "negates education and knowledge as process of inquiry". Foucault too was concerned by institutionalisation.

His work on “Panopticism” in “Discipline and Punish” (1977) drawn from Bentham’s Panopticon of prison design[28] is particularly powerful given his prior conception of heterotopia.

“Published in 1791 the panopticon was a design for a prison that its creator, the utilitarian philosopher Jeremy Bentham, claimed would “invigorate industry”, “reform morals” and “facilitate education”. In Bentham's design exposed, backlit prison cells situated around the periphery of the building face inwards towards a darkened central watchtower. The prisoner in Bentham's design is subject to permanent display.” (Hope, 2005, p.360)

Foucault approached the view of many that Panopticism was utopian with concern, as he believed such thinking would result in “surveillance society” (Lyon 1994). He referred to prisons as heterotopias, and the concept of feeling somewhere else and contrary to cultural norms as entirely different to the formation of panopticons of surveillance, the fear of being watched and “an abstract concept of total control and discipline that could be formulated across other institutions such as schools and factories” (Markus, 1993; Johnson, 2012).

Fig.9 Round House Panopticon at Statesville prison, Illinois. Image courtesy Funk (2010).

The premise of the design (replicated in prisons around the world) was to monitor the maximum number of prisoners at the lowest possible cost, and with fewest possible guards. The layout was one of a central tower, surrounded by a ring of prison cells. While the layout may be different, a need for value optimisation and maximum space utilisation remains a major factor in the design of 21st century learning spaces.

[28] I draw no inference to the fact that our lecture capture software is called Panopto.

Foucault's fear of Panoptocism (and of institutionalised space), was that observation becomes continuous (Hope, 2005, p.360). The prisoners in Betham's design were always in line of sight, and merely "the object of information, never the subject of communication" (Markus, 1993, p.200). Panoptocism translates to FEAR-full settings in education, where the aesthetic and/or layout speaks to Freire's concern about linear didactics and institutionalisation through rows of uniform computers, where learners are prisoners, no longer eager to act with agency for fear of observation.

While Foucault's concepts have been criticised as overlapping, incomplete, or vague (Crampton & Elden, 2007; Johnson, 2013), his stated concern about panopticism and conceptualisation of heterotopia provides us dual perspectives on educational formations of space. One is of total control, while the other implies the opposite, where "power here is ambiguous and reversible." (Johnson, 2012)[29]. Foucault's conception of the panopticon as a spectre of social control extends to the lives of everyone, not just prisoners (Foucault, 1993) and that the prevailing power of institutions is that good citizens internalise authority. If a driver stops at a set of traffic lights set to red, they wait, even if there are no other cars present in the oncoming direction, because police are an internalised authority. Students obey the implicit and explicit laws of different spaces, and regulation is ubiquitous and self-imposed. On-campus heterotopias must be a significant inversion to "punch through" the internalised authority of learners. Heterotopia means to be waved through that red traffic light to worlds where the highway code ceases to exist.

Another challenge to heterotopia is their often-temporal nature (Caliskan & Tumturk, 2020; Johnson, 2013). The difference of such spaces cannot last long because "sooner or later, it will be deployed as a transformative phase to perpetuate the operation of the very system that the heterotopia disrupted", as Foucault suggests "the institutionalization of the abnormal is to construct the norm"[30] (Haghighi, 2020, p.310), while Gourlay too believes they may not easily be sustained (2015) due to pressure to conform.

A truer incorporation of heterotopia in education may be sought where it re-connects or distorts disciplinary landscapes as heterotopia, through its process of contestation (Gandy, 2012, p.16) can carve "new conceptual terrain" (Ibid, p.4). Heterotopia probes boundaries, tests defences and unsettles established domains of study (Defert, 1997, p.281). Heterotopias represent "real, social and imagined spaces" (Gosling, 2014, p.25) where pedagogic practice not valued by societal entities might be nurtured. But in research there is now erosion from the designation of institutional spaces as heterotopias even though they may only share some features. Affinity space and heterotopia have

[29] Papert used prisons as the setting for much of his work on constructionism through makerspace and "fab lab" projects
[30] Foundry experienced this via a form of spatial erosion, where features intentionally opposite to the university were replicated by contractors elsewhere but erosion limited to minor details (King & Reed, 2020).

this erosion in common; for example McKenna (2017) deeming distance learning environments affinity spaces, or Haghighi (2020) deeming lecture theatres heterotopias.

Haghighi feels lecture halls "are sites in which knowledge is deployed as a visible object that docile bodies can consume, or as critical practice, enabling seemingly formless students to test novel ways of becoming" (2020, p.323), she argues the relationship between students and academics should no longer be considered panoptic and that lecture theatres are in the main spaces of deviation. But heterotopia is a spatial construct, and there is little to suggest the nature of that space has changed globally, even if *some* practices locally might render them temporal heterotopias. Lecture theatres remain panoptic, only 180 degrees removed from the panopticon that so alarmed Foucault (1977) and FEAR-full for as long as their internalised authorities continue to exist. In this light, lecture theatres remain a staunch descendant of the banking system education Freire was so opposed Pedagogy of the oppressed (1993).

It is true Foucault likens universities to heterotopia, in as much that learners, often in adolescence, are segregated from real life and society while partaking academic rituals in a "court" of examination and assessment (1998, p.69). All lectures and lecture halls are an impossible candidate of heterotopia, not because they do not meet Foucault's six principles, but because of their didactic traditions, and their institutionally timetabled formality. Reviewing available literature raises the question if outlier approaches of progressive pedagogy allow an entire genus of space to be re-categorised in such ways. This usage speaks to the need for heterotopia to be theoretically strengthened, not diluted, or aligned with other concepts, such as Barden's heterotopic affinity space (2016) which suspended norms of regular workshop activity in a given space, rather than demarcating all such spaces heterotopias.

As counter-sites, heterotopias suspend, neutralize, and invert societal or institutional norms (Haghighi, 2020). They also replicate while challenging (Nelson, 2010, p.17). The Foundry replicates the function of computing labs but challenges that style of spatial provision. It challenges current institutional approaches to entrepreneurship, through leveraging intrapreneurship for all learners, while there are other dedicated spaces on campus for enterprise (Reed & King, 2020).

"The concept of heterotopia introduces a starting point for imagining, inventing and diversifying space: nothing more, nothing less. Heterotopias have no axe to grind, just scissors to cut."

(Johnson, 2013, p.800).

Like affinity spaces, heterotopias offer settings where mainstream education can be disrupted or subverted. They have their own "systems, rules, practices and regulations" which "offer a sense of shelter or sanctuary" (Nelson, 2010, p.12). And although Gee would not use this phraseology (due to

proximity of Lave and Wenger's terminology) "a particular kind of community develops articulated in inclusion/exclusion or the difference in what happens in that space and distinct from it" (Ibid, 2010, p.12). Foucault was concerned with issues of institutionalisation, hierarchy, organisation and power. Instantiating heterotopias brings issues of power and control to the surface (Nelson, 2010). Not through the articulation of the concept for a space, but through what Nelson calls "the predicament of confrontation and contravention that follows" during their operation (Ibid, p.17).

Sustaining and even condoning heterotopias in education (however uncomfortably) is something I refer to as a nettle worth grasping, because the benefits to learners of FEAR-less spaces that unlock learner agency by far outweighs the risks of a disruptive setting. But without research that considers agency a catalyst for deeper learning engagement, the potential of heterotopic affinity spaces will be lost on mainstream education. Flow is a powerful illustration of positive engagement and one which manifests in affinity space (Savva, 2020). Having discussed the literature of both heterotopia and affinity space, this chapter moves to completion by considering the implications of Csikszentmihalyi's flow, the theory of optimal experience (1975).

3.3 Flow Theory

"The best moments in our lives are not the passive, receptive, relaxing times… The best moments usually occur if a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile."

Csikszentmihalyi (1990, p.3)

Flow has maintained prominence while other engagement theories have lost prominence (Schaufeli et al., 2002). Discourse on how "burnout" is experienced by different professions (ibid, p.464) and by students (Balogun et al., 1996) has shifted towards notions of engagement and focus on personal strengths and skills over that of weakness and malfunction (Seligman & Csikszentmihalyi, 2000). Schaufeli et al. (2002) define engagement as the hypothetical opposite of burnout, supporting Csikszentmihalyi's view that to be fully absorbed in a task is an enjoyable, optimal experience - a pleasurable state of concentration, performance and creativity while operating at peak experience (Šimleša et al., 2018).

Positive emotions are more than side-effects of engagement. They create trajectories and upward momentum that promotes exploration (Rutledge, 2012), and fosters more open, reflexive and socially interactive cognitive states where negative experiences can be re-examined healthily (Tugade & Fredrickson, 2004). "A build-up of cognitive, psychological, social and physical resources from positive emotions accumulates over time" which has the power to reshape who we are (Rutledge, 2012, p.13).

Flow research exists across a great many domains, and many human activities have been shown to manifest it (Csikszentmihalyi, 1994). There is particular connectivity to activity that features technical work requiring mastery, and a form of performance. Developing computer software (Rogulja, Tomić, & Olčar, 2011), musical recital (Csikszentmihalyi & Robinson, 1990; Riggs, 2006), dancing, rock-climbing, sailing and chess (Csikszentmihalyi, 2013) have all featured in flow literature. It may appear effortless, but flow cannot manifest without strenuous mental or physical exertion and skilled performance (Kiili & Ketamo, 2005; Silberschatz, 2013). Lapses in concentration erode it, but where sustained, actions are seamless and transformative "in the zone", where track of time is lost (Bloom, 2005; Csikszentmihalyi 2002).

Csikszentmihalyi developed "the flow of optimal experience" to define a state and feeling experienced when acting with complete involvement (1975; 1990). Flow is experienced by those who situate themselves in optimal settings (Chan & Ahern, 1999, p.152) that are conducive to learning (Kiili, 2005). When achieved, flow screens-out unwanted stimuli, and trance-like focus on only what is meaningful in that moment manifests (Csikszentmihalyi, 1990). Purpose alone is not enough to achieve a flow

state. “One must also carry through and meet its challenges. When an important goal is pursued with commitment and focus, and all the varied activities fit together into a unified flow experience, the result is harmony that is brought into consciousness” (ibid, 1990, p.6).

“Your concentration is very complete. Your mind isn’t wandering, you are not thinking of something else; you are totally involved in what you are doing… Your energy is flowing very smoothly. You feel relaxed, comfortable, and energetic”

(Csikszentmihalyi 1975, p.39).

Game Jams are aspirational events, attended by both existing and prospective developers, during which both learning and professional aspirations can be tied to flow. Webster et al., (1993) studied the visions experienced by marathon runners while in flow and competing. They noticed that while in flow, atheletes visualised aspirations of future success, not immediate race performance. Flow during sporting practice has also been used to predict the likelihood of event success (Schuler & Brunner, 2009).

Play has been bound to flow since its inception (Csikszentmihalyi, 1975a; 1975b), but play has also been used to locate and measure it (Massimini & Carli, 1988). Jammers and teams experience powerful adaptations of flow and group flow (Armstrong, 2008). Sawyer (2003) develops an understanding of group flow as a collective state that occurs “when a group is performing at the peak of its abilities” (p.167). He posits both group and individual flow should be considered separate activities of individual agents - paralleling Bommarito’s interpretation of work of challenge, with focus in “passionate seriality” (2014). While it is accepted that individual flow is a state of consciousness (Armstrong, 2008), group flow is somewhat more elusive. Sawyer goes as far to say that it “cannot be reduced to psychological studies of the mental states or the subjective experiences of the individual members” and that more work was required to establish notions of group flow (2003, p.46).

Csikszentmihalyi & Csikszentmihalyi (1988) found flow led to greater intrinsic motivation, agency and overall satisfaction. Sawyer (2003) agrees, but notes motivation is also down to agency over the task at hand, positing that extrinsic objectives can reduce available flow. The heightened intrinsic motivation observable at jams is well represented by flow theory and there is a substantial body of evidence from game-based learning concerning flow’s positive effect on learner motivation (Ainley et al., 2008; Boots & Strobel, 2014; de Freitas, 2006; Hedman & Sharafi, 2004; Killi & Katamo, 2005; Li, Cheng & Liu, 2013; Rigby & Przybylski, 2009; Savva & Souleles, 2020; Voulgari & Komis, 2011).

A. Principles of flow

Csikszentmihalyi was inspired by Maslow's concept of "peak experiences" (Beard, 2015; Abuhamdeh, 2020). Through flow he sought to define the importance of "clearly set goals, a loss of self-consciousness, a distortion of time, and an emphasis on personal growth over final product" (Riggs, 2006, p.178). Flow has remained fundamentally unchanged with six key principles defined early in in the theory's development fifty years ago:

Characteristics	Conditions
The merging of action and awareness	A clear set of goals
An altered sense of time	A balance between perceived skills & challenges
A sense of control	The presence of clear & immediate feedback

Fig.10 The separate characteristics and conditions of Flow of Csikszentmihalyi's Flow

While conditions have stayed the same, flow has borne an expanding list of characteristics. In literature sometimes these are conflated into a single list, without the important delineation Csikszentmihalyi provided.

For example, Bergamin (2017, p.418) presents Csikszentmihalyi's flow as "phenomena" with no separation between *characteristics* and *conditions*:

1. A narrowing of the focus of consciousness on a clearly delimited stimulus field.
2. Exclusion from one's awareness of irrelevant immediate stimuli, memories of past events, and contemplation of the future; hence a focusing on the unfolding present.
3. Merging of action and awareness, also described as absence of doubt and critical reflection about one's current activity.
4. Awareness of clear goals and unambiguous feedback, so that one knows one's standing with reference to the goals.
5. A lack of concern regarding one's ability to control the situation.
6. A loss of self-consciousness, which in turn may lead to a sense of transcendence of ego boundaries and of union with a larger, transpersonal system.

Kawabata & Mallett (2016) present a list of nine principles, while Šimleša et al. (2018), present Csikszentmihalyi's recent research on characteristics as a collated list of ten "principles" (p.233):

1. A balance between perceived skills and challenges
2. Clear proximal goals
3. Immediate feedback
4. Intrinsic Motivation
5. Hyper focus
6. Temporary loss of reflective self-awareness
7. Distortion of time-perception
8. Feeling of control
9. Merging of action and awareness
10. Attentional-involvement[31]

Abuhamdeh critiques the operationalisation of flow in literature, citing numerous reasons why Csikszentmihalyi made this delineation between characteristics and conditions. Yet significant numbers of studies continue to ignore the distinction (Ibid, 2020, p.6) giving rise to criticisms of flow and its application discussed in the next section. In his recent paper, Abuhamdeh (2020) retains Csikszentmihalyi's separation, and re-presents Nakamura and Csikszentmihalyi's previous separation:

Characteristics	**Conditions**
Intense and focused concentration on what one is doing in the present moment	Perceived challenges, or opportunities for action that neither overmatch nor underutilise existing skills
Merging of action and awareness	Clear proximal goals
Loss of reflective self-consciousness	Immediate feedback on progress that is being made
A sense that one can control one's actions	
Distortion of temporal experience	
Experience of activity as intrinsically rewarding	

Fig.11 Nakamura and Csikszentmihalyi's (2002) characteristics and conditions with separation

It is important to this study (and future research into heterotopic affinity spaces), that engagement (and therefore flow) is concrete and tangible. The imprecise application of flow characteristics and conditions is extensive, and should be addressed if flow is to be more readily considered in the design of learning spaces. This review continues with further discussion of such criticisms from the literature.

[31] Abuhamdeh and Csikszentmihalyi added this tenth characteristic in 2012, and Abuhamdeh as subsequently (2020) been involved in calls for clarification towards a more robust framework discussed in criticisms of flow that follows.

B. Criticisms of Flow

Easily identifiable goals offering immediate feedback are required for flow to manifest, and a balance between challenge and skill is necessary to sustain flow and provide confidence that task completion is possible (Csikszentmihalyi, 1988).

Kawabata and Mallet draw issue with the notion of "challenge" which they feel is ambiguous compared to the situations in Deci & Ryan's self-determination theory (2016, p.7). Deci and Ryan indicate that self-determination is not well addressed in flow (Ibid, 2016), and that challenge might be effectively presented "as a composite of a) the perceived difficulty of the activity and b) a sense of the importance of engaging in the activity" (Ibid, 2016, p.7). This misconstrues their *rationale* with Csikszentmihalyi's *purpose* of activity: "The mountaineer does not climb in order to reach the top of the mountain, but tries to reach the summit in order to climb'' (Csikszentmihalyi, 1988, p.33)[32].

Chen, Wigand & Nilan (2000) take a different approach, stating that the often-extrinsic goals or reasons for undertaking an activity are replaced by intrinsic rewards and engagement for its own sake when flow manifests. This thinking is missing from Kawabata and Mallet's criticism and is vital nuance. The flow of game development is akin to climbing a mountain; you might set out to make a game (or summit Everest), but when the conditions are right, the ongoing challenge activity (be it coding or climbing) becomes the enjoyable primary purpose.

Kawabata & Mallett (2016) telegraph a clash between Csikszentmihalyi's (1990) characteristic of "full concentration" for engagement to be enjoyable, as if it were a condition (see Fig.22). Although they do highlight a contrast with self-determination theory, where autonomous experience means intrinsic motivation that is not discussed in flow (Deci & Ryan, 2000; Ryan & Deci, 2007)[33]. Where the two theories align is in agreement that too many extrinsic goals is challenging to the cultivation of motivation (Deci & Ryan) and optimal experience (Csikszentmihalyi).

Similar to Bommarito's criticism of affinity space, researchers have suggested that flow should be tightened conceptually. Hamari and Koivisto (2014) suggest flow should be divided between conditions for attaining flow and its positive psychological outputs, while Lovoll & Vitterso (2012) state that flow is hard to operationalise in scientific investigations because it is a complex psychological state. Abuhamdeh argues theoretical development of flow has been impeded by lack of consistency. His study of 42 publications found flow was operationalised in at least 24 distinct ways, resulting in his

[32] Deci & Ryan suggest growth and change occurs when people become self-determined and competence, connection and autonomy "needs" are met. (Legault, 2017).
[33] The characteristic of "A sense that one can control one's actions" may provide equivalent functionality in Flow.

call for a reset of how researchers engaged with flow, particularly regarding the enforced separation of flow conditions and characteristics (2020).

At 50 years old, achieving theoretic clarity for flow may be an unwieldy task. But while operationalised differently, there is broad agreement on the conditions of flow as challenge-skill balance, the availability of clear goals and feedback. Well recognised characteristics of flow remain the loss of self-consciousness, time distortion, concentration and the merging of action-awareness (Csikszentmihalyi, 1990; Hamari & Koivisto, 2014; Nakamura & Csikszentmihalyi, 2002).

Šimleša et al. (2018)'s presentation of flow phenomena with no such separation was perhaps intentional, as they later make a similar case that flow needs a rigorous framework. They use the analogy of a car engine for their flow engine framework, where what Csikszentmihalyi and others call "conditions" (Abuhamdeh, 2020) become "inputs", cognitive aspects become "processing" and the effects of this operation (such as absorption, positive affect and task achievement) are the "outputs" (Šimleša et al., 2018, p.235) - I feel a better analogy here might be the identical "input, process and output" stages of how computer processors work.

Calls for clarity on flow are significant because Csikszentmihalyi worried about "'breaking the spirit'' of his theory by specifying it too acutely, that flow might lose meaning if reduced to a clinical balance of challenge and skill (Csikszentmihalyi 1992). The phraseology of "balance", "challenge" and "skill" has also been problematic for empirical researchers. Lovoll & Vitterso ask "Can balance be boring?", and in their "Critique of the ''Challenges Should Match Skills'' Hypotheses in Flow Theory" (2012) they argue not for balance, but for an "imbalance model" of skills and challenge to manifest flow[34].

In game design, play should be *safe*, but feel *dangerous* (Crawford, 2003) and it is here I feel the empirical nature of this criticism of "balance" falls foul. While Lovoll & Vitterso's contestation of the idea of a harmonic "perfect balance" may technically be correct, it is not informed by this paradoxical notion that game designers use to ensure player flow. Challenge should always appear risky, but only where a means to survive is provided by the design. In this light, player-learner challenges are balanced on a "cliff edge" of perceived failure, as an im-balance would mean falling. The enjoyable engagement of games comes from a façade of peril; the mountain climber or musician about to step on stage, making that step because it is a perilous but achievable balance of skill and challenge. Research into game design difficulty curves and player engagement strategies could here be revelatory.

[34] This is somewhat self-inflicted as Csikszentmihalyi and Nakamura (2010, p. 187) attempt to specify specific ratios of challenge and skill. Giving 50:50 for enjoyable experiences, but above 60:40 above will cause anxiety.

Csikszentmihalyi implies skills and behaviours are proximal in their relation, not in terms of harmony as the positive emotional state Lovoll & Vitterso intuit, "a sense that one is engaging challenges at a level appropriate to one's capacities" (Nakamura & Csikszentmihalyi, 2002). While Šimleša et al., (2018) maintain a "doer [who] underestimates or overestimates his skills or challenges, reaching a state of flow is not possible." (p.236) providing the example of a musician performing a poorly-practiced piece would result in on-stage anxiety should they not have skills to overcome the challenge. They also present the opposite state, that if a musician is given a piece "below them", there is potential for apathy, even indifference. When balance is achieved, the zone of optimal experience is unlocked, so their interpretation of initial balance being one of "very slight misbalance" (p.236) is closer to my interpretation of "perceived imbalance" for absorbing autotelic experiences[35].

Kawabata and Mallet (2016, p.8) might be accused of engaging in lexical semantics in their drawing issue on what Csikszentmihalyi means by "optimal experience". Stating flow activities which are self-destructive (Nakamura & Csikszentmihalyi, 2002; Schüler, 2012) should not have the nomenclature of "optimal". This is an "on the nose" interpretation that Šimleša et al. (2018) repel through their use of an engine metaphor which I extend below:

Optimal experience refers to the car's engine being well oiled and race-ready, and its being able to function at peak performance. It is not how the driver intends to use it on track. It is not a moral positioning of a racing driver's tactics. Csikszentmihalyi does not "oversimplify" optimal experience not burdening it with such morality. The phrase simply defines an engagement state as to whether it is effective, and that its effectiveness is pleasurable in operation - irrespective of its overall impact, and especially where it brings about loss of reflective self-awareness (Abuhamdeh & Csikszentmihalyi, 2012).

Much of flow research concerns the mastery of sports, the development of positive emotions and life-long skills (Šimleša et al., 2018). Csikszentmihalyi himself notes flow can be "so enjoyable that people will do it even at great cost, for the sheer sake of doing it" (1990, p.4), opening implications that over-engagement (or doing something for too long) may be unhealthy. While one researcher has made a leap to implicating flow in addiction (Amos, 2017), Wu, Scott, & Yang (2013) state gaming addiction as "a recurring behaviour that is unhealthy or self-destructive which the individual has difficulty ending" (p.206) outlining a more destructive psychological cycle of negative emotions than flow encompasses in its positivity . Such inference makes no note of factors such as "the gambler's fallacy" (Bar-Hillel &

[35] Autotelic experience is Csikszentmihalyi's term for those undertaken for their own sake (Abuhamdeh, 2020).

Wagenaar 1991)[36]. Flow has been identified as resulting in ethical blindness when goals are being pursued, although Aleksic (2016) looked at business practices and not games or game development.

Kardefelt-Winther (2017) notes more broadly that research on technology addiction leverages too great a variety of research questions. The findings of studies are often inaccurately portrayed by the media and other researchers, while their terms are often misused by parents (Johnston, 2021). There are significant ongoing debates as to what it means to have a digital addiction and more research and the widespread application of flow pertains to almost every perceivable activity be it healthy or otherwise (Aleksic, 2016; Wu, Scott, & Yang, 2013; Starcevic, 2013) where challenge balances skill.

In the most recent work on flow and engagement, technology and play are found to have a "rightful role" in childhood development, that is of "critical importance of supporting children's agency and digital citizenship skills from a young age". By accessing technology in supportive environments children learn "to critique content, balance screen-time with non-screen time and to develop self-control and self-regulation", facilitating "long-term positive outcomes for children in their digital lifeworlds" (Johnston, 2021, p.1). This perspective chimes not only with Csikszentmihalyi's beliefs (1975), but also Routledge's (2012) that positive emotional engagement creates upward trajectories and fosters cognitive states which are more open, reflexive and socially interactive, where negative experiences can be reflected upon. Experiences of addiction are negative spirals, provide little room for such reflection (Tugade & Fredrickson, 2004; Johnston, 2021).

C. Education & Flow

While my professional practice of game design is experiential, there are examples indicating the significance of flow "loops" in education. For game-based learning, Kearney & Pivec's (2007) "recursive loops of game based learning: a conceptual model" and Sweetser & Wyeth's (2005) study on improving player re-engagement through game-flow analysis. Both studies recognise powerful engagement, aligning learning with current games-industry terminology (Kriel, 2015).

Flow is increasingly important to education. Kiili (2005) believes flow is a relevant state for learning, providing a feeling of "total involvement" (Arya et al., 2013) with many educators now seeking to foster the conditions from which flow may arise for the classroom as "passive teaching modes can seldom elicit the quiet intensity characteristic of flow" (Carnes, 2015, p.390).

Csikszentmihalyi (1975), Papert (1980) (who studied under Piaget) and other significant figures in 20th and 21st century education have suggested play has profound implications for educational

[36] Where chances of a win are misconstrued as conditional to previous events, when separate odds entirely (Kovic & Kristiansen, 2017).

engagement, but there is still resistance and “uncomfortableness” to unlocking full-form play, or “bad play” (Carnes, 2015). As an academic in games technology I can attest to the hesitancy to engage words such as games and play can cause in conversation with colleagues from other fields. It is also true that play is still seen as “tolerable among children and teenagers” yet “wholly unsuited to young adults”, as it condones unprofessional behaviour viewed at odds with traditional aims of higher education and the advancement of “hard knowledge, rooted in reality, confirmed by science, and upheld by reason” dispersed to young adults. (Ibid, p.391).

In the context of the Foundry, “many professors and administrators are boggled by the idea of playing games” (Carnes, 2015, p.383) in formal education, and institutional interpretations still consider play along with most off-topic activity as shorthand for something the opposite of learning occurring. This raises profound concerns about how we might progress approaches to learning engagement. Enjoyment and off-topic activity is not an indicator of stifled pedagogy, a lack of “serious” content or some other curriculum deficiency. The relationship between flow and play is evident, especially at the forefront of early childhood pedagogy (Gray, 2015). Studies by Cowley, Charles, Black, and Hickey (2008) and Kiili, Lainema, Freitas and Arnab (2014) recognise the challenge, skills, and achievement of flow’s incorporation as a zone of proximal development, making it compatible with Gee’s nurturing affinity space (Gee & Hayes, 2012) and the agency of Foucault’s heterotopia. Unfortunately, this thinking has yet however, to make its way to many institutional managers and decision makers.

While gaming, players experience flow as chains of rewarding, enjoyable successes that drive game progression. From the elation of “making it to the next level” or “having just one more go”, flow manifests because a game developer provided the setting for a continuum of challenge to exist in which the player situates themselves. We teach that successful games balance a difficulty against player skill at a given game stages, so that as player proficiency increases, so does the challenge. Functionally, there is no exit point until either player skill exceeds the challenge (boredom) or game challenge exceeds player skill (anxiety) and in this light, such flow in standardised FEAR-full settings remains utopic thinking.

During jams, flow may be considered during the initial design phase, but it is more-likely also experienced during the challenging practice of game development itself where jammers embody Seymour Papert’s constructionism and the active engagement of learning by doing (Fowler et al., 2013b; Musil et al., 2010; Preston et al., 2012). Flow is crucial here as it allows jammers to avoid anxiety and boredom, sustaining optimal experience and maintaining engagement well beyond what can be expected or witnessed from formal curricula.

Significantly, flow is now starting to be recognised in context of virtual affinity spaces and the design of educational experiences (Savva & Souleles, 2020). It is useful in overcoming issues of politics and hierarchy that can stifle student ability or pose dangers to learner motivation and identity (Riggs, 2006). Its positive attributes are also common to heterotopia and affinity space, because goals are easily understood and jammers "need no self to bargain about what should or should not be done" (Csikszentmihalyi, 1975, p.49).

3.4 Conclusion

This literature review is somewhat selective given the multi-disciplinary nature of its three theories. My aim was to show that engagement and behaviour across different conceptions of (heterotopic or affinity) space can become visible through flow. The remaining chapters of this thesis build on this position with a view to establishing the tangible impact of heterotopic affinity space on learner agency and engagement.

Figure 23 overleaf visualises the connections I made during this literature review over the gap between heterotopic affinity space and flow (Fig.22). The many arrows are specific connections which locate this study at the centre of this gulf and show my research context, aims and questions imported.

My "post-it notes" are now the major gaps my reviews exposed. The arrows between these gaps make the research context of this study navigable. The centre of this interconnected web is entitled "this study", positioned between Barden's heterotopic affinity space, and flow theory as its conceptual centre. The gaps and my reflections positioned overleaf resulted in the development of my theoretical framework (which follows overleaf):

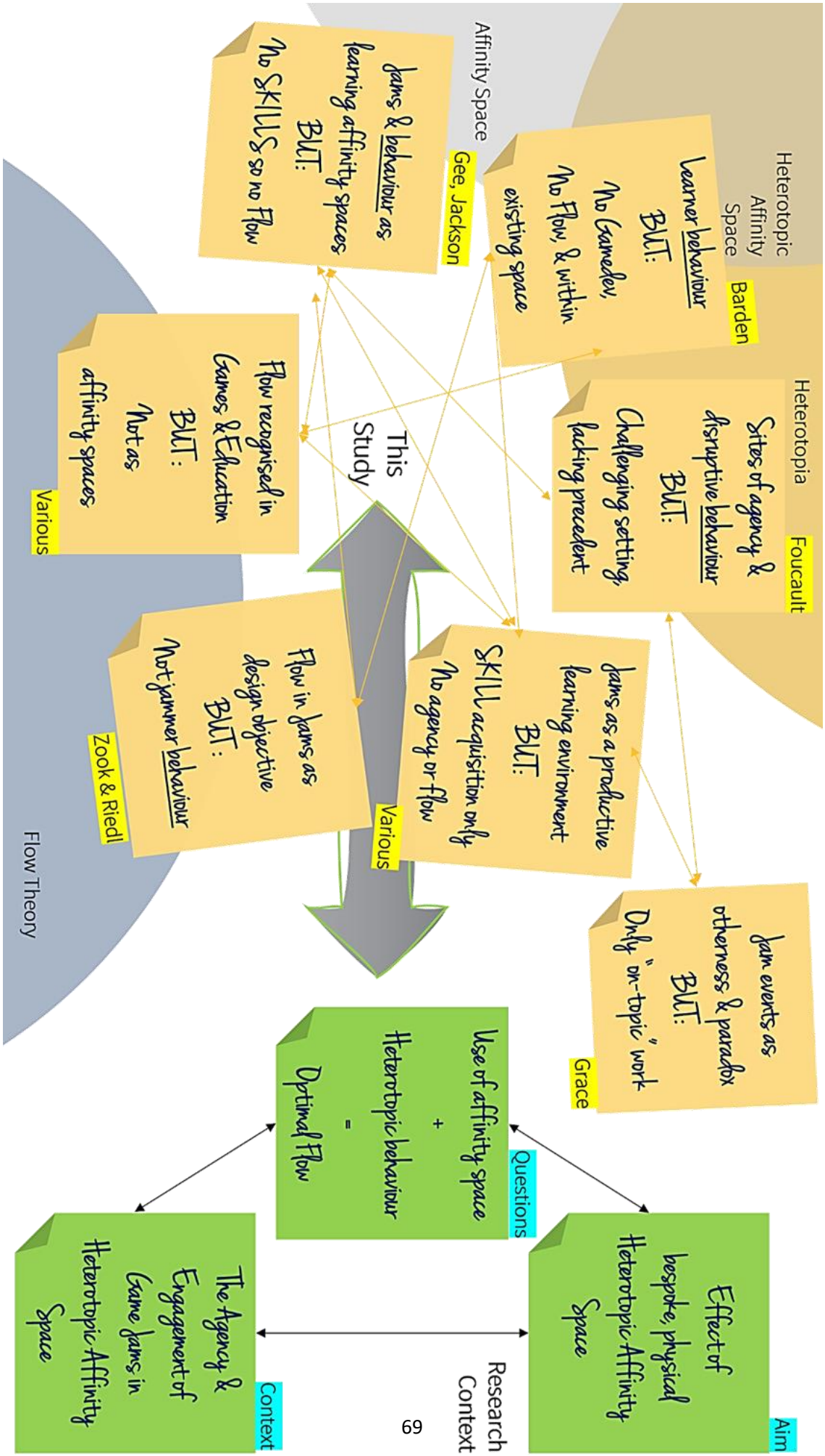


Fig.12 My resultant 'gaps' between flow and (heterotopic) affinity space in literature now mapped.

CHAPTER 4: Theoretical Framework

Here I define key concepts for this research drawn from my literature review. Flow theory, affinity space and heterotopia again feature, but specific developments and models of affinity space that have emerged are central.

4.1 Gee's Nurturing & Passionate Affinity Spaces

Gee's theory is pivotal to this study of game jams in heterotopia, because jammers navigate unique learning trajectories in settings that are "spaces of complex opportunity" where "social journeys" are embarked upon with others different to themselves, but with whom affinity for the goal is shared (Gee, 2005, p.231).

The Foundry is a progressive learning environment inspired by Gee's notion of affinity space, and the passionate and nurturing activities (Gee & Hayes, 2012) of individuals and groups. It is a unique on-campus space for technology projects and events, with an aesthetic and layout made possible by Barden's blending of Foucault and Gee's theory. The Foundry draws on Freire's Pedagogy of the Oppressed (1993) as Freire saw formal education an activity that "anesthetises and inhibits creative power" as opposed to one that should provide a "constant unveiling of reality", where learning has impact beyond the classroom (Freire, 1993, p.77). Affinity space supports Freire's notion that institutionalised settings and pedagogy continue to "maintain the submersion of consciousness" despite the demand for "the emergence of consciousness and critical intervention in reality" (Freire, 1993, p.80) which aligns with the industrial agency required of technology graduates (and the original rationale for the space).

Formal education continues to organise cognitive ability by age (Piaget & Inhelder, 1969), but affinity space allows us to avoid complications of community and membership, and place emphasis on how space supports collaborative learning of more diverse groups (Jackson, 2016). While Bommarito (2014) criticises the potential regard to which terms like community have been ignored, it is possible to see Gee's formation as addressing some of the same semiotics that Lave and Wenger approached through communities of practice and their work on situated learning (1991).

Nurturing affinity spaces are one of two significant extensions to affinity space theory. Nurturing spaces are those where experts feel they have something new to learn and newcomers feel it is easy to join the space. The norm of such spaces is to support others and be an audience when something is produced (Gee & Hayes, 2011, p.30). Gee's (2012) description of passionate affinity spaces are those of heightened passion for the subject of the space, where people produce as well as learn. They differ from nurturing spaces as there are sometimes rules of conduct, behaviour can be regulated by other

members, and people can earn status and influence meritocratically due to their accomplishments. Age and demographics remain unimportant in this variation, and there is no need for similar levels of passion.

Gee and Hayes's writing on passionate and nurturing spaces provides significant lists of the qualities and variations that such affinity spaces should pertain (2012), and these are drawn out in the previous affinity space literature review. However, they also matter here because they are lent to Bommarito's situated model of affinity spaces (which features in this theoretical framework), and also exist as states of intent in the development of my own model as the second significant original contribution to knowledge developed by this study.

4.2 Barden's Heterotopic Affinity Space

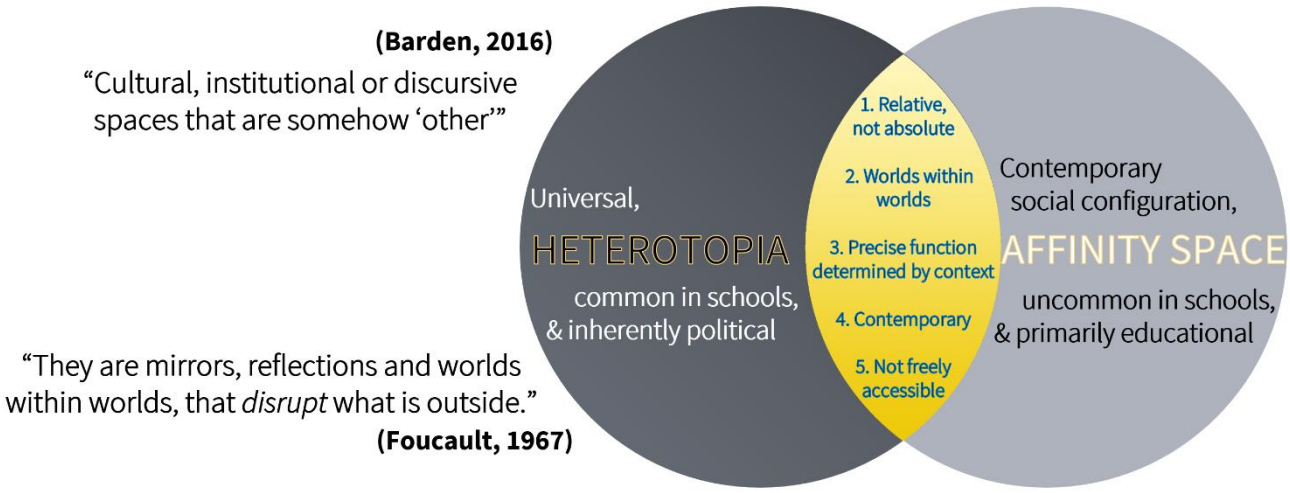


Fig.13 Barden's Venn (2016, p.230); where disruptive heterotopia renders affinity space compatible with education.

Barden's study reconfigured a dyslexia support workshop "into a space which exhibits features of both a heterotopia and an affinity space" (2016, p.222), his research positing a hybrid that the Foundry was built in the image of. Heterotopia accentuates affinity space towards the transgressive, and disruption from norms results in disruption by learners. For Barden, college leaders permitted more usual activities be set aside, while learners gained access to tools (software and websites) more usually blocked on college computers (2016, p.224).

The Foundry, as physical heterotopia, resulted in similar disruption, and "off-topic" behaviour and artefact generation that was beyond the scope of the game jam. As with Barden's college setting, the FEAR-less space by design, was disassociated from formal educational norms and the academic regulation than when jams (or dyslexia workshops) were run "by the book".

Foucault believed heterotopias were spaces of deviance and defiance, and that fears drove people to build heterotopias (Foucault, 1998) to be protected from things (Pitsikali & Parnell, 2019, p.2). So, it is reasonable to posit that instantiating heterotopic campus affinity spaces might not only make *informal* learning more palatable to *formal* education, but might also be an undertaking that ultimately protects learners from the harms of institutionalised education itself:

"*Traditional educational environments provide students with experience,*

but these experiences are damaging"

(Jackson, 2016, p.66)

4.3 Csikszentmihalyi's Flow of Optimal Experience

To be "in flow" means to have subjective experience of engagement with "just-manageable" tasks (in terms of the challenge that tasks present), where feedback on progress is clear and changes in direction can be made based on that feedback. The subjective experience of these periods is that flow is experienced "moment to moment", and tasks fall away as the next challenge is accepted (Nakamura & Csikszentmihalyi, 2014, p.90).

There have been other approaches to the assessment of task or activity engagement, such as that of "task involvement" (Nicholls, 1984), "cognitive engagement" (Fredricks, Blumenfeld & Paris, 2004), and more recently "attentional involvement", that "represents the degree to which one's attention is devoted to the activity at hand" (Abuhamdeh & Csikszentmihalyi, 2012, p.258). Unlike the empirical purposes for which the above techniques were developed, it is the inherently positive manifestation of flow as an emotional state that allows the different streams (and behavioural states) of this thesis to become interwoven.

Flow is the experience that sustains best-selling videogames, maintains attention, and challenges players to improve their skill as they progress through a game. Flow is also an experience encountered in the creation of videogames themselves. In this light, the wider field of positive psychology can be aligned not only with the powerful affinity games can foster in shared spaces, but also as a goal for progressive education; as learning engagement should not be an unenjoyable experience, or the experience of falling out of flow and its boredom or anxiety (Csikszentmihalyi, 1975b).

Game jam projects do not progress as if more usual learning, or by following industry practices, but as intense (often) 48-hour phenomena requiring what might be considered extreme and perhaps enviable levels of participant engagement (less exhibited in formal learning). For activities that can manifest it, flow is not a continuous state. It is a "groove" of intense engagement that has been shown to have rewarding effects, in activities ranging well beyond games and game development alone, with

research that focuses on themes of performance such as marathon running (Schuler & Brunner, 2009), musicianship and mountain climbing (see previous chapter). The temporal distortion that occurs once a flow state is achieved is where participants "are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself'' (Csikszentmihalyi & Rathunde, 1992, p.59) and it is this experience in affinity space which sustains jammers and their game jam performance. In flow, players are operating at full capacity (Deci, 1975). It is however, a fragile state, because if game challenge exceeds a player's skill, it results in anxiety. Or, if their skill exceeds available challenges, they will relax, become bored (Nakamura & Csikszentmihalyi, 2014), or even frustrated until they "formulate new goals and create a new flow activity" (Csikszentmihalyi, 1990, p.6).

There are also parallels between flow states and affinity space which are developed through my data analysis and interpretation of Bommarito's research (2014) on affinity spaces and the deterioration of relevant "on-topic" activities. My analysis considers off-topic activity during lateral moments may be a powerful benefit of heterotopic affinity spaces, where individual and group distractions become "crashmats", or times to reflect, repair or re-fuel cognitive processes post-flow. So in less-heterotopic spaces, if there are less lateral moments there may be more negative emotions associated with flow deterioration.

4.4 Bommarito's Situated Model of Affinity Space

Bommarito's situated model for affinity space (2014) supports the assertion that affinity spaces may change or shift in overall type (Gee & Hayes, 2012). His model allows for the positioning of different types of affinity space that, depending on the type of work being undertaken, allows them to be understood by being situated across two "on-topic" quadrants of activity. The quadrants of his model are passionate seriality (individual) and deliberative group activity.

Bommarito's model is a predominant feature of my post-analysis return to theory, and a discussion through which I laterally apply my findings in order to interpret the shifting states of individuals and illustrate how jammers experience different parts of the model at different times. After introducing four layers of findings drawn from my analysis, I translate his model for affinity *spaces* to one of those for different phases of heterotopic affinity space engagement (PHASE).

Bommarito's work develops Young's notion of "seriality" (1997) to consider affinity spaces where participants work towards a shared goal without the need for *connectedness* beyond the space itself. The GGJ is stronger than Young's analogy (of waiting for a bus, and passengers coming together to discuss its lateness), because jams consist of adult learners, industry veterans and the hobbyist public,

drawn to a space which binds them in shared pursuit for a duration after which they return to their normal lives (Fowler et al., 2013a).

The implications of Bommarito's model on this research is significant because his model does not consider heterotopic affinity space or the Foucauldian *otherness* of behaviour that my study concerns. There is no mention or location of flow in his model, as it situates spaces, not states (although the individual work he describes facilitates my interpretation).

4.5 Jackson's Energising Moments

Jackson's study of game jams as contemporary learning events considered the prospect of affinity spaces in schools. Jackson talks in terms of jams as occasional events and does not do the work of this study in terms of physically mediated space or Barden's heterotopia. Without hers though, my study would not have been possible, not only because she looked at the emotional experience of jammers during the design phases of a game jam, but due to how she interrogated her data.

Jackson describes energising moments as "a reflective research tool I developed during data analysis" that she "applied to identify moments where "participants were most engaged", because her study needed a mechanism that would "draw attention to the moments when participants were most deeply engaged and excited by the project related work" (Jackson, 2016, p.63). Jackson's conception of engagement is drawn from her learning and teaching, and while her jammers did no technical development, her premise of jams as school-based affinity spaces, and the process through which she developed energising moments are understandings vital to this study.

I planned originally to look for the "highs and lows" of jammer activity, to identify where disruptive heterotopic behaviour manifested. My consideration being the lows represented "critical incidents" (Flannagan, 1954), and the highs being Jacksons "energising moments". But while immersed in observation, around such variety of unfamiliar behaviour, I realised my approach was in-direct for my purposes, and Jackson's process could instead be leveraged to develop my own conceptual lens to identify significant emerging behaviours.

Jackson chose to develop her own construct; the positive energy relating to game conceptualisation to critically examine the extent to which her jams were nurturing affinity spaces (Jackson, 2016). Lateral moments would allow me to examine moments of *otherness* where jammer agency led to engagement that (at least on the surface) appeared contrary to jam goals.

CHAPTER 5: Methodology

In this chapter I discuss my rationale for an inductive, qualitative research methodology, and how my research questions were enhanced by the emerging themes of this study and my initial aims (below):

1. Understand more about disruptive behaviour manifesting during Foundry jams.
2. Explore if emerging disruptions and/or distractions during Foundry jams can be classified.
3. Investigate if engagement is affected by these accentuated individual and group behaviours.

These aims addressed gaps in knowledge around game jams as affinity spaces, institutional affinity spaces, and the agentive effects of heterotopia on participant engagement. Subjects of interest were participants of the 2019 GGJ (jammers) and their process of team-based game development within heterotopic affinity space. Flow as a *state* of engagement is well established in positive psychology and game studies, yet unrecognised in affinity space and heterotopia research. Thus, my research aims aligned across themes of *connectedness* (affinity space), *otherness* (heterotopia) and *intentness* (activities or behaviours) of jammers in the Foundry as follows:

1. Understand more about disruptive behaviour manifesting during Foundry jams.
   - The effect of heterotopic affinity space on jammer activity, i.e., their intentions or *intentness.*
2. Explore if prevailing disruptions/distractions during Foundry jams can be classified.
   - Jams fulfil Gee's notion of gaming affinity spaces (Jackson, 2016), signifying *connectedness*.
3. Investigate how engagement is affected by these individual and group behaviours.
   - Jams within heterotopic affinity space (Barden, 2016) provide a theme of *otherness*.

The impetus for this study was an increased overall "volume" of jam behaviour in the Foundry. There was much more "going on" here compared to lab-based jams. It was this additional activity with which this study is concerned, which I refer to as emergent behaviour and where I aimed to provide responses to the following questions (and themes) of this study:

1. How do jammers engage with physical heterotopic affinity space? (connectedness)
2. What behaviours emerge while jamming in heterotopic affinity space? (otherness)
3. How does "flow" present for jammers in heterotopic affinity space? (intentness)

This chapter commences with my broad theoretical positioning, before I outline a shift in approach from intensive case-study to mini-ethnographic case study (Fusch & Ness, 2017), and conclude with the interactive research design (Maxwell, 2020) for this study. My research methods are discussed in Chapter 6.

5.1 Qualitative Research

The use of non-numerical methods supports a deeper examination of meaning (Kakabadse & Steane, 2010) while removing ambiguity from observed phenomena (Kurt, Inman, & Argo, 2011). Qualitative research also condones and facilitates creative analytical practices across a wide range of data sources (Dowlatshahi, 2010; Mansourian, 2008).

Game jams have been used in teaching since the mid-2000's (Fullerton et al., 2006), but research into gaming affinity spaces has only recently moved to embrace emotional states like "challenge" and "frustration" in the context of constructionist pedagogy (Marone, 2015; Harvey & Pence, 2021). This shift strengthens my basis for a qualitative methodology as it forms tangible connection between my epistemological perspective (of constructionism) and my theoretical framework that comprises concepts pertaining to Gee's affinity space and Csikszentmihalyi's flow. The study of game jam settings has been predominantly quantitative prior to this study (e.g. Alencar & Gama, 2018; Wearn & Mcdonald, 2016), but research into jams as approaches (and spaces) for teaching and learning has highlighted their trans-disciplinary nature, and that they exist at a nexus of game studies and the educational sciences. Game jams are recognised sites of learning (Meriläinen et al., 2020) that have been categorised as both "nurturing" and "passionate" affinity spaces (Bommarito 2014; Gee & Hayes, 2012; Jackson, 2016). There have been calls for research into jams as pedagogic interventions (Fowler et al., 2013b; Meriläinen et al., 2020). Interestingly, research into jam sites is often quantitative, while the overwhelming body of affinity space research is more qualitative (e.g. Barden, 2016; Magnifico et al., 2017; Marone, 2015).

The Foundry is a virtual and physical heterotopia for student-led technology projects, game jams and hackathon events that exists aesthetically and operationally within a "bubble" of campus affinity space (Jackson, 2016) at UWE Bristol (King & Reed, 2020). Given the emerging implications of affinity spaces *and* heterotopic spaces within educational institutions (Barden, 2016; Bommarito; 2014; Jackson 2016; King & Reed, 2020) *and* the increasing recognition of game jams as learning interventions (Meriläinen et al., 2020) my approach required the flexibility and *unknowingness* of an inductive approach to exploring disruptive behaviour in heterotopia. A qualitative study would allow me to delve more deeply into participant behaviour and "invite the unknown" (Holliday, 2016, p.6).

I needed to understand how jammers engaged with the Foundry, what any significant emerging behaviours might be, and if it had a bearing on jammers achieving a state of optimal experience called "flow" (Csikszentmihalyi, 1975b). I decided on an inductive approach due to the balance of opportunism and principles in qualitative research (Holliday, 2016) and because I did not start with preconceived notions of what was happening, what was important, or with any theories in mind.

Instead, the emerging behaviour I pursued required creativity and methodological flexibility due to the intense and novel setting, but also structure and rigorous alignment with social science; Holliday refers to this as the judiciousness of interactions between cultures of setting and process (2016, p.8).

5.2 Case Study

I had planned to conduct an intensive, interpretive case-study, as I had a deep understanding of game jams and also the design of both virtual and physical learning spaces. I knew that my data collection required deep immersion in a known field (Thomas, 2011), and case-study allowed me "to enter a research field in which we discover the unknown within well-known borders" (Starman, 2013, p.42). It was interpretive as I had not set out to prove a specific theory, but rather to look "with fresh eyes" to learn something new (Eysenck, 1976). I needed to understand more about how jammers behaved in a progressive new setting of disruption and agency.

Case study seemed optimal for answering the "how" and "why" of my research questions; the context of the Foundry and the GGJ was "known" and "important", but the separation of different behavioural aspects were not yet clear (Baxter & Jack 2008, p.545). The "time-sensitive" nature of case study was also useful (Andrade, 2009; Baxter & Jack, 2008; Yin, 2014), as jams are intensive 48-hour videogame development events where teams develop games before time runs out (Deen et al., 2014; Musil et al., 2010).

Time-sensitive aspects of game development activity was of interest, and case study was well suited to the analysis of activity viewed through an analytical lens such as Flanagan's "critical incidents" (1954) or Jacksons "energising moments" (2016). While these processes were formative to my thinking at the outset, I had not considered the extent to which Jackson's energising moments would become a catalyst for my own "lateral moments" during my analysis.

5.3 Mini-Ethnographic Case Study

Case study facilitates in-depth explorations of multiple perspectives and in concise frames of investigation (Stake, 2005), but it was not the methodological choice I thought it was (Flyvbjerg, 2011). There was "complexity and uniqueness" (Simons, 2009, p.21) to jamming in heterotopia, which would lead to a need for "analytical eclecticism" (Starman, 2013). As my data collection approached, I still did not know the explicit behaviours I was looking to study, so case-study alone was not an appropriate method in of itself (Simons, 2009). Researchers should specify a design that gives best chance of addressing their research questions (Fusch & Ness, 2015) and that can collect the most effective data

sources (Fusch et al., 2017)[37]. Instead, I pursued a hybrid model, blending two methodologies to mitigate each design's limitations (ibid. p.2).

Ethnography in learning space research dates to Dewey's experimental classroom pedagogy and self-reflective teaching practices (Watson-Gegeo, 1997; Dewey, 2013). Ethnography means "learning from people" (Spradley, 1979) and the "description and interpretation of a culture or social group" (Holloway et al., 2010, p.76). Re-framed in this light, my research pursued the culture, practices and behaviours of jammers and teams during the Foundry GGJ 2019. Understanding would be drawn from their common experience through language (Spradley, 1979), as jammer voices are rarely heard in jam research[38].

Mini-ethnography focuses on a limited area of inquiry within a broader field of investigation (White, 2009; Storesund & McMurray, 2009), "particularly when time or monetary constraints are evident" (Fusch et al., 2017, p.5) and where an understanding of what is remembered by participants (White, 2009) during interview is required. While doctoral students are encouraged to avoid ethnography due to time constraints (Storesund & McMurray, 2009), mini-ethnographies are shorter (White, 2009), timescales can be measured in days or weeks (Alfonso, Nickelson, & Cohen, 2012) and "cultural data" capture can be undertaken intensively (Storesund & McMurray, 2009).

The complexity of what I sought to understand from jammers in heterotopia was not only the functional, interactional complexity of human behaviour; it was also prospective feelings, beliefs and meanings drawn from those interactions. Ethnography drew me closer to an understanding of Foundry jammers as they interacted within a new and evolving phenomenon (Fields & Kafai, 2009; Bommarito, 2014). A blended "ethnographic case-study" would allow me to pursue "explicit interpretation of the meaning and functions of human actions" (Atkinson & Hammersley, 1994, p.248) while articulating research outcomes from the perspective in which they were witnessed (Spradley, 1979; Fairhurst & Good, 1991).

My data collection in January 2019 retained the framing of a case study, but my subsequent analysis would be more reflectively ethnographic, particularly due to my use of digital technology to revisit events repeatedly, and in context of the reflexive thematic coding of events "bounded in time and space by a case study design" (Fusch et al., 2017, p.926). The general plan for my data collection would remain unchanged by this updated methodological stance, as mini-ethnographic case study considers data methods from both designs, and the stories told through my analysis (Braun & Clarke, 2021)

[37] I came to realise analysis was less about code saturation, and more the quality of interpretation that mattered (Braun & Clarke and Clarke, 2019).
[38] Jackson (2016) interviewed students involved in game conceptualisation, but students were not engaged in game development. Affinity space research is yet to consider development practice or game jam development.

would be behaviours bound within the "case" of a weekend-long jam that mini-ethnography condoned (Fusch et al., 2017).

The term "ethnographic case study" is not a new one, despite being seen by some as unconventional (Fairhurst & Good, 1991), but I was more comfortable with this approach because ethnographic case study grants insight from what was said, how participants acted, and how tools and artefacts were used (Spradley, 1979). Most importantly, ethnography facilitated a deeper interpretation of both captured media and coded data - beyond the mere description and explanation of themes, towards the beliefs and assumptions embedded in those themes (Bailey, 2018, p.200). Ethnography supported an analysis "moving from idea to explanation, from data to story, and in many cases from confusion to meaning" (Madden, 2017, p.149).

5.4 Digital Ethnography

Most ethnographic research is compatible with a digital ethnographic approach, as the impact of digital technology increasingly encroaches upon traditional ethnographic practice. Technological developments "offer new ways of engaging with emergent research environments", so digital ethnography is a strong fit for the study of behaviour and engagement of learners in a progressive new setting, where "the material, sensory and social worlds we inhabit" coalesce (Pink, Horst, Postill, Hjorth, Lewis & Tacchi, 2016).

Digital ethnography recognises the "idea that digital media and technologies are part of [both] the everyday and more spectacular worlds that people inhabit", suggesting a conducive alignment with this study's notions of heterotopia and affinity space. Digital ethnography also recognises the importance of decoding human behaviour, and "the relationship between digital, sensory, atmospheric and material elements of our worlds" (Pink et al., 2016).

A significant strength of digital ethnography is its condonement of unorthodox communication and dissemination methods over that of writing alone. For this study, the media harnessed and created by participants, and the recordings from my devices would unlock new "ways of knowing [about] other people's worlds that might otherwise be invisible" or "unanticipated by more formally constituted and thus less exploratory research approaches" (Pink et al., 2016). This final point also speaks to why this progressive take on ethnography was suitable for the exploration of unknown behaviours, beyond traditional (FEAR-full) academic settings.

Digital ethnography is suitable for the study of game jams in heterotopic affinity space for the following reasons:

- Firstly, because alongside my observation and interview activity, "mediated contact" with participants would pervade through the permanence of audio and video recordings linked to this study and its publication.
- Secondly, field notes would not be authored in the traditional manner, instead, written up post-event, with validity triangulated across media artefacts, interviews, and my observations; offering reflexivity to (re)examine events as they came to light or became important.
- Thirdly, the use of digital media was key to answering my research questions and the successful identification (and evidencing) of emergent behaviour in heterotopic affinity space.
- Fourthly, such extensive digital recordings as I planned would provide a truer account of events, increasing the credibility of the study and its results beyond writing alone.

5.5 Ethnographic Reflexivity

"Creative arts is one lens through which to view the world; analytical/science is another. We see better with two lenses. We see best with both lenses focused and magnified."

(Richardson, 2000, p.254)

There has been sustained growth in the use and evolution of qualitative research over the past forty years, yet the well-worn challenges from researchers of more positivist traditions remain (Atkinson, Coffey & Delamont, 2003; Handwerker, 2006; Reeves, Peller, Goldman & Kitto, 2013). Qualitative research only remains reliable if conducted in a rigorous manner. By side-lining questions of validity, interpretivist ethnographers risk marginalising the impact of their studies (Hancock, 2002; Morse & Richards, 2002). Addressing issues of reliability and validity in ethnography requires alternative approaches to those of more experiment-driven positivist researchers (LeCompte & Goetz, 1982).

A great deal of qualitative studies in education and the social sciences have used interviews and focus groups to create *perceptual* accounts of what individuals *think* about given settings and/or their experiences. Ethnography here offers the opportunity to overcome the shortcomings of interview data alone, as observations, interviews, documentary data and rich media can be triangulated towards accounts of behaviours, interactions, and broader social phenomena (Reeves et al., 2013).

My methodological approach advocated a reflexive, interpretivist study, enacted by an interactive research design cognisant of issues of bias, data collection, analysis, interpretation, and ethical considerations (Lukiv, 2004). I sought to understand the sometimes unruly off-topic behaviour and its

effect on engagement in heterotopic affinity space. Ethnography here offered advantages over other qualitative methodologies (e.g., phenomenology or discourse analysis) due to its complete immersion in a social setting and the prospect of rich exploration.

The credibility of digital ethnography can be further enhanced by incorporating reflexivity into its design and operation, where digital media increases both the transparency and accessibility of the study for the reader. Digital assets here serve more than illustrative purposes, and their incorporation seeks to unlock new "modes of evoking the feelings, relationships, materialities, activities and configurations" of a chosen research setting (Pink et al., 2016).

Discussion of internal and external reliability and validity may traditionally reside with more positivistic, quantitative methodologies, but work to bridge the qualitative-quantitative divide has seen ethnographers harnessing mechanisms from both to increase the credibility of their studies. The reliability and validity of my ethnographic case-study depends on the integrity of its internal and external design (LeCompte & Goetz, 1982), so that (despite its unique setting, conditions and my subjectivity) other researchers might develop similar studies. A robust internal design remains compatible with an exploratory frame and preserves the possibility that other researchers might draw similar conclusions so the interactive research design which scaffolds my methods is presented at the end of this chapter.

In addition, Laurel Richardson (2000) provides an important list of descriptors for the appraisal of ethnographic validity (which informed my research design) which I summarise below:

- The study forms a substantive contribution, aiding understanding of social-life in some way, through work demonstrating a deep understanding, that also informed its design.
- The study succeeds aesthetically, operating creative analytical practices which open up textual accounts and invite interpretive responses. Reports are not-boring, complex, and satisfying.
- The author's outputs are reflexive; in terms of how they came to the text, how data was gathered, how ethical issues were handled; accountably and accurately representing participants.
- The study is impactful for readers, is emotionally and/or intellectually affecting, and generates new motivations and questions and in the minds and practices of others.
- The author/study expresses a reality, embodies a sense of lived experience for its duration; and seems "true" through its credible account of reality in terms of its cultural, social, individual or communal sense of "real".

High quality ethnographic work incorporates such elements in its design and implementation, and it is through these considerations that the merit, authenticity and overall credibility of this research can be judged in terms of its ethnographic quality (Reeves et al., 2013).

Reflexivity

Ethnography is fundamentally interpretivist and differs to the positivism of experimental research (in that its data collection typically precedes its hypotheses and its analysis requires more descriptive and reflexive methods). Researchers who ignore threats to the credibility of their ethnographic work risk undermining the credibility of their findings (LeCompte & Goetz, 1982). Traditionally, ethnographers might have observed social activity with little thought as to how the researcher's presence affected subjects of the study and the process of data collection. Reflexivity is an approach to address methodological liabilities in qualitative studies, and it refers to the impact of the researcher's self and the positions they hold on their inquiry.

Reflexivity is a process of ongoing self-reflection on the researcher's beliefs and values and the extent to which it might distort the reporting of social phenomena. A reflexive researcher achieves credibility by presenting their thinking in regard to the positions they hold (Reeves et al., 2013). Reflexivity facilitates researchers to be held to greater account in terms of their claims to reliability and validity as "self-reflexivity brings to consciousness" the "complex political/ideological agendas hidden in our writing" (Richardson, 200, p.254) as "the ethnographic life is not separable from the self" (Ibid, p.253).

While reflexivity is relevant to modern ethnography, it is especially so to digital ethnography (Pink et al., 2016), as researchers here "theorise and encounter the world as a digital–material–sensory environment" where researchers might scrutinise themselves over how their knowledge is produced as our association with technology becomes more relevant over time. Reflexivity here goes beyond a simple notion of bias and considers the subjectivity of the researcher in an exploration of a setting or culture. It is also seen as more ethical than traditional ethnography, as it allows researchers to build from the collaborative and creative ways in which knowledge is created.

By embedding reflexivity in my research design, I considered the potential for of a study that could "identify, explore and link social phenomena, which on the surface have little connection with each other" (Reeves et al., 2013, p.1365) - in my case, what might be considered as negative behaviours and positive engagement. In this thesis, my reflexivity is also represented throughout; from my positionality statement in Chapter 1[39], my selection of digital ethnography and reflexive thematic analysis (introduced in the following chapter). It is also apparent in the manner I return to the literature to evaluate my findings in the discussion and conclusion of this thesis.

[39] My positionality is first introduced and discussed on page 21.

5.6 Additional Considerations

Reactivity

Reactivity is the implication of a researcher in presence of their research activity, known as the observer effect (Onwuegbuzie, 2003). If a researcher is the instrument of analysis for qualitative research projects (Starks & Trinidad, 2007), they must consider the risk of an "inevitable transmission of assumptions, values, interests, emotions and theories" (Tufford & Newman, 2010, p.81). My research design had to take account of my knowledge of the Foundry setting, game jam events, participants drawn from courses I teach and my position as somewhat of an insider, even if I was to be a non-participant observer.

Effects

The Hawthorne effect occurs when participants in a study feel they are being given special consideration (Sedgwick & Greenwood, 2015). My study was required to not elevate or alter jammer experience in any significant way. Rather than risk my data being drawn from contrived situations, I would take an ethnographic approach to video observation (distant) and audio interview (close), enforcing multiple perspectives. This risk was mitigated through this both active and passive, personal and technological data collection. Interviews were scheduled away from key game jam moments, and at routine intervals, with flexibility provided for deferment so the jam remained paramount to jammers.

Novelty effect refers to unnatural responses from participants when reacting to novel stimuli introduced to a setting by a researcher (Onwuegbuzie & Leech, 2007). Jams are an established phenomenon and increasingly a platform for research (Fowler et al., 2013b), with emerging clarity of what constitutes research in a jam setting (Kultima, 2015; Aurava et al., 2021). Nonetheless, jams present challenges to researchers interested in physical settings, as they vary considerably in their form and function. Their primary constant is that of a shared pursuit of a theme, where jammers are energised by tasks and challenges towards their fulfilment (Fullerton et al., 2006). For jam research, their novelty is that of the theme, setting, team makeup and games created.

The use of software and digital media tools for game development during a jam is expected by jammers, so the implications of "novelty effect" of technological stimuli such as video cameras is already muted by related media activity, (e.g., webcams live-streaming the event, or event videorecording). The Foundry is a technology creation space for projects and events, where jammer use of such equipment and is already pervasive. Jams are constructionist events where digital artefacts are made and then shared. Such research methods during a game jam would unlikely be deemed inauthentic.

Biases

Having been previously responsible for the development of the Foundry - a project seeking to address the lack of soft skills in technology undergraduates (see Chapter 2) – such work could initially be seen as a potential bias. However, game jams and this study's aims were never in scope of the former project. While I had considered the overall quality of games produced might improve through better collaboration within the space, and that the work produced might be more politically transgressive (Barden, 2016), jam artefacts themselves were not the focus of this study. I sought to understand why this space was producing inconducive behaviour and what its effect on jammer engagement might be.

Confirmation bias means drawing conclusions on new data, based-on previous hypotheses (Greenwald et al., 1986). Such bias is only a risk during analysis, when other plausible explanations are overlooked that could have been a superior explanation (Onwuegbuzie & Leech, 2007). I had no such prior convictions, or connectivity to work aPriori explained what I sought to explore, due to the relative newness of heterotopic affinity space and the emergent pedagogic validity of jam events.

In terms of order bias, my research design and data collection would be structured in a manner that followed an arc of game development process and generalised jam proceedings. The order in which I would ask my questions would make no difference to the dependability or confirmability of the findings, and wider generalisation to other contexts was not in scope of my study (Ibid, 2007). In addition, so that my study could not be accused of observational bias, I had to ensure that I maximised jammer behaviour capture across the event (through techniques discussed in the next chapter).

Illusory Correlation

In scope of risks to the validity of my data collection, illusory correlation occurs when a connection between events and people is presented by a researcher, where the connection can later be proven to be non-existent (Onwuegbuzie, 2003). I was looking at new and disruptive behaviour that could be catalogued and shown to be experienced by jammers and this would only be possible if there was a depth and richness to my data collection, and rigour to my inductive processes. Any emerging theories, had to be representative of jammer experience, triangulated by their responses and my ethnographic accounts.

5.7 Interactive Research Design

Maxwell's interactive research design (2020) was revelatory for my study development, as it put my methodology into practice and provided solid foundations of internal and external reliability through its design of an explorative study that did not know what it might find.

The model is differentiated by research questions not merely being a starting point, but remaining a central device for the entire design, remaining a "live" tool and more than an abstraction of what occurred (Maxwell, 2020, p.215) and the resources, problems, ethics, and settings of the study form the research environment (ibid., p.218). Comprised of two halves, and four states, research questions remain central to all states, which can interact as research progresses. From the top, research begins with goal development and theoretical frameworks, which influences development of the central questions. The lower half is more operational, where methods are bounded by research goals and the questions at its core. Validity is enhanced by the proximity of methods and questions, which can be drawn-back to a theoretical framework for discussion. My interactive design looked like this:

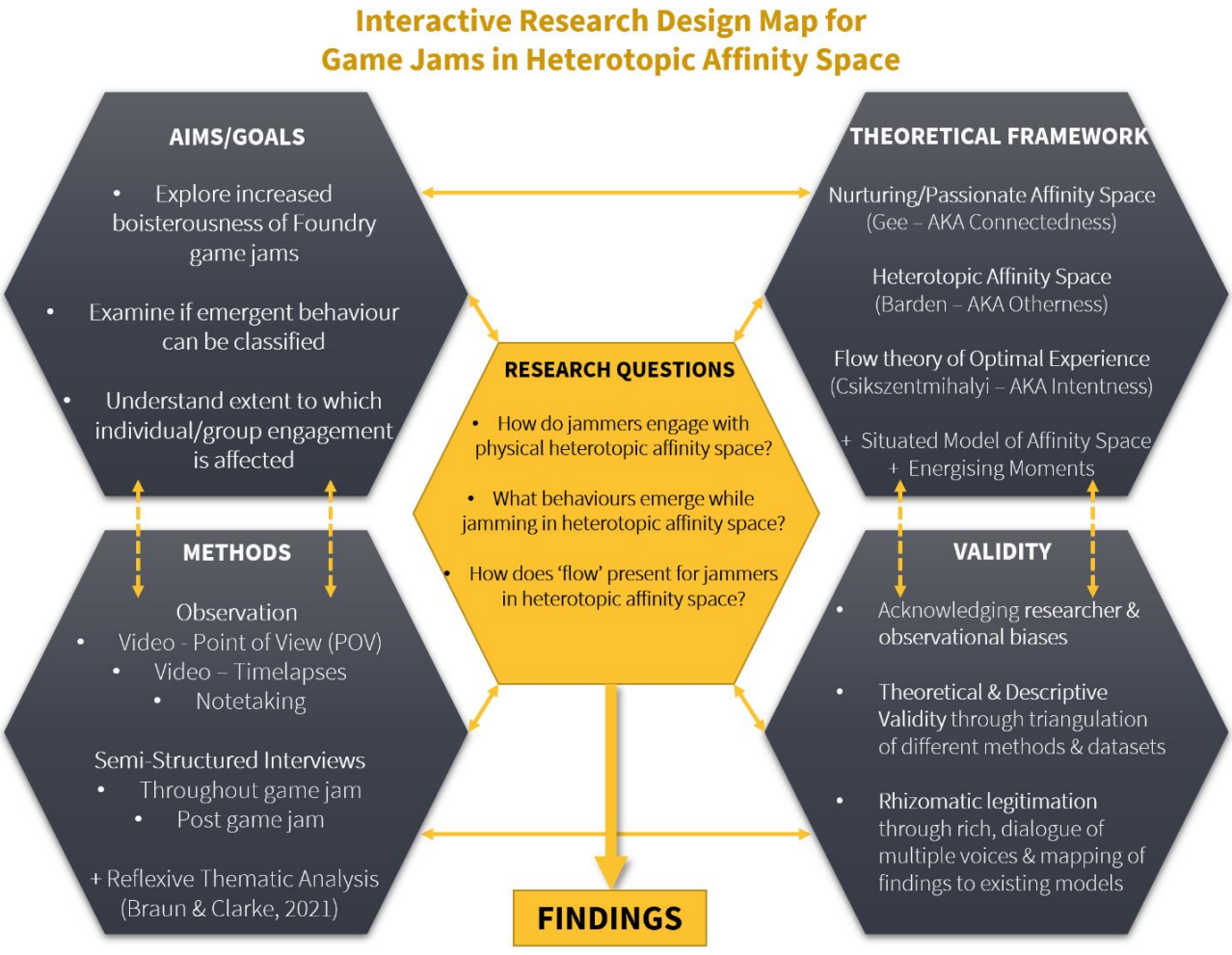


Fig.14 My application of Maxwell's Interactive Research Design Model resulted in this overview.

CHAPTER 6: Research Methods

"Places are not only materially carved out of space but interpreted, narrated, understood, felt, and imagined – their meanings pliable in the hands of different people or cultures, malleable over time, and inevitably contested."

(Gieryn, 2000, p.455)

If positionality considers how personal values, views, and situations influence a researcher's world-view (Sánchez, 2010, p.2), then the Foundry was a product of my positions. My role during the jam was researcher, and other than welcoming jammers and informing them of the Foundry research taking place I had no significant organisational involvement, but I still held power. My data collection hinged on my prior knowledge not having undue bearing on jammers during the event, so I made a mental inventory of my actions, ensuring that I was not perceived as a site organiser, but a reflexive researcher, aware of their position "in the trenches" observing Foundry jamming.

In qualitative research there is an on-going relationship between the researcher and the researched. I acknowledged my "soft power" and minimised my connection with the setting during observation and interview, to mitigate any risk my privilege might amplify certain voices over others or that might endorse certain points of view while dismissing others (Sánchez, 2010, p.3). My positionality and prior experience was important for this mini-ethnographic case study, but I recognised my role faced both inwards to jammers and their behaviours, and also outwards to broader theoretical implications and my study's credibility.

6.1 Foundry Setting

As introduced in Chapter 1, and discussed in Chapter 2, the Foundry was a blank-page exercise to create an off-grid heterotopic campus affinity space aligned with Barden's thinking (2016). It remains a place where students work on technology projects for industry, which hosts participatory technology events such as game jams (Reed & King, 2020). Its existence challenges institutionalised learning spaces, and the processes that manifest them. It is as far as possible a FEAR-less bubble of informal affinity space (Jackson, 2016) within a large "post-93" institution that mirrors, inverts or subverts institutional norms that surround it (Foucault, 1998).

The setting of the Foundry for this research is not one of convenience, as it would have been more predictable to run this study in more-readily understood computing labs. The Foundry presented an opportunity to observe jammer experience of a heterotopic space for the first time, before it was known to a wider student population.

My resulting design considered the behaviour and engagement of jammers through video and semi-structured audio interviews. Digital media allowed data captured during the 48-hour event to be analysed later, giving me time and space to experience the jam and follow-up on leads based on "local knowledge" (Thomas, 2012) of both jamming and the Foundry as separate but connected educational approaches.

For the duration of the event, my ethnographic approach was being "on the ground" with jam-teams, watching and "living" games be developed first-hand, where each team was a case, nested in the wider Foundry setting.

6.2 Global Game Jam 2019

Fig.15 Flyer I designed for Foundry Global Game Jam Events.

GGJ scheduling only provides structure for the start and finish of the event worldwide (and by time zone). Most jam-sites host a formal welcome presentation, where game development commences shortly after a video keynote which reveals the "theme". This theme is vital to the event, as it serves as the central inspiration for all games (e.g., the 2020 event theme was the word "Repair").

Once development begins, teams are free to undertake any process or practice on any game concept of their choosing, and using any technology, provided games are uploaded and (often) presented and/or play-tested by the close of the event.

Fig.16 Jammers at the end of the GGJ 2019 event (who provided informed consent for this photo).

Teams follow simplified development processes derived from industry practice, not solely due to the intense timeframe and inherent complexity of game development, but also due to differing levels of experience within teams, as working to a common denominator of understanding increases the chance of successfully creating and completing a game demo.

In this study I follow students from the third year of Games Technology, who are familiar with game development practice, but for the reader I provide an abridged summary of jam stages below:

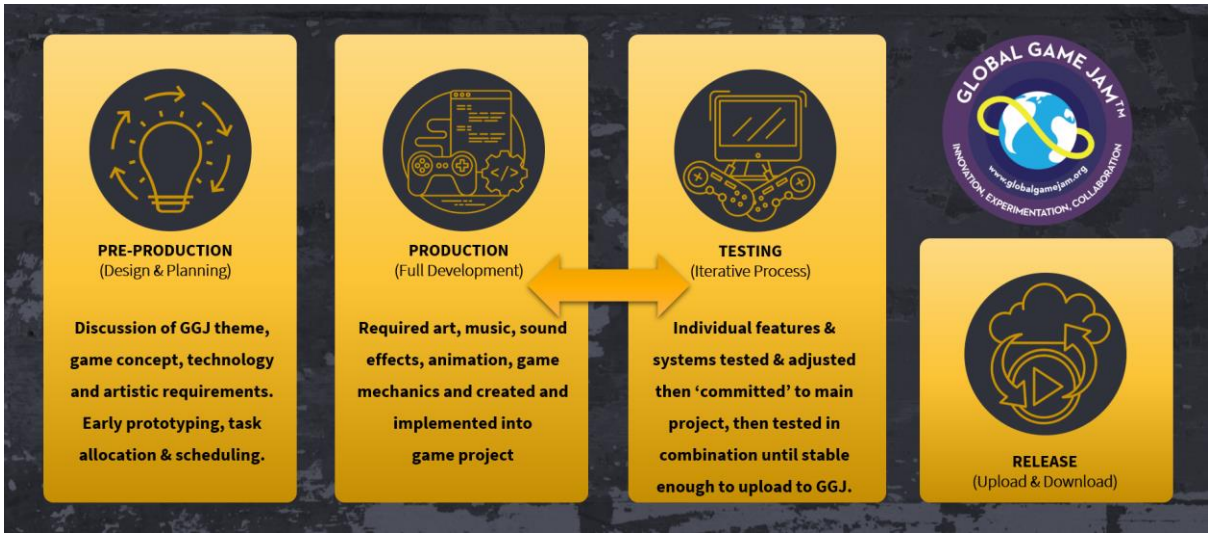


Fig.17 Simplified stages of game jam game development practice.

The 2019 Foundry event was opened by alumni now working for Rockstar Games (one of the world's largest games companies). The jam saw 220 registrations, of which approximately 175 participated on-site until completion. Over 30 games were completed, with 24 games successfully uploaded to the GGJ website by the deadline.

6.3 Data Collection Strategy

In anticipating my likely data, I broke my research questions into prospective "data buckets" (Braun & Clarke, 2019) from which I later expected to find codes and themes arising. I needed to *see* and *hear* how jammers engaged with heterotopic affinity space (RQ1) to recognise the new behaviours arising (RQ2) and to understand how flow presented (RQ3). I chose media for observation (Allen, 2017) so digital ethnography could facilitate a credible representation of how the Foundry was used, but also so my field notes and analysis could re-visit and interrogate potentially complex semiotics not evident in the heat of the moment.

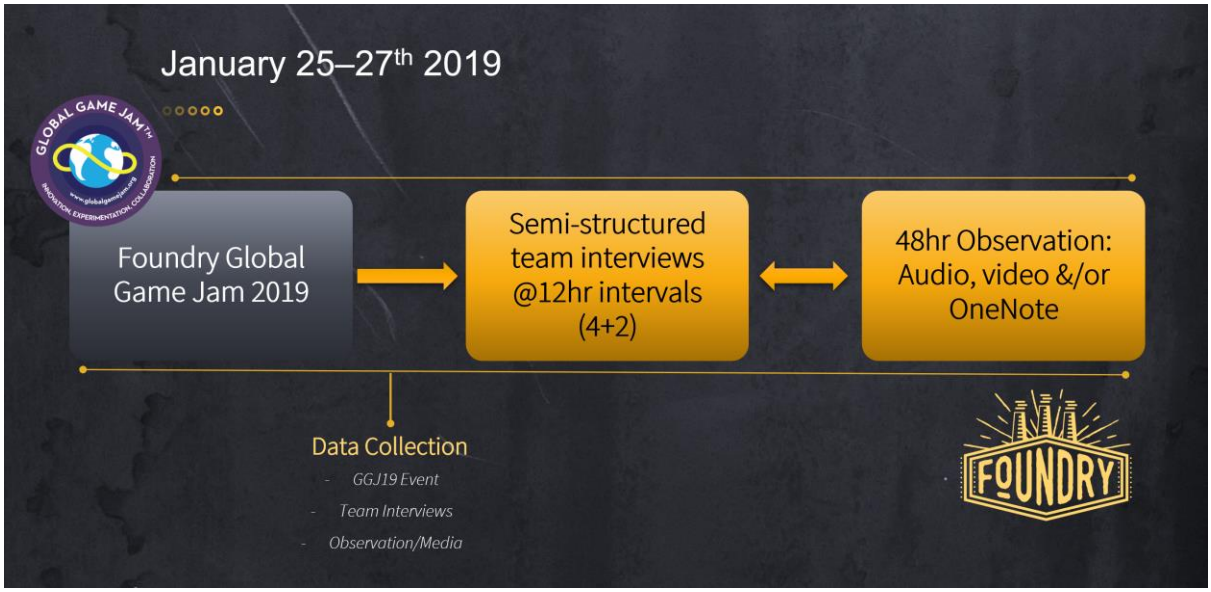


Fig.18: Interviews and observation as an overarching approach for my data collection.

I chose media so what I witnessed could be challenged or corroborated by audio and video, capturing events across the space even if I was elsewhere. My ears similarly would be assisted through audio recording, later transcribed to provide a textual dimension for thematic analysis. This more technical approach added rigour to my interpretation of jammer interactions and through field notes created after the fact; relieved the pressure of attempting to write everything in real time, knowing there was a digital representation of the event to fall back on should any researcher aspects falter.

Because methodology influences the suitability of tools or methods available to researchers, I visualised a route to enquiry suitable for digital ethnographic case study. Through this exercise, I refined my data methods towards a final strategy for collection and analysis which gave me confidence prior to the jam. My initial practice here condoned my shift to reflexive thematic analysis (Braun & Clarke, 2019; 2021) discussed later this chapter.

Fig.19: Early thinking on my data through to analysis prior to considering the (positive) impact of Reflexive TA.

A. Observation

"With oneself as a lens, a researcher observes and interacts with members of a culture in order to understand the culture, and then disseminates the researcher's interpretations to those outside the culture"

(Fusch et al., 2017, p.928)

Observation provides well-established opportunities to gain in-depth understanding of participants and their perspectives. Digital media offers the opportunity to capture behaviour more effectively than notetaking alone (Allen, 2018). I chose video as my primary content of observation not only because it "froze in time" occasions of behavioural interest I could later re-visit, but also aided my data familiarisation, freeing-up my time for my interview process during the jam. Significantly, through multiple, physical, lenses I gained additional perspectives on jammer behaviour beyond my own.

Direct observation is used in case-study and digital ethnography and is distinct from other methods as the observer is a research instrument (Fusch et al., 2017; Holloway et al., 2010; Landau & Drori, 2008; Marshall & Rossman, 2016). Being a free-roaming camera and shooting what appeared of interest for me was interspersed only by scheduled interviews, allowing me to fully absorb events first-hand. Shooting impartial video from fixed points, also brought benefits of indirect observation, and an equity to my hand-held video-recordings. It was important I was not in control of these fixed lenses, as I would gain new perspective from them post-event. Through both fixed and roving cameras in the space, my data gained that of a "Vulture's eye" (Whitty, 2002) as I was now able to switch between such focal lengths in order to make sense of interactions within the space adding rigour and credibility through "a focus on both social structure and individual experience" (Waller & Simmons, 2006, p.1).

All video recorded during the jam was shot on a Google Pixel smartphone in 4k 60fps. Wiped prior to the event for data security and to ensure no network connections. Static timelapse videos were recorded by GoPro Hero 7 black cameras in 4k resolution. Motion-timelapses of the Foundry were captured by a DJI Osmo Pocket with table mount. The pan of the motion timelapse was defined by the furthest limits of the space that the jammers had made their "base" for the event.

B. Fieldnotes

"Ethnographers ultimately produce a written account of what they have seen, heard, and experienced in the field. But different ethnographers, and the same ethnographer at different times, turn experience and observation into written texts in different ways".

(Emerson et al., p.21).

Ethnographers differ as to what the primary benefits of observation are, and in how they choose to represent what is observed. My study was concerned with jammer interactions and exploration of activity less seen in more formal spaces; through deep immersion attempting to understand what was meaningful about disruptive activity in the Foundry (Ibid, 2011). My approach was to capture enough data to allow significant events to come to the fore (Rice & Ezzy, 1999, p.258). This was not dissimilar to Jackson's ethnographic approach to her game jams over several events that allowed her to reflexively triangulate and then re-visit "energising moments", identified post-event as occasions worthy of investigation.

My fieldnotes were written in two post-jam passes, so I could maintain my focus on behaviour as events proceeded, and so what I wrote would be informed by perspectives more removed from my own, increasing the authenticity of my accounts (and the credibility of my later claims). The first fieldnote report concerned the general organisations and interactions of jammers. This aligned to my first research question, as to how jammers set up their Foundry spaces for effective work. A straightforward task which involved corroborating what I had seen with what had been recorded. Secondly, (and later) during data familiarisation, I would triangulate my observed view of how jammers interacted with the Foundry against what I had seen, noted, videoed, or heard discussed by jammers. I would do this process iteratively; firstly, prioritising rich media, and secondly while proofing interview transcripts to render jammer perceptions of Foundry jamming visible.

This approach was not to avoid notetaking. I incorporated (digital) ethnography into my case study because ethnographers want to connect with those encountered in a setting and centre their energies on establishing "holistically and intuitively" how participants think, feel, and interact in a setting. For a study on jamming this meant me pointing the camera in interesting directions, rather than putting

it down to write and risk missing "the experiential insights and intuitions that immersion in another social world can provide", as it is only later an ethnographer needs to recall, examine and write-up their experiences (Emerson et al., p.22).

This approach renders my fieldnotes and later perceptual accounts of the event more credible, in fact my "jammer use of the Foundry" (Chapter 7) and "jammer perceptions of the Foundry" (see appendix) fieldnote reports anchor my research to the event and provide baseline accounts for my analysis, providing the reader a sense of the environment, the setting and jammers themselves. Results of my analysis subsequently provide a third set of fieldnotes for lateral moments identified (Chapter 8). Together, these three reports are the scene-setting and proving ground for my claims to knowledge and theoretical developments in Chapter 9, where they provide a model for Phases of Heterotopic Affinity Space Engagement (PHASE).

Chiseri-Strater & Sunstein (2006) recommend inclusion of the following fieldnote content. The table below compares my approach, to ensure my fieldnotes were authentic and credible:

Fieldnote Practice	My approach
Date, time, and place of observation	The duration of the activity in question. Video and Interview timestamps to corroborate. As with the event timings, all interviews pre-scheduled with participants
Specific facts, numbers, details of what happens at the site	Event location & details pre-recorded in research process, not required in real time (see Chapter 2)
Sensory impressions: sights, sounds, textures, smells, taste	Use of memory, audio and video to record these moments via jammer and research reflection
Personal responses to the fact of recording fieldnotes	Reflexiveness on my part & rounds of semi-structured interviews, to accommodate for personal responses
Specific words, phrases, summaries of conversations, and insider language	Gamedev/Gamer language well known to researcher. Reflexive Thematic Analysis + Narratives post-event
Questions about people or behaviours at the site for future investigation	Behaviours noted/recorded for this explicit function. Re-created and optionally re-visited during follow-ups
Page numbers to help keep observations in order	Observations written retrospectively based on moments identified through triangulation

Fig.20 Table of fieldnote best practice and my interpretation.

C. Participants

Jams can feature diverse teams of students, professionals, and members of the public. But for this event, my desired focus was that of jammers accustomed to FEAR-full spaces, who could form teams of varying ability that I had no influence over. Accessing students for research projects can be a challenge without an established relationship (Jackson, 2016), but my role as leader for final year students enrolled on my "Commercial Games Development" module provided for the recruitment of an ideal sample. During the first semester students of this module work in teams and complete three game jams. This experience meant these students had exposure to jams but no previous exposure to the Foundry. My prior contact with them reduced inherent risks to a mini-ethnographic study of just a few days, and the issues associated with their talking to an "outsider" (see the previous chapter for other potential *effects* I was mindful of). Recruiting this sample provided ample time to introduce my intended research process and its ethical arrangements well before the event.

Of the 40 students on my module, 35 gave their informed consent to participate in my study. 24 across four teams jammed in the Foundry for the duration of the jam. Another four individuals signed up and attended, but either worked outside of the space, or drifted between the Foundry and other areas. These individuals are listed as "others".

I developed pseudonyms before the jam in order to increase anonymity, although I did refer to them by name during my interviews on a couple of occasions, which made transcription proofing more time consuming. Team names and pseudonyms were derived from Eastern-bloc car companies and vehicle models. This choice was due to the brutalism of communist industrial architecture and the paradox of utopian-dystopian realities of interest to me during the Foundry project[40].

Team TICO	Team TATRA	Team TARPAN	Team TRABANT	Others
Felicia	Mikrus	Smutek	Smyk	Moskovitch
Ogar	Gacek	Zil	Zaz	Riva
Oga	Beskid	Uaz	Dacia	Star
Zastava	Maluch	Ziguli	Caro	Warszawa
Kamaz		Lublin		Nysa
Kaszel		Skala		

Fig.21 Jammer and jam team pseudonyms used in this study.

[40] I became fascinated by architecture in Eastern Europe (5th period 1955-1980) where inspiration clashes with utilitarianism (e.g. Spodek in Katowice). Such spaces in history speak to themes of resistance, heterotopia and paradox (as they were dystopian or utopian depending on your viewpoint).

D. Interviews

Semi-structured interviews facilitate open-ended questioning to explore uncharted territory, where researchers need latitude to spot leads and pursue them (Adams, 2015, p.494); something particularly suitable for disruptive, transgressive, or politically motivated behaviour (McIntosh & Morse, 2015), providing the flexibility to discuss interesting behaviours with jammers in a manner prescriptive surveys or interviews would not have supported.

Team interviews constitute a significant body of data for this study, with circa 12 hours of recordings from across the event and follow-up interviews. I visited each team in turn, talking with them about how they configured their space and how they had been working together in pursuit of their game.

Interviews were scheduled at 12-hour intervals throughout the event (to avoid interviews at the most energetic beginning and end of the event); proceeded by two follow-up interviews at one hour and one-month post-jam. The staggered schedule for team interviews had mandatory 12-hourly slots with optional 6-hourly slots interspersed in case a team was not available during the main interviews. Jammers were not forced to attend any interview ("mandatory" phraseology refers to I, the researcher having to attend). Each team was scheduled for four in-jam interviews, 12 hours apart, followed by a short "catch-up" immediately post-jam, and a deeper reflective discussion one-month post-jam.

This sequencing allowed a two-hour window for all team interviews to be recorded, in any order teams were able to talk. Selected times where most jammers would be around, and levels of stress would likely be lower - keeping the beginning and end of the jam clear prevented my research from adding to any negative time-pressure or "crunch" effects (Borg et al., 2019)[41]. Each interview had three "openers"; a question on the use of the space, another on the behaviours of the team and the last on the subject of game development practice. From these questions, conversation was led enthusiastically by jammers.

When an interview slot approached, I would visit team areas and let them know I was ready when they were – if it did not appear they were in flow. The rationale of attendance was that all available members would take part, and a majority was required else I would return later. Of the two post-jam interviews, my intention was to give jammers the opportunity to add to any final reflections to my own thinking on their behaviour and engagement during the jam.

A Zoom H6 digital audio recorder was used, as I was concerned consumer devices might struggle to determine voices during a boisterous event. Digital audio allowed me to focus on my questioning,

[41] I also resolved to not push jammers for a response beyond occasional re-phrasing of questions, due to the unique, sometimes-pressurised jam conditions

while adhering to pre-determined themes or topics. I was “present”, giving busy jammers my full attention. Audio also allowed me to re-live the event and experience jammer responses alongside transcriptions for enhanced data familiarisation.

6.4 Data Sources

Data Source	Format	Description	Notes
Jam Interviews	.WAV recording	-4 Interviews per team. -16 Interviews total. -30 Min maximum duration. -8hrs of audio recording.	Audio transcribed by professional transcription service then checked for errors manually. Recorded during the event. Microphones struggled with audio levels due to boisterous activity.
Post-Jam Interview 1	.WAV recording	- 4 x 5-10 min Interviews. - “hot take” post jam finale.	Recorded immediately after the event in the event foyer.
Post-Jam Interview 2	.WAV recording	4 x 60 mins max, 1 month post jam. Reflective interviews on jamming in the Foundry and my observations.	Recorded by the entrance to the Foundry with no technology events running.
Video Time Lapse Observation	*.MP4 recording	- 4 x 4 hr recordings. - Playback in seconds - Shows team layout & working style	4 Hours was life of each action camera battery. "Time lapses" condense hours into seconds. Approach to "typify" team interactions
Handheld Video Observation	*.MP4 recording	Recording of activity throughout the space of non-typical jam activity	A "show not tell" approach to allow analysis after the fact rather than summarising events via notetaking.
Misc. Fieldnotes	*.ONE Microsoft OneNote	Notes captured as audio, video or text (i.e., narration by researcher. Ad-hoc OneNote usage to scaffold interview timings & themes.	Not intended as back-up to audio/video, but various notes by stylus/text during quieter times.
General Fieldnotes	Whiteboards then *.DOCX	The Foundry GGJ2019, Jammer setup and behaviour.	RQ1 general jammer activity fieldnotes were written up immediately.
Interview Transcriptions	*.DOCX Microsoft Word	4 x Audio transcripts from professional service. Imported to NVIVO and proofed for errors.	Corrections made due to technical terminology, and background noise during the game jam.
Lateral Moments Fieldnotes	Microsoft Word	6(8) significant occasions of lateral behaviour written-up post-analysis.	RQ2 behavioural fieldnotes were written retrospectively from lateral moments identified by phase-one analysis.

Fig.22 Table of data sources for this study.

6.5 Data Analysis Strategy

A. Thematic Analysis vs Content Analysis

Many variations of thematic analysis have emerged since Braun and Clarke first conceived their approach (2021). Phrases such as thematic content analysis, thematic analysis and content analysis appear interchangeable, and describe a multitude of pattern-recognition and meaning-making processes filed under the notion of "coding" (Vaismoradi, Turunen & Bondas, 2013; Braun & Clark, 2021).

Vaismoradi et al. (2013) offer useful navigation, breaking differences between thematic analysis and content analysis down across criterion of aims, philosophy, and the process of research design. By mapping my requirements to these criteria, I confirmed my aims were exploratory, my study was realist (not factist) and my analysis was less concerned with counting codes than discovering latent meaning. I was comfortable in my choice of thematic analysis, but it was not until I neared my analysis that I realised this approach was too-generic and unresponsive.

B. Reflexive Thematic Analysis

In the years since thematic analysis (TA), Braun and Clarke have addressed misconceptions and misappropriations of TA in literature that has seen their approach to coding defined as a rigid series of stages and choices, rather than a mix of semantic and latent, inductive, or deductive activity (Braun & Clarke, 2019, p.592) where codes become themes and themes become stories about patterns of shared meaning.

Braun and Clarke's response to TA's misapplication was the emergence of an enhanced TA approach which values the "subjective, situated, aware and questioning researcher" (2021, p.5) where "reflexivity" is ongoing critical reflection across a researcher's role, practice and process. This reflexivity differentiates this from previous TA incarnations and my use of it for analysis increases the authenticity of this already reflexive digital ethnography and the subsequent academic credibility of my claims to knowledge (Ibid, 2019; 2021)

C. Reflexive TA Process

Reflexive TA is not a focus on the accuracy and reliability of coding itself, but on a researcher's deep engagement with their data and any "course changes" made in deciding "where to go next" during analysis (Braun & Clarke, 2019)[42]. Adopting Reflexive TA was a catalyst for my analysis at the very intersection of my data and its context; I became a navigator, fostering codes, themes and analytic stories, guided by my research design and my experiences (Ibid, p.11). Reflexive TA was operationalised in across six phases I summarise below (but not to be interpreted as a linear process):

1. Familiarisation: Deep and intimate data familiarity content through immersion. My re-reading, re-watching and re-listening to data and writing my field reports.
2. Coding: Fine-grain identification of interesting/relevant or meaningful to research question(s), applying meaningful semantic or latent codes for single meanings or concepts.
3. Generate initial themes (towards candidate themes): Identifying meaning across dataset. Codes clustered that share key concepts towards meaningful "answers" to research questions.
4. Developing & reviewing themes: Assess initial fit of candidate themes against dataset. Checking themes against coded extracts *and* full dataset. Can be collapsed, split, retained, or discarded.
5. Refining, defining, and naming themes, built around strong concepts or essences.
6. Writing up: Begins in phase 3, but earlier informal familiarisation notes/reflexive journaling feed into formal writing, where compelling data extracts tell persuasive stories to address research questions.

(Braun & Clarke, 2021, p.35).

6.6 Ethical Framework

The design and implementation of my study adheres to the BERA Ethical Guidelines for Educational Research (fourth edition, 2018) and each of its key guidelines are addressed in turn. It also draws upon the International Visual Sociology Association (IVSA) and ESRC guidelines with regards to the use of digital media and human participants.

Consent & Transparency

Prospective jammers for my study were introduced to my research plans four months before the event and were given opportunity to ask questions before participant information sheets and inform consent were issued. It was important my research did not feel thrust upon them or that participation was somehow under duress. I ensured all students understood what involvement in my study meant,

[42] I include Braun & Clarke's 10 key assumptions for the use of Reflexive Thematic Analysis in the appendix.

especially given its reliance on digital media. While I was only observing a fraction of the two hundred jammers registered to attend, all were given an overview of the Foundry research taking place and media consent forms were also completed by all who attended the event even if they were not accessing the Foundry.

Participants were reassured that non-engagement or withdrawal was of zero-detriment, and completely removed from our usual curriculum engagements. I ensured site organisers were consulted in the same manner and were granted the same terms. I was always transparent about my research design and open and honest with those proximal to the study. In terms of data, only anonymised and disaggregated media would be published and archived; all personal audio and video recordings not published as part of this thesis would be deleted on conclusion.

Right to Withdraw

My study engaged adults aged 18+, enrolled in full time higher education. None were vulnerable or of limited capacity. Had they been, approval from those responsible would have been sought. I made it clear jammers had the right to withdraw at any time, for any or no reason, and without prejudice. To deal with sometimes fluctuating team dynamics, I enacted the feedback of my ethics approval, adding clarification that if a jammer withdrew, the rest of a jammer's team who had not withdrawn consent would be able to continue, unless the jammer withdrawing requested they did not want this to happen, irrespective of if they were no longer involved in the team project.

After withdrawal from my study, a jammer might also choose to continue the jam. So I asked site organisers to ensure jammers were supported across all parts of the campus jam-site. I also allowed for a situation where if a jammer left a team to join another, or leave the event altogether. In this case only the previous in-scope data would be retained, unless consent was withdrawn. I was also clear that in the event of withdrawal post-thesis submission, the publication and any images within it would not be recalled, but their data would no longer be used in further publication.

Incentives

No incentives were offered to my study participants, and there was no restriction on jammers other than that their on-site jam activity should take place in the Foundry. I had considered this might be seen as a benefit to participation, so I ensured another new learning space called "The Works" was available for non-participants to use so all jammers had the option of a new campus space.

Harm from Participation

My duty of care was to ensure participants experienced no harm or detriment, distress, or discomfort from their participation in my study (BERA, 2018, p.19). I was especially conscious of the extent to

which jammers would be giving me their attention while working to very tight timescales. While the GGJ organisation dissuades sites from promoting jams as competitions (Kultima, 2015), some researchers still refer to jams and hackathons as competitive events (Alencar & Gama, 2018; Kos, 2019) despite their promotion as a safe place for experimentation and learning (Meriläinen, 2019). I was mindful of disclosure and reporting processes for research in this regard, so advised site organisers of the process if activities likely to lead to the harm of participants were identified. My interviews were also staggered to avoid periods of intense workflow, particularly away from the start and end of the jam, while site organisers provided refreshments, meals, social activities, and rest areas to aid wellbeing.

Privacy and Data

I made it clear interview responses would be pseudonymised in text, and that no personal details (usernames, passwords, logins etc.) would be in view of video stills or recordings. Any personally identifiable data and raw digital artefacts captured would be stored on a "Bitlocker" encrypted university file system, and only retained for the duration of the project. Upon completion, all non-published data would be destroyed. I would handle the data in accordance with the Data Protection Act 1998, and if any participant wished for their data to be destroyed, or withdrawn from the study, that they had the right to request to have their artefacts and likenesses obfuscated, excluded and/or deleted or not used in any subsequent publication.

Limits of Confidentiality

I was careful about traceability, but made it clear there were other means of triangulating *who* had said *what* which were beyond my control. E.g., if jammers chose to post their real names on team websites or upload their game source code on the GGJ website[43]. Permission was sought from each participant with regards to the use of quotes by their pseudonym, as well as for use of audio-visual artefacts in further research or dissemination. It was made clear to participants that no private information about them would be made public, and nothing would be published with personal identifiers. In terms of interviews, I sought additional ethics clearance for the use of media.

In some circumstances visual research methods do not require anonymity. Observations of public events (e.g., the GGJ) and case studies (e.g., this study) where individuals have consented to the use of imagery are notable exceptions listed by the IVSA (Papademas, 2009). Moreover, work for the ESRC's National Centre for Research Methods found identifiable images can and should be used in a

[43] It is common to use a software repository such as GitHub that allows software developers to work on the same project at the same time. Often these repositories are set to "public", and comments left are sometimes personally identifiable.

range of ways, and especially when in support of innovative methodological developments, providing researchers balance the status and vulnerability of participants with the nature and importance of visual data to the study (Wiles, Coffey & Robison, 2010).

I recognise debate continues as to the inclusion of identifiable imagery, so all textual data was pseudonymised so it could not be directly linked to published photos and I was confident all reasonable measures had been taken to minimise any potential harm. All campus jammers (including those beyond my sample) received a presentation and information sheet informing them of the Foundry research, and all who entered the Foundry had to give their consent that images and videos were in scope of publication and could be anonymised on request. Study participants who had previously given informed consent were reminded that unredacted images were in scope of publication because their jam interactions were my data.

Research Community

It was important this study upheld the integrity and reputation of educational research at large. I made sure my details were available to all participants in case there were concerns or complaints before, during or after my study, and reached out to remind participants as to how I planned to handle their data both before and after the study. My data and methods were amenable via scrutiny, and participants were fully aware of my approach, its implications, and their right to withdraw at any stage.

6.7 Changes to Data Collection

Presentations

I originally planned for games created to form part of my analysis, but made the decision after videoing the game presentations to exclude them from analysis for the following reasons:

1. The presentations were not held in the Foundry space due to issues of capacity.
2. While the videos serve as evidence of the high calibre of Foundry-made games, deriving meaning from them would have risked my analytical focus.
3. I instead summarised each of the Foundry games in the appendix and included a video montage to provide the reader a sense of the event, the jammers and the games created.

Social Media

As discussed in the ethics section, I decided to exclude social media posts from jammers due to the inherent complexity and potential traceability of internet content. The use of social media always carries the danger that content which at one point may have been the “norm” in terms of public acceptability, could become extremely sensitive over time (Wiles et. al., 2008).

In addition:

1. I did not want unintended triangulation of “who said what” that could result in damage to the participants wellbeing, especially in the case of long-term right to withdrawal.
2. The resultant tweets under the site hashtag #BristolGGJ or #GGJ19 would not have been impactful to the study but would have resulted in a great deal of work to obfuscate.

360 Video

I originally planned to use multiple 360-degree cameras to “map” jammer interactions across the Foundry in addition to timelapses and hand-held video. It would have provided a powerful prospective analytical resource from which jammer interactions could have been explored. However, the workload for managing five cameras plus interview recording would have made this intervention difficult to orchestrate, especially given the still emerging nature of 360 cameras at the time of my study.

Timelapses

I had not planned to use time-lapses originally, only 4K ultra high-definition cameras throughout. My intention was that in addition to hand-held video and audio interviews, I would have cameras running capturing 60 images every second across multiple locations. This approach would have required constant monitoring of battery levels and replacing of camera memory-cards across the two-day event. Technology triage should not take precedent over observation and interview, so such an approach would have risked my data integrity.

By using time-lapse recording, I was able to increase battery and memory card endurance dramatically, as only a single still image was captured every few seconds. In this manner, hours of activity were summarised in seconds - providing clips which typify the layout of each team’s area, and how jammers worked within them. This change in process not only stretched the record-time from less than an hour to over four hours, and it released my attention giving me the space to conduct my observation and interviews successfully.

Participant Withdrawal

Overall, only one jammer left the Foundry to work remotely at the end of day two. Another switched to helping another team outside of the study on day three but returned to their original team before the presentations. All but one team attended all interviews, while three of the four teams attended both final retrospective interviews.

6.8 Ethnographic Credibility

“If we ethnographers want to make our explanatory claims more transparent and disputable by readers, then we need to show readers how we came up with our interpretations, [and] how we made mistakes and lucky guesses along the way to capturing other people’s meanings. That is what interpretive reflexivity discloses.”

(Lichterman, 2015, p.38)

This chapter has so far detailed the “what, where, how, why and when” of my research methods, towards an authentic exploration of jammer activity and the effects of heterotopic affinity space. In closing, this section considers the credibility of this study, its claims and its pursuit of social meaning (Brewer, 2012).

The credibility of an ethnographic researcher often pertains to the degree of “membership” in the culture or group being researched, because "for qualitative data to be admissible as evidence for claims about social life”, “the researcher should have been deeply involved and closely connected to the scene, activity, or group studied" (Fitch, 1994, p.36). However, there should also be “enough distance from the phenomenon to allow for the recording of interactions uncoloured by what [the researcher] might have had at stake" (Ibid, p.36). Subjectivity in an interpretive ethnography allows the thinking and reasoning processes of a researcher to be made explicit. It would be almost impossible to study a social situation without the ability to perceive and represent “goings on” without subjective knowledge of participants and the setting (Croucher & Cronn-Mills, 2021).

My knowledge of game development and jam culture allowed me to harness authentic vocabulary and to curate an “emic view of the situation”, while minimising the chance of misrepresenting or misinterpreting participant activity. My familiarity with the Foundry setting increased the authenticity and informed the relevance of selected behaviours over those which might have arisen in “more contrived settings like an experimental laboratory” (LeCompte & Goetz, 1982, p. 43) or spaces I was unfamiliar with. My methods condoned this need for closeness and yet also provided additional perspectives only made possible by the distance of digital means, so I could explore how best to figure out “other people’s meanings in the field.” (Lichterman, 2015, p.35).

Scepticism about knowledge claims has led many ethnographers to incorporate reflexivity into their studies. This provides the reader adequate resources with which to consider the value of interpretations and explanations. Ethnographic reflexivity is achieved when researchers discuss their study in context of the interests and/or biases that accompany the positions they hold. Interpretive reflexivity is important as it can show “how we came up with the patterns we call meaningful” and

offers readers “interpretive explanations” (Lichterman, 2015, p.38). For ethnographers, iterative phases of data familiarisation can also provide clarity, insight and a “self-monitoring process during data analysis” (LeCompte & Goetz, 1982, p.43) challenging researchers to question their interpretations.

Reflexivity also allows a researcher’s voice to be represented as part of the analytic process (see Chapter 8), but it is embedded throughout this thesis (e.g., see “researcher positionality” in Chapter 1). Reflexivity from the outset can be significant because it establishes “who the author is and how that might matter for the study at hand” and can manifest ongoing and interconnected “circuits of communication” within a study. By making their reflexivity transparent, readers can subsequently “assess causal as well as interpretive claims” made by an author (Brewer, 2012, p.312).

For ethnographers “reflexivity communicates to readers our recognition that knowledge claims are conditioned and partial” so that researcher influences can be considered (Lichterman, 2015, p.36). To ensure credibility, my interpretations would be products of a reflexive research design and data engagement process (Brewer, 2012) scaffolded by research literature. My methods presented an opportunity to identify emergent behaviour, in a manner of which both researchers and participants might reflect on interpretation(s) drawn from my data. My methods were not deployed in isolation either, as triangulation is a cornerstone of interpretive study, increasing plausibility through comparisons and/or interpretations of events across multiple sources.

Reflexivity and triangulation in tandem provide sufficient basis for the claims I come to make, and a robust platform from which a debate of alternate interpretations might be mounted. This basis is something Fitch refers to as the standard of “adequacy and coherence of evidence in support of ethnographic claims” (1994). The reflections which emerge during my analysis aid the reader in establishing the credibility of lateral moments, the subsequent development of the “PHASE” model my final conclusions (Chapters 8, 9 and 10 respectively).

From moments worthy of scrutiny, to group interviews where initial findings were returned to participants, my aim was to provide the reader an adequate and coherent evidence basis (Brewer, 2012). This thesis also provides digital and textual data extracts made publicly available (see appendix) to enhance the credibility of this study, allowing subsequent readers to tally their interpretations with my own (Ibid, 2012), as researchers must "decide for themselves whether or not to believe account[s] of what it is that a particular group of people are doing at any given time” (McDermott, Gospodinoff, & Aron, 1978, p.245).

CHAPTER 7: Fieldnotes

This chapter takes an alternative approach to data presentation due to its mini-ethnographic case study methodology, the unique setting of the Foundry and nature of game jams. From jammer conversation and personal reflection, it provides a space for the reader to appreciate how the Foundry was used while also illustrating the richness of jam events and my data itself. It concludes with a gallery of video stills made of one image per video file to provide readers a sense of jam activity, and what was recorded intended as a quick-reference guide for types of jammer activity.

Fieldnotes are useful for data familiarisation, a pre-analysis stage recommended by Braun & Clarke (2019). The following sections are important context for how jammers engage with physical heterotopic affinity space (RQ1). After which, Chapter 8 (analysis and findings) addresses emerging behaviours (RQ2), before I return to the theory in Chapter 9 to address the implications of heterotopic affinity space on flow (RQ3). These questions are jointly revisited (and answered) in Chapter 10 (conclusion).

7.1 Jammer Foundry Use

The following pages and sub sections provide a short summary of how each jam team configured their work area, taken from early conversations, so the reader can situate themselves in the Foundry space at the start of the jam event.

A. Team Tarpan

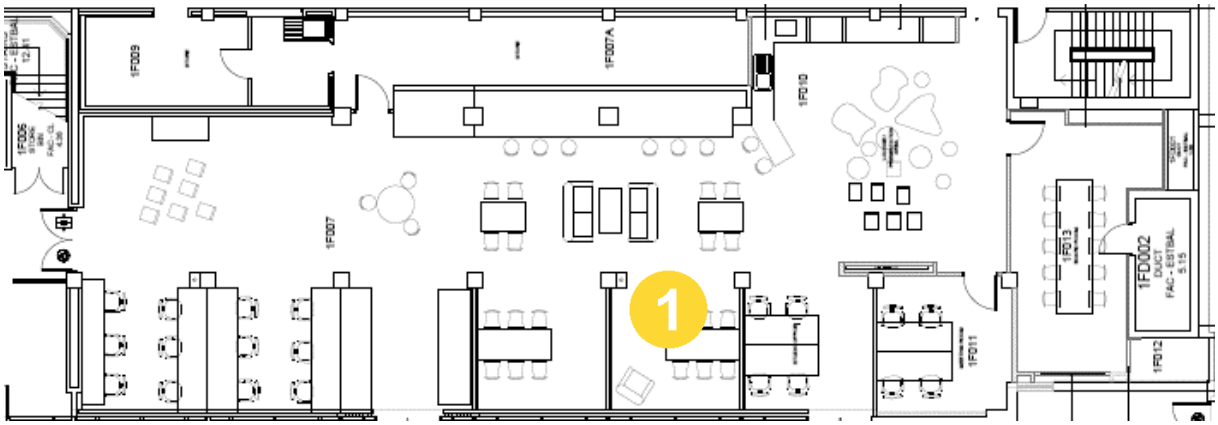


Fig.23 Team Tarpan's approximate Foundry location.

Team Tarpan were Smutek, Zil, Uaz, Ziguli, Lublin and Skala. Tarpan chose one of the 3x3 metre "activity pods" towards the centre of the Foundry as their base. These pods open onto the main throughfare of the Foundry between two concrete pillars, with mesh and wood panels dividing them from other teams. Tarpan placed a desk across the entrance of their pod to partition it, positioning computers and screens so they could face each other.

Fig.24 Tarpan blocked off their pod with a desk, providing deliberative space.

Tarpan moved furniture around to be seated in a circular formation, where talking to each other was as easy as turning your head (Smutek). I was told this was because they wanted to interact with each other and "not feel separated in this space" (Ziguli). They explained the Foundry was "a hell of a lot nicer" for group work than traditional lab spaces (Smutek), as it was not possible to have fast and free-flowing interactions in formal labs because communication is difficult, and you can "have people thrown out of the room" (Lublin). Ziguli felt that labs "are nice for working on your own", but with the ability to "move things around as well rather than the rigid straight lines of computers" the Foundry provided more flexibility.

Breaking from the Foundry vs. labs discussion, Skala explained they had placed a monitor against the wall below the windows as a “playtesting area”, where any (or all) of the team could go to playtest their game. Significantly, Ziguli noted that this was not how they went on to use this part of their space. It would instead be host to individual and group lateral moments.

Tarpan were generally laid-back jammers. They had a couple of stressful moments during the 48-hour event (where the graphics shaders for their game broke and everything on screen was bright pink and green), but otherwise worked calmly throughout. They often had insightful responses to interview questions, and much of what they spoke to concerned the supportive nature of the jam and the agency of the Foundry. How they felt about the event and space from our early interviews is summarised below (see appendix for jammer conversations and transcripts).

Fig.25 Tarpan viewed from beyond their "open-but-closed" activity pod.

Lublin felt their Foundry jam was their best jam yet, in terms of collaboration and communication: “we’ve had so many discussions and we’ve helped each other so much and done like paired programming and stuff like that. Whereas in most jams I feel like there was so much “let me work on my little task”, [where] we assigned tasks and split up, but here we’re so close, it’s just a quick chat to him, “what’s he up to?”, “What can we do?” kind of thing”. Ziguli believed this was because the Foundry made these interactions possible, where it was more comfortable than in a lab to “just lean over and say, “What do you think about this?” or to show them your screen and say “Does this look cool?”. Skala added he thought this was due to how the team had configured their space as a “little

enclosed cubbyhole" where they wanted to be close to each other, acknowledging that in traditional labs "I don't want to be that close to everyone."

Ziguli felt the Foundry was much more conducive to jamming because "everybody was in the same boat" (which aligns strongly to the *connectedness* of Gee's affinity space). The agency of the Foundry also appeared to have an effect, adding it was "a very creative atmosphere in there because everybody was just throwing ideas out rather than it just being silent", and that energy was heightened, especially at the start where "everyone's frantically trying to come up with ideas." Ziguli also felt that the way you could "overhear somebody else's ideas" due to the layout of the space heightened a sense of connection, and that the Foundry jam provided "a unified task and everyone wanted to be there."

Skala felt this year he was "much more part of a team rather than a group of guys doing it", even though he had jammed with them previously, where "it feels much easier to act as a group" in the Foundry. Smutek felt there was a rich atmosphere of construction in the space, "There were people animating, there were people drawing stuff, those sound people, just everything…", "Music guys just wondering around asking every now and then if we wanted anything" (Skala). For team Tarpan, the Foundry meant "everything creative condensed into one spot" (Smutek). In terms of atmosphere, Tarpan felt that despite tight timescales, the Foundry remained friendly (Ziguli), where it was "nice that the only pressure is what you put on yourself."

Fig.26 Tarpan present their multiplayer horse racing game with four player-horses (but only one cart).

B. Team Tico

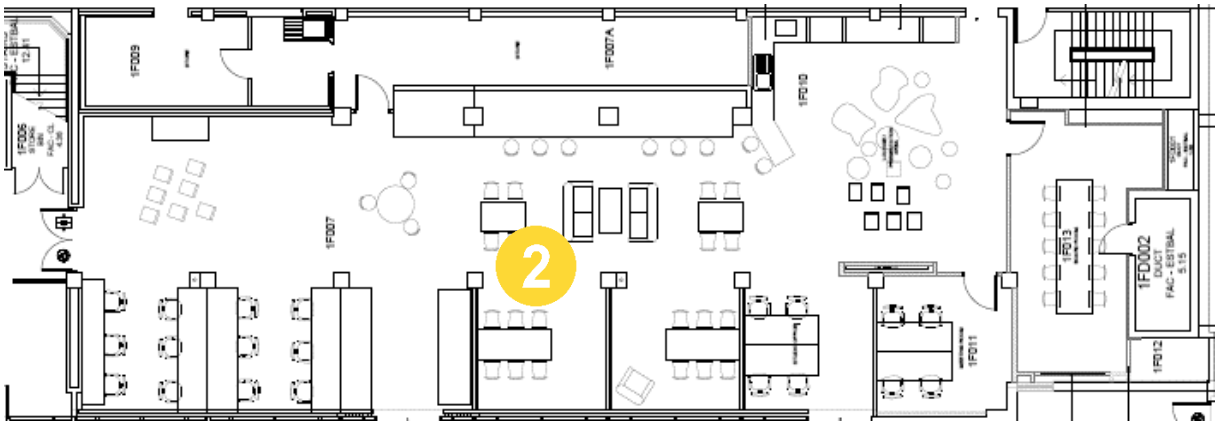


Fig.27 Team Tico's approximate Foundry location.

Team Tico were Felicia, Ogar, Oga, Zastava, Kamaz and Kaszel. Tico, similarly to Tarpan, also chose one of the 3x3 metre activity pods. Instead of arranging themselves on the outside looking in, they seated themselves around a medium-size key-clamp table, and sat looking towards one another, and not requiring the "head turn" of Tarpan to interact.

Fig.28 (Left) Tico crowd round a single table. (Right) Three of the team talk to Tarpan.

Kamaz and Zastava said what he liked about the Foundry was the ability to partition themselves off from everyone else in the space. For them, it was the separate but connected aspects of the Foundry that made it preferable to jamming in computing labs. Uaz believed that the Foundry was conducive because it felt less like a classroom, with Zastava adding "…this feels like we're more actual developers", and that the space felt a lot more like industry, because the expectations of it were collaborative and professional rather than "just computers at a desk" in computing labs.

Felicia picked up on aspects such as playful vs. productive or industrial vs. homely related to the Foundry's design intent, and that "it feels like a workspace" and how it telegraphs "Hey, this is where you come to work," and "here is where you produce content, produce stuff". This is similar thinking to Ziguli's sense the Foundry design "makes me think about making things" and that it "makes me think constructively" (see Appendix: Jammer conversations about Foundry).

Tarpan felt in the Foundry they had the ability to reconfigure the space when they needed to, and that compared to computing labs it was “less like a classroom” (Felicia) and felt “more free and less restrictive” (Uaz). The team were vocal in agreement that Foundry was a preferential jam space to other spaces, while Ogar felt that the setting was enjoyable even “quite cool, hip. Down with the cool kids”. Felicia felt the University would benefit from more spaces like the Foundry across its other campuses, and that compared to the studio facilities in the Arts, Creative Industries and Education faculty, the Foundry felt “more of a proactive space” and that within, “[it[feels like we’re real developers, doesn’t it” (Kamaz).

Tico were also similarly enthusiastic at the prospect of jamming in the Foundry for the first time. Of all four jam teams, they had the most intense work ethic, and often a darker, if playful, more minimal and direct timbre to their responses. In terms of the intensity of the jam, Kamaz proclaimed “I’m going to go until I can’t and then I’m going to not, obviously,” and that this was possible due to “young bones.” Kaszel, similarly, planned to stay (awake) for as long as he could too.

Jam engagement would prove different across different members of Tico. While it resulted in an entertaining game and successful presentation (see below), their intense jam development practice had taken a toll on team members when significant technical issues arose towards the deadline had risked there being no game at all. It may be partially due to this, or student “burnout” (Balogun et al., 1996) that Tico were shorter in their responses during their initial post-jam interview, and did not attend their follow-up a month later.

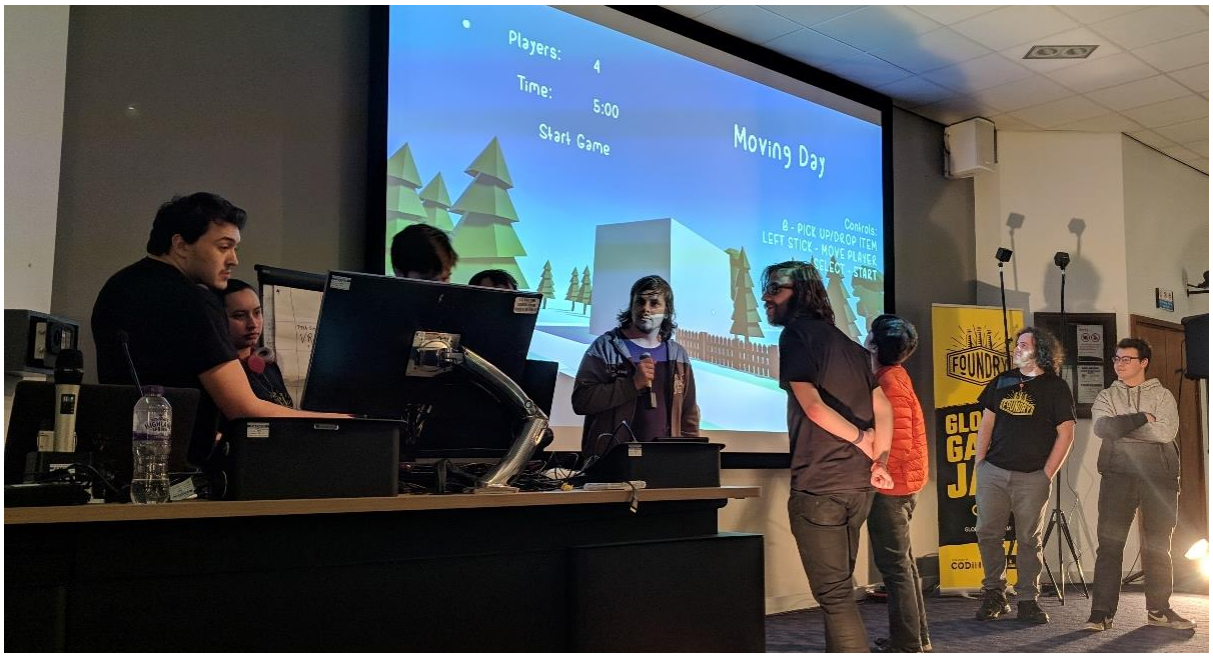


Fig.29 Tico present their game “Moving Day” despite many technical problems.

C. Team Tatra

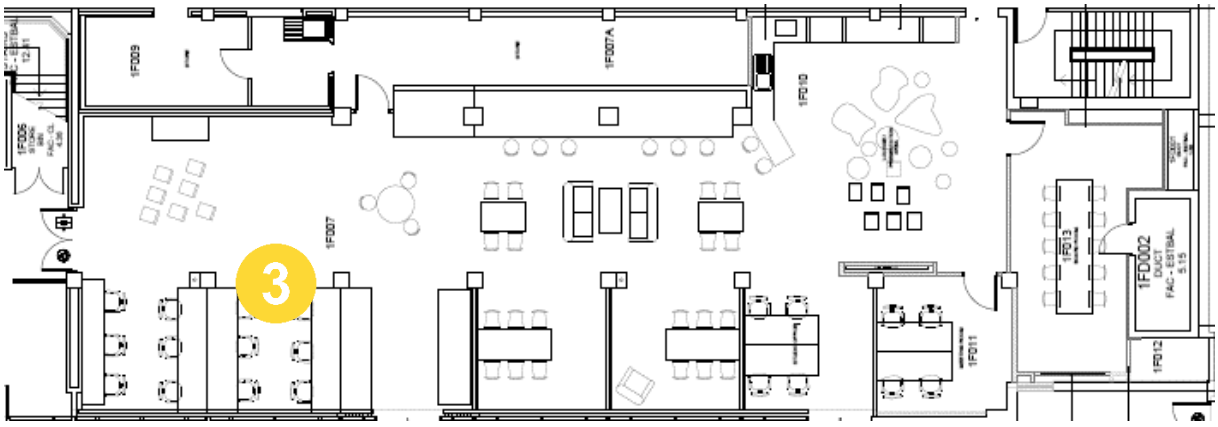


Fig.30 Team Tatra's approximate Foundry location.

Team Tatra were Mikrus, Gacek, Beskid and Maluch. Of all the teams, they had the most traditional layout, with their computers set up along two lengths of workstation desks near the Foundry entrance. As a team their interactions were understated, but they were highly process-driven and ambitious, having much to say about the productivity of the space, their arrangements and jam experience.

Fig.31 Tatra's two rows of desks. Gaming PC's, snacks and toiletries visible.

Gacek described the design of their space and their reasons for selecting it as the result of anticipating their requirements before the jam, where they wanted to know exactly who to turn to at given stages. Maluch here nods to the *connectedness* and nurturing nature of Foundry jams, stating their layout was "optimal", as they were so close to one another where "it would be a mistake not to ask each other for help.". Gacek felt it was important that anyone stood at the entrance of their space should

be able to see all of their monitors, perhaps foreshadowing the requirements of audiences in more nurturing affinity spaces. Mikrus also perhaps recognised Foundry design intentions, believing their space achieved an important balance of "It's open, but it's also confined enough that you [get] your own personal bit, but it's also within reach of everything else."

On collaboration and teamwork, Tatra were very project-management focused, "we've had a plan and we've followed through with it and we haven't had any problems" (Mikrus). But Tatra also showed implicit understanding of the Foundry as "open but closed", and "formal but informal" in their use of task chairs to travel the space at speed, and in using walls for post-it-notes. When asked about this, Tatra told me their blackboard use at the other side of the space was to keep track of their "to-do list" and to delegate responsibilities. Gacek felt the polished floor and steel-wheeled chairs were important, allowing accelerated movement in ways not facilitated by the carpets (or perhaps FEARs) of computing labs. Maluch concluded that effortless jammer interactions were crucial for jam success.

Fig.32 Tatra made a mobile game, where you fly flocks of geese "homeward".

Fig.33 Teams used walls, windows and floors for post-its, as well as blackboards and touchscreens.

D. Team Trabant

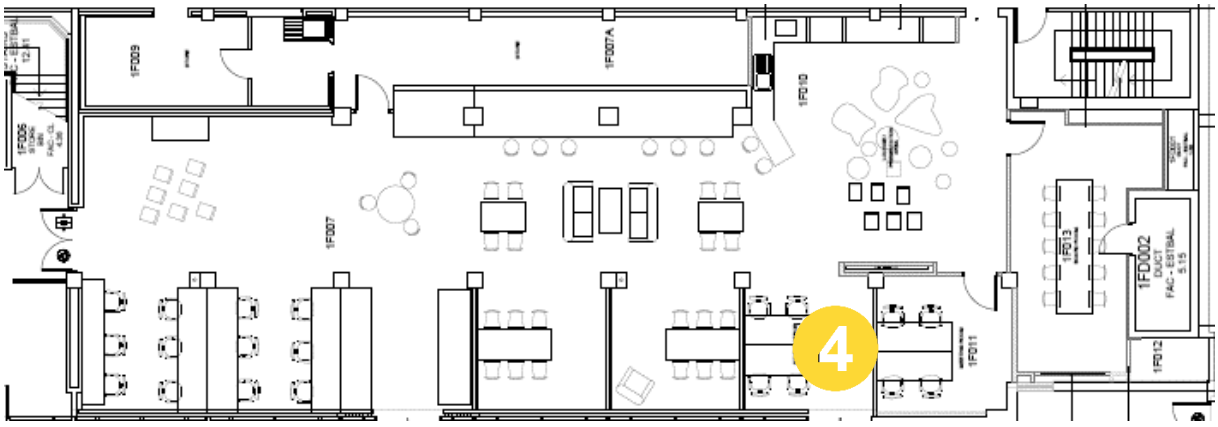


Fig.34 Team Trabant's approximate location in the Foundry.

The members of the fourth team were Smyk, Zaz, Dacia and Caro. Trabant formed their workspace as a diagonal line of seats, couches and a coffee table arranged from low to high in a staggered fashion, where everyone could see all screens. Their area also included one of the large surface hub interactive screens, along with another smaller TV screen they propped up on a shelf against the back wall.

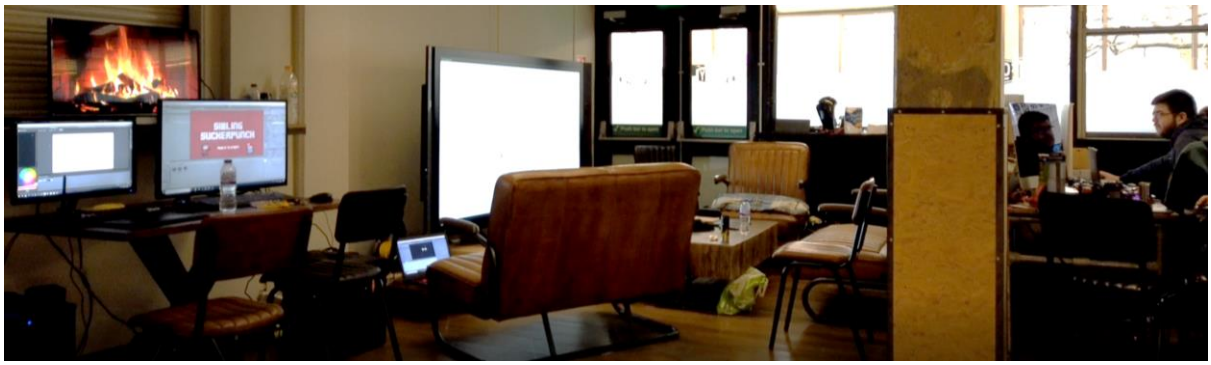


Fig.35 Trabant arranged seating from low (sofa) to high (stools, out of shot) diagonally across their space.

While other groups used semi-permeable boundaries and acknowledged features such as the mesh panels, Trabant oriented themselves towards the wall to achieve a triangle space jutting into the main floor from the corner. Trabant were (along with Tarpan) the two more vocal teams, especially in terms of the impact of the Foundry space, and outlined a great many implicit design goals they were not aware of. Zaz introduced their space to me as one where "we're not really distracted by anything else behind us. We're like, walled off in our own section", but also interestingly that, "we seem *like* this section here, but, we're not '*in*' this section".

Trabant also talked of the informal use of furniture in the space when they sat while "doing [mood] boards or doing the [game] plan on the board and it was like, "Oh, we're sitting on the sofa doing work," which is a weird thing". Zaz continued on this theme, "Normally when you're sat on a sofa, you're there relaxing, watching the TV, eating food maybe. But in this situation we were there sat on

the sofa, doing work, which felt more relaxed just with how the seating was, like comfy seats and stuff," but Trabant also reinforced the notion of ownership of their area, "We sort of had that space and it was our space", which Dacia felt was like having their personal office.

Smyk felt the Foundry was interesting because "usually when you have a space that you generally just mess around in, you're probably going to immediately go to just messing around and relaxing when you go to that area ", but with the Foundry they jammed because it was a different space compared to previous jams. But they also felt "a lot more in control of our area here rather than in the lab" where you just have to "sit at your desk" (Smyk). Asked to expand on this, Smyk felt the Foundry was a more organic space, because all team "areas are unique in how they're set up", and that "a lot of the labs are more orderly, " or worse "most of them are identical…" Zaz reflected on how another team (Tatra) had chosen a layout more like the labs near the entrance, "when we were first coming into the room I thought maybe that section would be better because we would work harder.", and that their [own] area "would be a more relaxed area, [where] maybe we wouldn't get as much work done", but Smyk responded "Yes, but we got more work done" and Dacia felt it was a better standard of work as a result. Smyk felt this was because "the brainpower that we're putting into the game is being used more efficiently" here.

On aspects of the jam affinity space, Trabant were strongly connected with the Foundry, joking they wished they could stay and live there after the jam (Dacia). Caro commented on the friendly jammer atmosphere, and the *connectedness* they experienced: "You know that everybody is doing the same thing," and that despite this same deadline, you can "just go over and speak to any of the groups will and they'll happily speak to you". Later in reflection, Caro would go on to say "the game jam for me, […] as a whole, […] connected with everybody doing work, doing the same sort of work" and all agreed it seemed a supportive, positive (Zaz) and focused jam (Smyk).

On the subject of other campus spaces, Zaz felt the problem was the lack of too much or too little prescribed separation, "there are team spots that you can go to. But it's normally we sit in the lab in a section of the lab when anyone can like - it's not really split up." whereas the Foundry was split up, and even though they could hear activity elsewhere, they could "sort of block out [those] other one[s]" (at which point a horse from team Tarpan's game was heard echoing across the space). Zaz felt university spaces were not sectioned off *and* with multiple computers, it was only ever one or the other. For labs "it's a line of computers", otherwise "they're like meeting rooms", so "you're either purely talking or you're purely working, so there's no real balance" (Zaz) and no middle ground (Dacia).

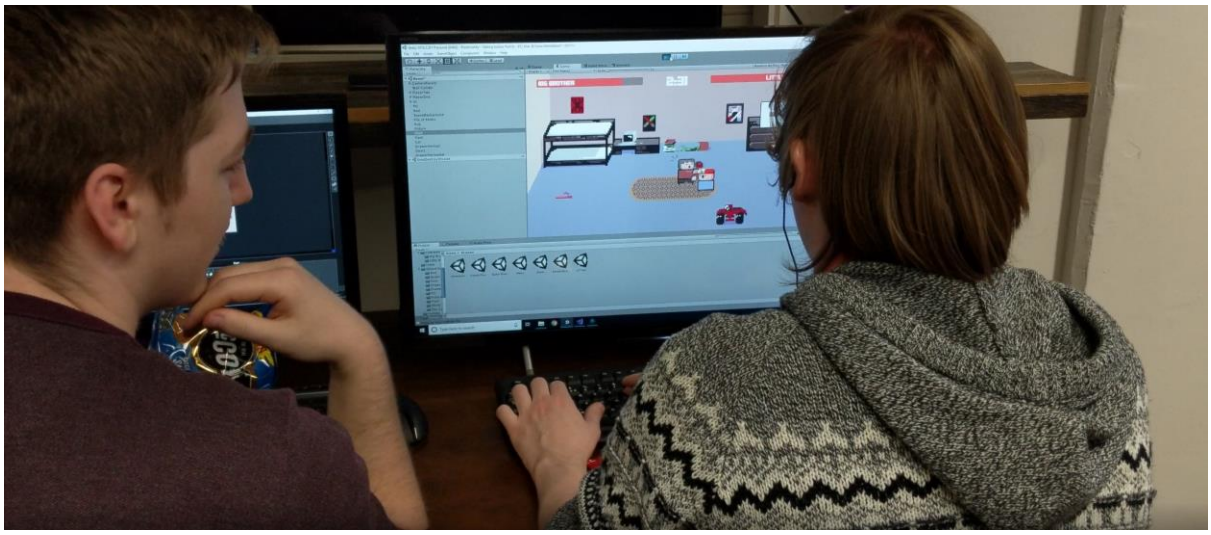


Fig.36 Trabant's game was a bedroom brother brawler, towards the jam theme of "what home means to you".

Trabant also reflected on the wider organisation across the Foundry and on interactions with other teams, unknowingly touching on heterotopic *otherness* and design paradoxes. In terms of the construction of the space Zaz noticed the “metal fences” with wooden panels below them as “they’re like walls. [But] They’re not walls, but you can see.”, or walls you can see and hear through (Dacia), which still provided “a way that you can somehow zone off the team on the other side even though they’re right next to you.”. Smyk recognised the “open but closed” nature of the design, in stating “the Foundry is very open with the ceiling. It feels like things are enclosed but they go further than they are, like with the ceiling being low but it also going a bit further, your area being enclosed but also it goes a bit further”, with Zaz adding, “you can actually look across the entire Foundry and see the other side and still be in your section”. Smyk here recognised that “your area kind of blends into the neutral area which is like the big corridor”, and the space and areas within it were instead of a “hard, rigid box”, is “flowing”. This analogy aligns the Foundry with the layout of MIT’s B20, which forced incumbents to transect the space, thus meeting other researchers (Beam, 1996).

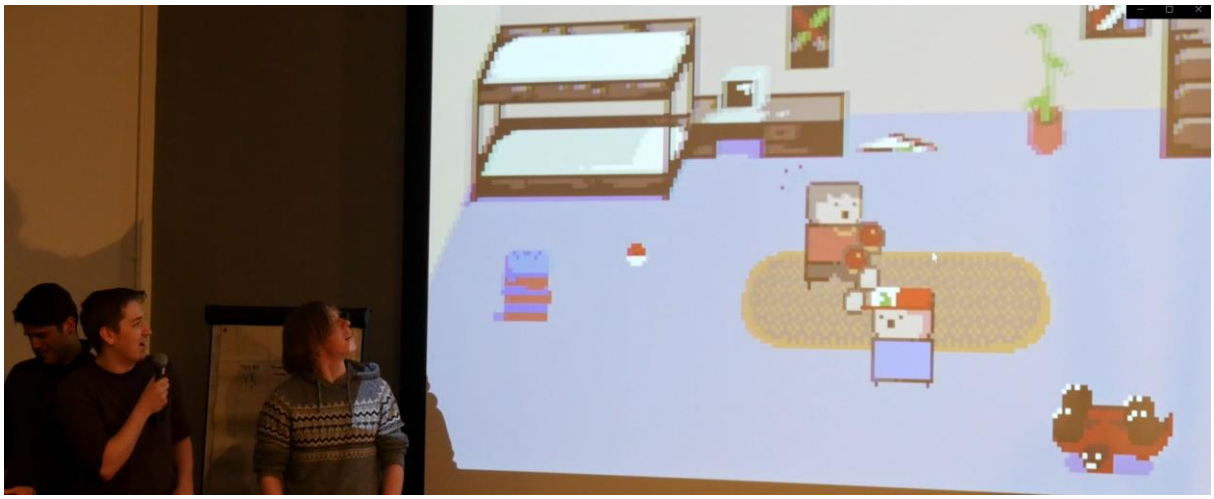


Fig.37 Trabant present their pixel-art brother bedroom beat-em-up.

7.2 Jammer Perceptions of Foundry

During my process of transcript proofing, I collated jammer conversations about the Foundry as I came across them. I wanted to present the reader with the means to gain a sense of the event before moving to my analysis (and to accompany the video trailer I produced also for this purpose). What is presented here is selected summary of their sentiment from the fuller extracts in the appendix. This was not a pre-meditated exercise to validate the Foundry design (I explicitly state this is out of scope of this study at its outset), or an errant coding pass from the thematic analysis that follows. But jammers outlining how they engaged with that of my first research question and how jammers engage with physical heterotopic affinity space.

Leading from the previous section on each team's configuration of the space, it was interesting that jammers were aware of the importance of layout, and that their designs for each area were clearly important, which was interesting because in traditional labs there are rarely such choices. It was apparent that jammers recognised other team's arrangements of the space, that each team's was distinct, and that each team thought "their little area was the best" (Smyk, Tarpan). I was surprised that even one-month post-jam Tarpan were able to recall how every team in the Foundry had configured their area.

The Foundry appeared impactful on jammer productivity: "I found when I was walking in the Foundry it very much switched my mindset to a productive one. You have this idea of; you're in this space, you have to work on this now" (Lublin, Tarpan), and that "the Foundry felt like a proper workplace." (Skala, Tarpan). Jammers also felt they "accomplished a lot as a group in such a small space of time" and that "the Foundry really benefited that" (Ziguli, Tarpan). Of collaboration, jammers felt they "branched out a bit more, and collaborated" compared to "…in previous jams [where] we've stuck to our group and that's been it" (Gacek, Tatra).

It was also surprising just how much the Foundry's constructionist and heterotopic design had percolated through to jammers: "It's kind of weird but the raw look of the room that looks like it's almost been constructed out of weird bits and bobs, it almost makes me think about making things", "that works with making games, makes me think constructively" (Ziguli, Tarpan). So too was it surprising that jammers recognised the informal space, and that "it brings out the fact that you're doing this outside of educational- […] it's not a formal education. It's like you're doing your own thing, you're in this new area, it's very different" (Lublin, Tarpan), which "feels a lot more informal than being in a lab" (Dacia, Trabant).

Jammer experiences also aligned to Gee and Hayes (2012) notion of nurturing affinity spaces, and Jackson's consideration that game jams are nurturing affinity spaces (2016). "We took care of everyone. Maybe not actually knowing that we do that, but we knew that there were other people and we took care of each other" (Maluch, Tatra). Later stages of a jam are usually the most stressful, where impending deadlines can cause crunch to occur (Cote & Harris, 2021) and in previous jams "usually everybody starts to get a bit sad and a bit not happy and fed up and annoyed, but that happened a lot less" (Beskid, Tatra). Significantly, it appeared that in the Foundry as heterotopic affinity space there was less post-flow anxiety or boredom where jammers "forgot about the lows" (Maluch, Tatra) and phased between different forms of activity seamlessly.

In terms of formal education and academic regulation (FEAR), jammers were in agreement about Foundry jamming: "I felt like I actually want to go there and do it, like I felt like I wanted to go and spend all day there and just do the Game Jam" (Dacia, Trabant). Much of this appeared related to the agency of the space: "we could just turn down our section of lighting, which did happen. Like one team turned down all the lights and it was like everyone all found it better. But I feel like in [computer lab name] you couldn't really do that" (Zaz, Trabant).

The FEAR-less agency of the Foundry was implicit to the configuration of the space too: "We could just literally lay it out how we wanted to do and in some of the other places I've done game jams and haven't been able to do that" (Skala, Tarpan). While others told of how they utilised the fabric of the space, "it was nice having the free spaces on walls and stuff to just stick ideas on" (Smutek, Tarpan) and in terms of regulation, that "there's no one in our way" (Skala, Tarpan), "it doesn't feel like you're not allowed to eat [like] in the lab, You're not allowed to drink in the lab" (Zaz, Tarpan). "There's not a poster saying, 'No food or drink here,'" (Smyk, Trabant) and "There's no one to tell us off" (Lublin, Tarpan).

"It was GO NUTS! rather than "you can do stuff but don't do certain things", like with post-it notes, I wouldn't even consider putting them on the windows [in a lab]" but in the Foundry "It's like, 'go for it! just whack it on there if you want, just do anything."

(Ziguli, Tarpan)

Finally, computing labs elsewhere did not emerge as favourable jam spaces, receiving criticism that they were uncomfortable due to "working in regimented desks" (Smutek, Tarpan), were places where "workflow would have been a bit less" (Uaz, Tarpan) because "everything is the same. All the rows are the same. All the computers are the same" (Zaz, Trabant), and places where jammers "wouldn't feel like I can actually configure lighting or all that", and more "Oh, I've got to go in and do this, It's

something I *have* to do and not something that I necessarily *want* to do."(Dacia, Trabant). Mikrus (Tatra) putting this most bluntly: "I'm pretty sure if we'd been in a lab pretty much everyone would have gone home."

A. Personal Reflections

GGJ 2019 manifested the same levels of behaviour and engagement I had witnessed during the inaugural 2018 GGJ in the pilot Foundry space. The 2019 event highlighted the same productivity, nurture and proactiveness of jammers, still elevated beyond that of jams in more traditional curriculum spaces and there was still unrelated behaviour throughout the event that made little initial sense to me.

Something that has stayed with me from the 48-hour observation is the extent to which there are no jammer complaints about the environmental conditions. A great volume of institutional design concerns itself with regulating light, temperature, comfort, accessibility etc., but the Foundry is too cold once the heating is off, and too hot when it is at full capacity - especially when computers are working hard. This is not to say that these are not important, but that they were not important to jammers in that space, and to some extent these differences further separate the Foundry from the institution around it and the multitude of ways jammers engaged with the fabric of a 1960's building.

In planning the 2020 game jam, I used the experience of observing the 2019 jam to mitigate potential side-effects of heterotopia I might not have noticed were it not for this study. I organised healthier food and refreshments knowing flow periods could be lengthy (productivity/nurture), provided warm blankets, heaters and even cooling fans to reduce the extremes of temperature. We also piloted an app which jammers could use to get support or report problems such as the behaviour of others[44].

Fig.38 For 2020 A Foundry app was available to report site issues or to request assistance.

[44] This not only relates to the experience of energetic jams in less-regulated spaces, but also to my practice recommendations and that events in heterotopic affinity space, while less regulated, may still require scaffolding.

B. Video Thumbnail Gallery[45]

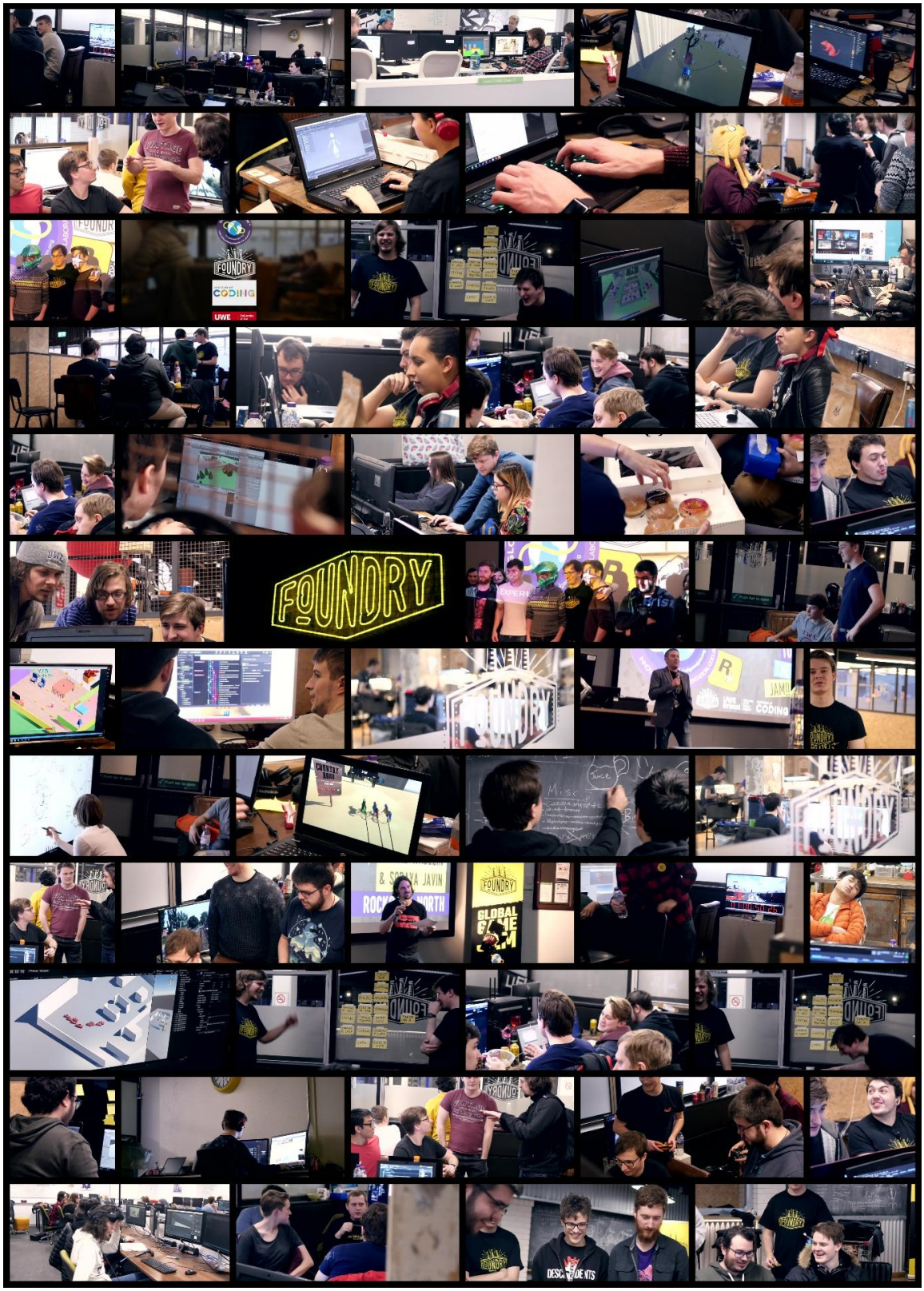


Fig.39 I exported 55 thumbnails from across my footage – a visual cross-section of jam activity.

CHAPTER 8: Analysis & Findings

Lateral moments and the modelling of phases *of* heterotopic affinity space engagement (PHASE) are the significant original contributions of this thesis as no work to model jam behaviours or flow in affinity space currently exists. In this chapter, I guide the reader through my reflexive thematic process which resulted in a conceptual lens for lateral moments. I then operationalise these findings to triangulate lateral moments in my data and present fieldnote reports for each. Without the findings of my analysis, it would not have been possible to advance Bommarito's theory in Chapter 9, where I add new layers of participant behaviour and flow states for affinity space.

8.1 Coding Lateral Moments

My analytical design aimed to understand how jammers engaged with physical heterotopic affinity space (RQ1), what emerging significant new behaviours in the space might be (RQ2), and what the implications of these emerging behaviours were for flow (RQ3). However, I did not yet know what behaviours during the increased energy and distraction of Foundry jams were worthy of investigation as there had been no effective way to flag one behaviour over another in real-time. Due to this starting-point, I selected an inductive approach for this first task of identifying "what to look at". This was the motivation for reflexive thematic analysis which through non-linear coding phases would provide the means to re-visit and reflect on the event.

Coding is a process through which themes and behaviours can be drawn out to develop new views of a phenomenon (Daly, Kellehear, & Gliksman, 1997). Reflexive thematic analysis (Reflexive TA) is an approach suited to mini-ethnographic case study as it requires researchers to engage more-thoughtfully and reflexively with their data and analytical processes (Braun & Clarke, 2021). As the following sections illustrate, all six stages of reflexive TA were utilised (although not in an entirely linear fashion). It would take multiple coding phases, one false start and a "discovery-oriented" conceptual leap (Klag & Langley, 2013; Locke, 2011) to identify significant emerging behaviours.

A. Data Familiarisation

In the days and weeks after the jam, while waiting for audio transcriptions, I re-familiarised myself with my data by replaying all audio and video recordings. I extracted still images from the videos (as seen in the previous chapter) and processed still photos into time-lapse videos. This experience of re-living and re-processing the events of the 48-hour jam was powerful, as I had never reflected on a jam to this extent post-event. Immersed in audio-visual data, and hearing jammer interview responses

[45] The thumbnail gallery began as a way to "show" jammer behaviour from video recoded during the event, but it also opened my mind to visual methods jam research as I began to notice patterns beyond scope of my research design.

once-more brought a richness to my coding I would not have experienced without familiarisation. It is from this activity (and subsequent coding phases) the final fieldnote reports of six lateral moments are shortly presented.

B. Phase 1*:* Early *Coding*

Upon receiving my transcripts, I was confident the volume of textual data would allow me to capture "good codes" that represented the richness of new phenomena (Boyatzis, 1998). While I was new to this approach, I knew coding would organise my data and facilitate meaning drawn from clusters of codes known as "themes" (Braun & Clarke, 2019) I hoped would provide means to triangulate occasions of jammer behaviour that was significant in some way.

After training for NVIVO 12 data analysis software, I began my first pass of exploratory coding. This inaugural round established a baseline of Foundry jam activity but did not determine a successful approach to identifying significant behaviour. My first codes were not as interesting or meaningful to my research questions as the paragraphs above might suggest, but they did bring jammer responses into a non-linear data dimension for analysis, even if my first passes had been "on-the-nose" attempts to create data "buckets" (Braun & Clarke, 2021) of jam activity across three criteria:

1. Established game jam activities/behaviours.
2. Existing affinity space or flow theory concepts.
3. General behaviour I observed during observation.

The codes from these criteria, concerned my first two questions: the "How do jammers engage with physical heterotopic affinity space?" and the "What behaviours emerge while jamming in heterotopic affinity space?". But mid-way through my first phase passes, I realised it was not going to provide the conceptual ammunition required to approach my third research question, "How does flow present for jammers in heterotopic affinity space?".

Jammer flow only occurs when the challenge of a task and participant skill are in balance. As a psychological experience, it removes perceptions of time, and elevates the sense of success, to an extent participants feel only a short period of time has elapsed, but a great much has been achieved (Csikszentmihalyi & Nakamura, 2014). I realised my coding should support this more temporal understanding of the "when and where" of flow, but also the new more FEAR-less behaviours I was searching. I returned to the work of Jackson and coded for "energising moments" (2016), and also Flannigan's "critical incidents" (1954). I was now coding for the good (Jackson), the bad (Flannigan) and the ugly (heterotopic) of jammer behaviour.

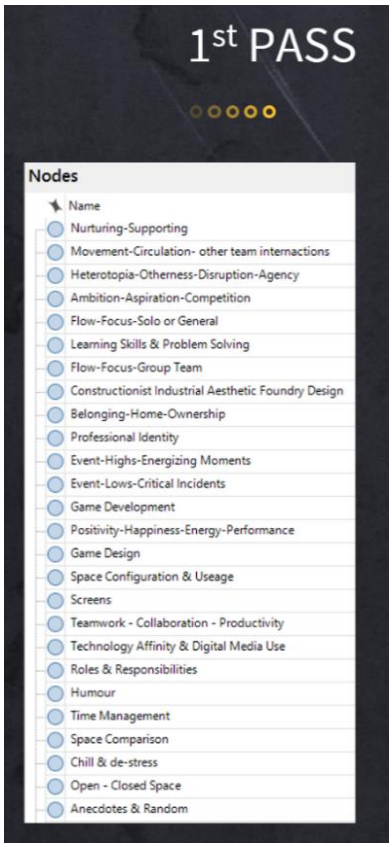


Fig.40 1st phase codes.

The results of my first coding were useful as they condoned what I had observed during the jam or intuited from my data re-familiarisation. It was also reassuring to see that all four teams were present in NIVO references throughout.

While not a quantitative study, for this first coding phase, I sought to understand how assigned codes related to each of my research questions. Of the 350 references, 260 were relevant to Foundry activity (RQ1). Teamwork and collaboration were coded 51 times, Foundry configuration was captured 64 times, and there were 47 references to different forms of technology use. Reading code excerpts chronologically by team in NVIVO provided a sense of the cadence that teams experienced in the Foundry. It had also captured references to nurturing or passionate states, occasions of learning and/or problem-solving, and accounts of project progress.

Significantly, it highlighted the extent to which jammers were implicitly aware of the heterotopic design of the Foundry, despite this never being made explicit. There were 20 references across the four teams to codes relating to themes of paradox in the space (e.g. “open-but-closed”), plus a further 17 to the cold, hard and industrial aesthetic, despite a further 19 to the Foundry being a warm place with which they felt connection. These tangible paradoxes in their responses were accompanied by a further 42 comparisons of the Foundry as preferable for jamming to that of other lab spaces[46].

Broad yet shallow, these earliest codes suggested some emerging themes, and evidenced that jammers had a passionate yet nurturing affinity for game development, task achievement and each other in the space. Good themes are those which tell convincing stories through patterns of shared meaning across data, research, and practice (Braun & Clarke, 2021). Reflecting on my initial coding, it did not help me understand the significance of certain behaviours over others, or speak to the impact of behaviour emerging from heterotopia on flow. Writ large, this coding itemised and collated things that happened, but it was not possible to abstract new themes or correlations from it.

I made the decision to perform what Braun and Clarke call a “radical revision”, where themes are reviewed and may be split, retained, or altogether discarded (2021). For me it was the latter, as I required more interaction between my codes and what I witnessed during Foundry jams. This was the

[46] Transcript extracts by these themes are available in the appendix and discussed later in this thesis.

impetus for my second phase, as coding for critical incidents and energising moments as temporal devices had not provided the utility I had hoped. My first coding had given me the "lay of the land", but my second attempt would be significantly more reflexive.

C. Phase 2: Rebooted Coding

My observation condoned the notion that unruly or distracted jammer behaviour was more prevalent in the Foundry, but my first coding had not yet helped connect this behaviour with jam activity in any meaningful way. Moreover, Barden's (2016) heterotopic affinity space (on which the Foundry was inspired), and flow theory (important to game studies) had not meaningfully coalesced during the first coding. The following rough sketch during my reflexive notes illustrated the extent to which these concepts were peripheral to what I had observed, and what jammers had discussed. I resolved to implement an alternative coding approach.

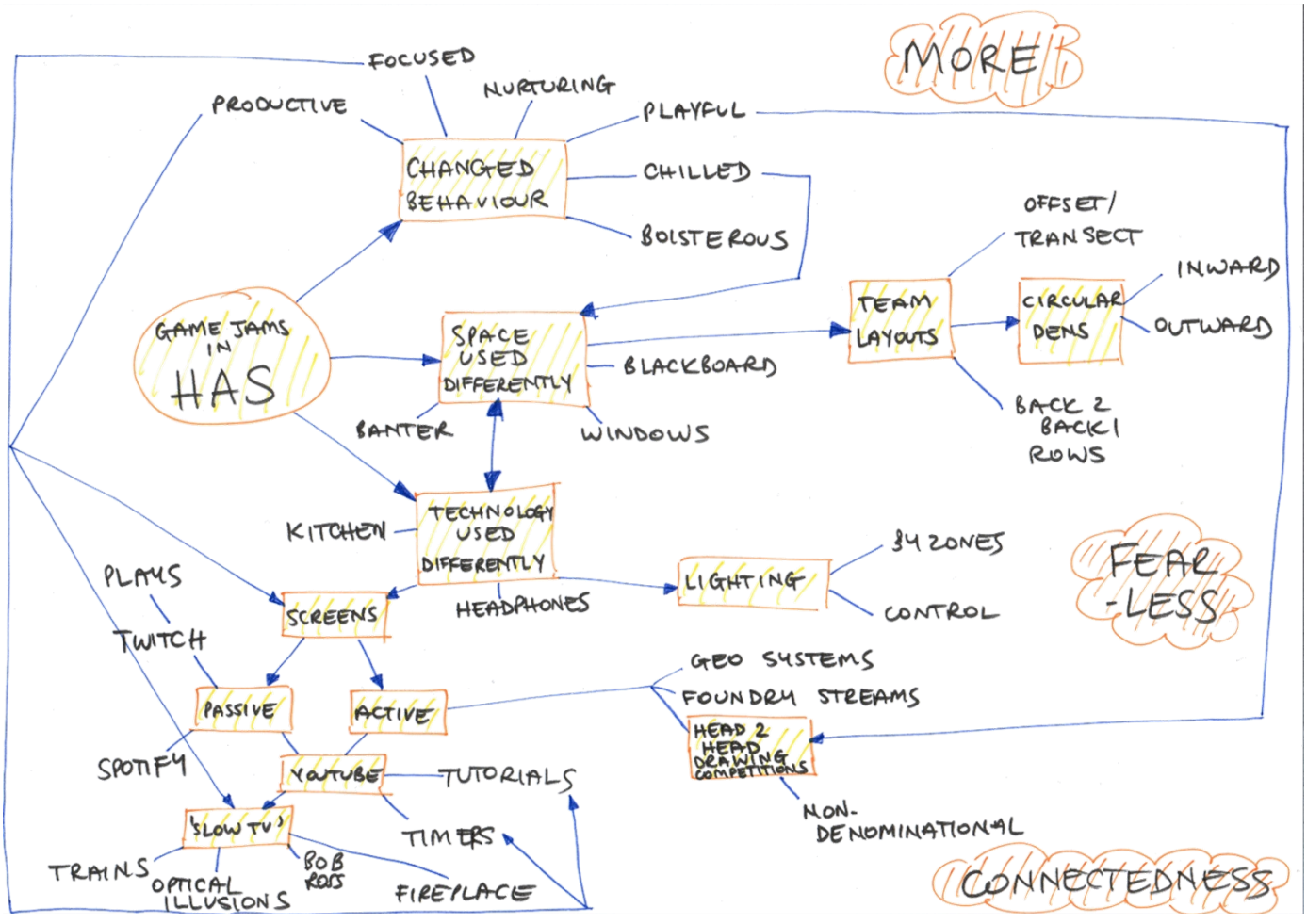


Fig. 41: An attempted map of observed behaviour was challenging and central themes did not yet appear central.

My first phase of coding amassed examples of jammers explicitly recognising that the Foundry was affecting and different to other spaces, but such disclosures lacked proximity to my theoretical framework, or robust links to heterotopic affinity space and flow theory. I reasoned that heterotopic behaviour would never be condoned in formal education unless it could be aligned with participant engagement and attainment. I realised it was first necessary to understand *where* activity occurred, so representative examples might be triangulated from my data and reported on.

Designing my second phase, I inverted the process that had resulted in heterotopia and flow appearing extraneous to jammer behaviour in my first coding, I remembered jammer teams were nested cases within the Foundry heterotopic affinity space during the GGJ, and that I, the researcher, was an instrument and my jam experience was not a bias needing to be managed, minimised, or removed (Braun & Clarke, 2021). My revised approach would code for jammer behaviour in context of my pre-existing research aims in the hope of exploring the behavioural jam landscape .

Phase two coding was inspired by key concepts of this thesis, aligned to my research aims and questions. This was not a change from "bottom-up" to "top-down" coding, more that this approach considered the origin of codes as concepts from my research study, instead of the arbitrary "buckets" of my first coding phase. The first code category was provided by the *otherness* of Barden's heterotopic affinity space, the second by the *connectedness* of Gee's affinity spaces and the third, that of *intentness*, which I intended as a proxy for flow, and to also capture wider states of intent, concentration & engagement:

Research Question	**Chosen Theme**
1. How do jammers *engage* with physical heterotopic affinity space?	Connectedness (Gee)
2. What *behaviours* emerge while jamming in heterotopic affinity space?	Otherness (Barden)
3. How does 'flow' present for jammers in heterotopic affinity space?	Intentness (my own)

Fig.42 Central concepts of this thesis, codes aligned by research questions.

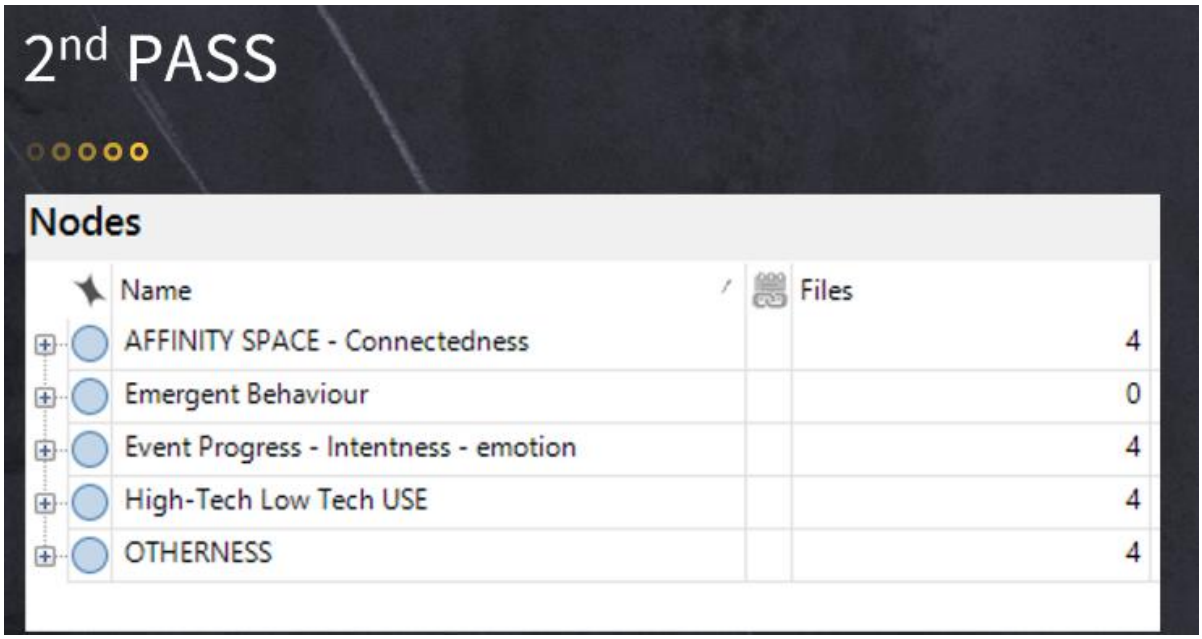


Fig.43 Coding for Intentness, Otherness & Connectedness.

The rationale for the categories above was firstly, that jammer interactions could be telegraphed via the *connectedness* of affinity space; secondly, that emerging unusual or accentuated behaviours might be attributed to heterotopic Foundry *otherness*; and thirdly, a notion broader than flow as *intentness*, to capture references of jammer engagement beyond accounts of flow alone. All four team transcripts were re-coded.

I retained the "high and low technology use" codes from my first phase to understand how themes emerging this time around might triangulate behavioural occurrences and technology use (where high technology denoted complex interactions such as screen-based content and software, while low technology use was more spatial such as lighting, heating and less interactive technologies in the space). What emerged from this second coding was unexpected and beneficial to my analysis.

While my "reflexive scribbles" were messy, they were a significant aid to my process of reflection. Had I not written up my thoughts, annotated screengrabs, reflected on the sum of my research process (and not just my resultant codes and themes) and drawn these connections, I would not have identified a significant outcome of this thesis – a conceptual organisation of off-topic jammer activity.

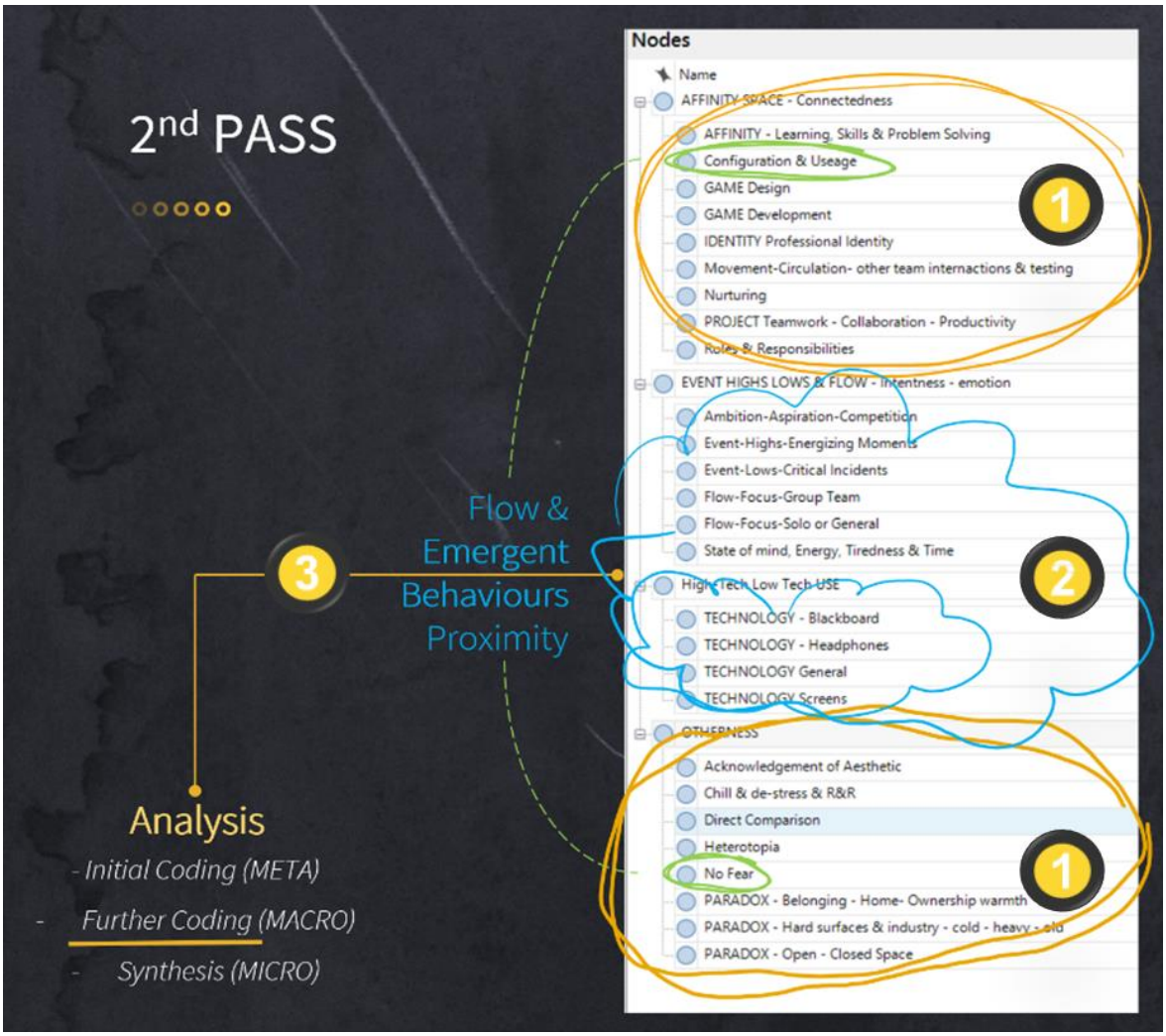


Fig.44 Sketching phase 2 coding themes lead to a breakthrough.

The blue and yellow scribbles I drew on the whiteboard were significant because:

1. Headings for *connectedness* and *otherness* accounted for two thirds of all coded references, but it was what they left behind was more significant. Emergent technology use, flow experiences and more emotional "event highs and lows" now all coalesced under my notion of *intentness*.

2. This new arrangement informed how I would triangulate emerging behaviour. What was different about Foundry jamming I had observed, and jammers had discussed was now jammer *intentness*. This visualisation implied off-topic activity might be proximal to flow *within* a construct and hinted to the important framing of my final research question: "How does 'flow' present for jammers in heterotopic affinity space?".

3. It was now possible to compare, contrast and even connect different codes under these headings. For example, more FEAR-less behaviour (discussed in Chapter 2) could be linked to the configuration

of team jam spaces through this coding, even if those acts themselves were not explicitly coded as *otherness*.

4. My notion of *intentness* also aligned with an approximation of gaps in the connectivity of my literature review across game jams, affinity space and flow theory. By coding for a theme of *intentness*, it allowed emerging behaviours (particularly around technology use) and flow theory to merge in a way that would become meaningful to my thinking as I returned to my theoretical framework. Reflecting further on my second coding phase also led to a further breakthrough:

If game jams were affinity spaces, the Foundry incorporated heterotopia to jam events, and such locations were strongly preferable to FEAR-full spaces in jammer accounts, it seemed logical that disruptive or distracted behaviour in the Foundry was directly due to the heterotopic intentions of the space[47]. Heterotopia had been the only significant change to our jam setting, so it was exciting literally and figuratively to "see" jammer intentions as *intentness* nestled between on-topic *connectedness* of the game jam and the off-topic heterotopic "*otherness*" of the Foundry through coding.

Jammer *intentness* and flow nestled conceptually beside on-topic affinity space activity of shared pursuit and common goal (Gee, 2005) and accentuated disruptive off-topic (Bommarito, 2014; Lammers et al., 2012) Foundry behaviour provided, not only the conceptual "what to look at" for activity I sought, but also a better temporal "when" of flow occurring in proximity than either Jackson's or Flannagan's approaches to the analysis of events.

D. Phase 3: Coding for Jammer States

My final phase was more iterative, and not the magnitude of breakthrough the conceptual re-boot of my second phase had seen. I was making progress beyond something that could be presented as the central themes, towards the "story" of my data, but there was more refinement required, and I wanted to consider research in the field that had come to relevance (Braun & Clarke, 2019).

Through two months of re-living, re-coding and re-interpreting my data, my understanding of the shifting nature of engagement within affinity spaces had grown, and the work of Dan Bommarito (2014) to map different types of affinity space gained significance in my thinking. Affinity spaces were neither permanent, nor fixed, and could phase between kinds determined by participant behaviour. I realised another coding phase should be incorporated, as if affinity spaces could shift in state, so too might jammer states.

[47] This aligns with the increased political agency Barden (2016) noticed in college students.

During my initial coding, I categorised behaviour as I had observed it, as being "technical" or "spatial" (i.e. if jammers had been interacting with technology or architectural aspects of the Foundry). A further result of my second phase, was the need to understand if Bommarito's mapping of different affinity spaces through "passionate seriality" and "groupishness" had been drawn into scope of my analysis (2014, p.410). Consequently, my final phase introduced a more detailed coding of both individual and group activity, with a view to developing a focus on the cadence of jammer actions.

The themes of individual and group activity across *connectedness*, *otherness* and as activity proximal to flow, reminded me once again of Jackson's energising moments (2016). These had been an imperfect tool during my first coding, but now gained renewed significance in my final coding phase. Not due to the energising moments themselves, as I was not looking for those occasions[48]. Instead, I sought to pinpoint moments when off-topic activity less seen in traditional jam settings was occurring. Jackson's moments became a blueprint for a conceptual lens of my own - a lens to locate moments of *lateral* or unexpected off-topic behaviour, that arose due to or were accentuated by agency of a (FEAR-less) jam setting.

I began considering individual and group off-topic activity in proximity-of, yet paradoxical-to, on-topic jam activity; and how a conceptual lens of such a format might permit emerging behaviours elsewhere in my data to be isolated for inspection. I defined *moments* I sought not as *energising*, but *lateral*, because, firstly, they appeared to occur laterally to the perceived on-topic goals of an affinity space due to heterotopic *otherness*, and secondly, they were moments worthy of consideration which might be more-ordinarily dissuaded as bad-behaviour in formal settings[49].

The outcome of this final coding phase provided new utility I would not have leveraged from the triangulation of observation and interview data alone. Lateral moments provided a gateway to understanding why off-topic behaviour mattered in heterotopic affinity space, and that boisterous or contemplative individual and group lateral moments were what was heightened about Foundry jams.

Next, I located and wrote-up six lateral moments, triangulated across video, observation, and interview. This exercise led to a further discovery that lateral moments appeared to bookend the occurrence of flow, with not just the conceptual proximity of my second coding phase, but with lateral moments suggesting real-world transitions from on-topic to off-topic activity during the jam.

[48] Jackson's study of game jam affinity space in schools had students take part in game jams, but her lens of "energising moments" looked for the exciting times during conceptualisation of game ideas. Her students did not undertake technical game development, so flow itself was out of reach as a measure of engagement.

[49] **NB: Participant disruption was neither encouraged or condoned by this study or the host institution. The effect of heterotopic affinity space on already energised game jam events was explorative, seeking to understand unexpected, unpredictable effects of the heterotopic space.**

Each lateral moment is presented here in the form of an ethnographic fieldnote report. This was important to this research, not only as conceptual proofing of lateral moments, but as tangible examples of jammer interactions and the proximity between off-topic and on-topic behaviour in heterotopic affinity space, and the experience of optimal experience known as flow engagement. Writing-up these occasions was my final reflexive practice which concluded my analysis. What follows are six occasions of off-topic jammer behaviour, located through and conceived as lateral moments. These activities were triangulated as valid for inclusion by featuring across observation, video, and interview data. In Chapter 9, lateral moments are interpreted and added to an existing model in the literature, before a new model is developed.

8.2 Triangulated Lateral Moments

This analysis originally isolated eight lateral moments for further investigation, but only six were firmly triangulated across my data[50]. The six examples are significant activities that engaged jammers in off-topic activity pre and/or post-flow during the event. I recognised adjustments to my coding "lens", or my triangulation process could render different moments visible (and other lateral moments no doubt occurred during the jam), but I was confident discarding lesser moments in lieu of increased rigour improved their utility. If a moment could not be re-seen, re-heard, *and* recollected by myself, it was discarded.

It is from the following lateral moments that my return to the literature is founded, and the discussion and concluding chapter is scaffolded. My intention here was to present a persuasive "story of my data" (Braun & Clarke, 2021, p.35). The following lateral moments are worked examples, harnessed in the following chapter, where individual and group heterotopic behavioural "states" are positioned atop Bommarito's situated model of affinity spaces (2014). Thus, the following moments present an analytical bridge between the behavioural data of my findings and its connectivity to affinity space, flow theory and heterotopia discussed in the following chapter.

The following lateral moments were activities witnessed during observation, captured by video and on record as experienced and discussed by jammers during interview. They are also behaviours that I had not previously witnessed or seen elevated to such extent during jams of the previous 16 years.

[50] The remaining two moments are included in the appendix, but are not discussed here or used in the mapping as while observed and recorded, no significant jammer discourse exists about them.

Technology-mediated lateral moments:

1	**Cab Rides + Countdowns (Slow TV)**	**Additional Screen**
2	Roaring Fireplace	Tertiary Screen
3	Infinite Zoom-ins	Tertiary Screen
4	Bob Ross Paints	Surface Hub #1
5	Drawing Competitions	Surface Hub #1
6	Star Wars Machine Translation EN-CN-EN	Surface Hub #2
X1	Twitch Plays Pokémon	Surface Hub #1
X2	Foundry GGJ Event Live-Stream	Surface Hub #1 + Tertiary Screens

Fig.45 Table of lateral moments, including "near misses" (X1 & X2 in appendix).

For each lateral moment that follows, I provide background to the origin and interactions of the off-topic activity, and its proximity to flow through the incorporation of jammer responses. The prior context for each team's use of the Foundry for jamming is available in Chapter 7. I have included a selection of video stills to give the reader a sense of each moment.

A. Cab Rides & Countdowns

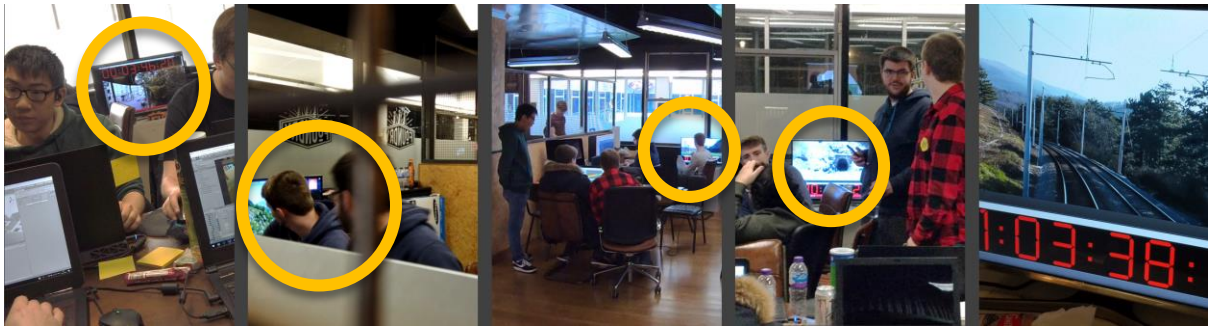


Fig.46 Jammers gaze at train journeys across foreign lands

Team Tarpan chose one of the activity pods inside the Foundry as their base. These pods are open to the front, and separated from the spaces either side by walls, which have metal grilles on top and structural chipboard below. In an "open but closed" layout, Tarpan placed a desk across the open entrance to the pod, creating a semi-permeable perimeter to their temporary territory. On the back wall by the windows, they installed an extra screen, that they stated was originally intended to be for group playtesting. Contrary to its intended purpose, this screen became a continuing source of lateral moments for the team, resulting in playtesting instead occurring on jammer computers[51].

For the majority of the jam, this screen displayed railway "cab ride" footage, that could be considered "Slow TV". In such videos, cameras are mounted in the cabs of railway locomotives for the entirety of

[51] Playtesting is a term applied to the process of playing game features at certain stages of development, in order to check that the gameplay and code is functioning correctly.

a journey, recorded in real time, with little editing. The group favoured two geographic locations for these videos: snowy alpine locations and suspended railways transecting urban environments.

Fig.47 Tarpan celebrate a breakthrough, with heterotopic farming content in view.

Tarpan at first experimented with other forms of slow TV during the first evening of the event such as the Swiss farming video (Fig.47), before settling on the cab ride genre. From here on, streaming train journeys exclusively, where Norway, Slovenia and a suspended German railway featured prominently for the duration. The team supplemented this video with a large red digital timer, counting down to the jam deadline.

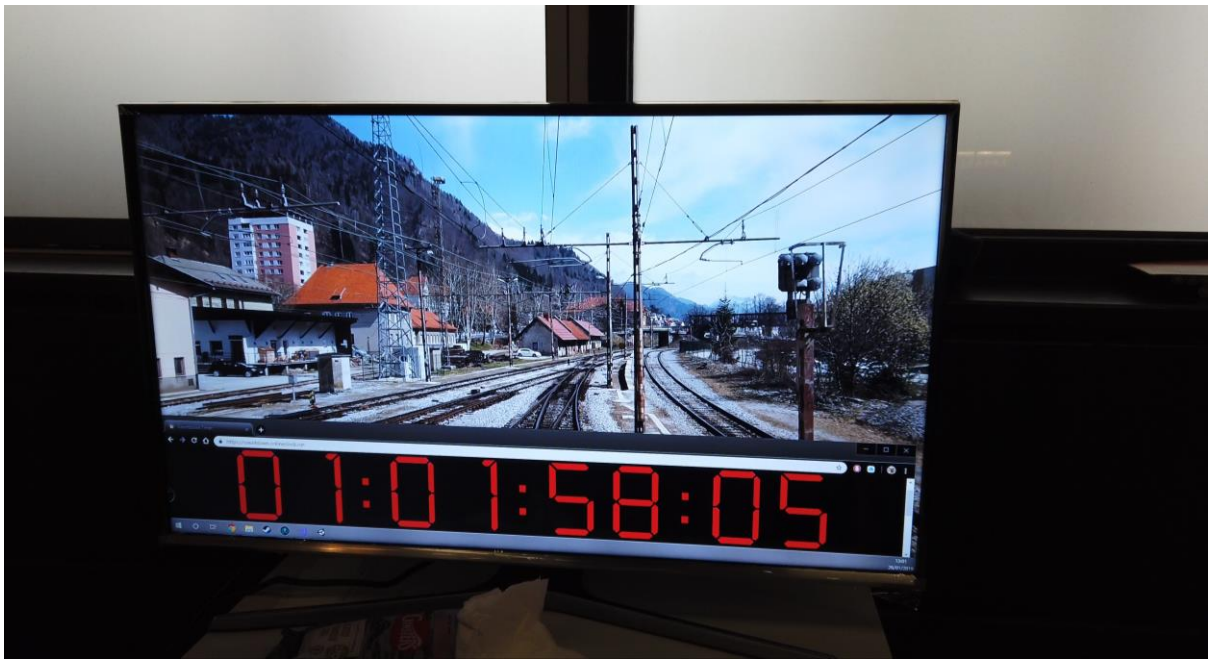


Fig.48 A large red timer at odds with the escapism of cab-ride video content.

Fig.49 Team Tarpan deep in flow with 1 day 13 hours remaining.

Timers are not unusual visual elements for game jams, but the inclusion of a journey appeared to soften their typically intimidating presence. It also created a paradox; as jammers could be "somewhere else" but could transition back to reality of the jam when their thoughts returned to working on their game via the deadline. I noted that it provided jammers something to look at, where they appeared to stare off into its horizon post-flow. Conversely, the countdown provided a robust mechanism for planning and task management pre-flow. The timer was also used by other jam teams: *"Yesterday there was a clock behind us, and it counted down how long until the deadline. And I looked at it one minute, and it was like 'one day, four hours, something, something'. And then I looked at it what felt like the next minute, but it said '19 hours to go'. And it's like, "Oh." It felt like time had noticeably progressed"* (Uaz, Tarpan).

In this way Tarpan's screen offered both an escape-from and a return-to on-topic activity. Fig.60 shows the additional screen unattended, yet Fig.61 shows the screen providing post-flow purpose:

"*Me and Zil had a decent amount of it where we'd have a problem, we'd take one of the sticky notes off the Mac board and put it down on the table. Then the both of us would just concentrate on doing it for the next X time until it was finished. Then we'd break out of the flow and either watch some trains going through Norway or go and talk to other people"* (Smutek, Tarpan).

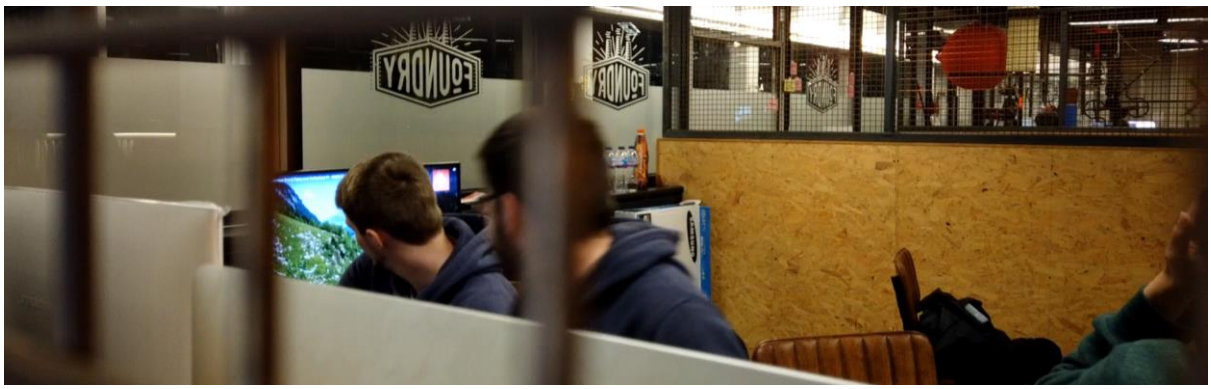


Fig.50 Team Tarpan gaze at the Slovenian countryside from a train cab post-flow.

B. The Roaring Fireplace

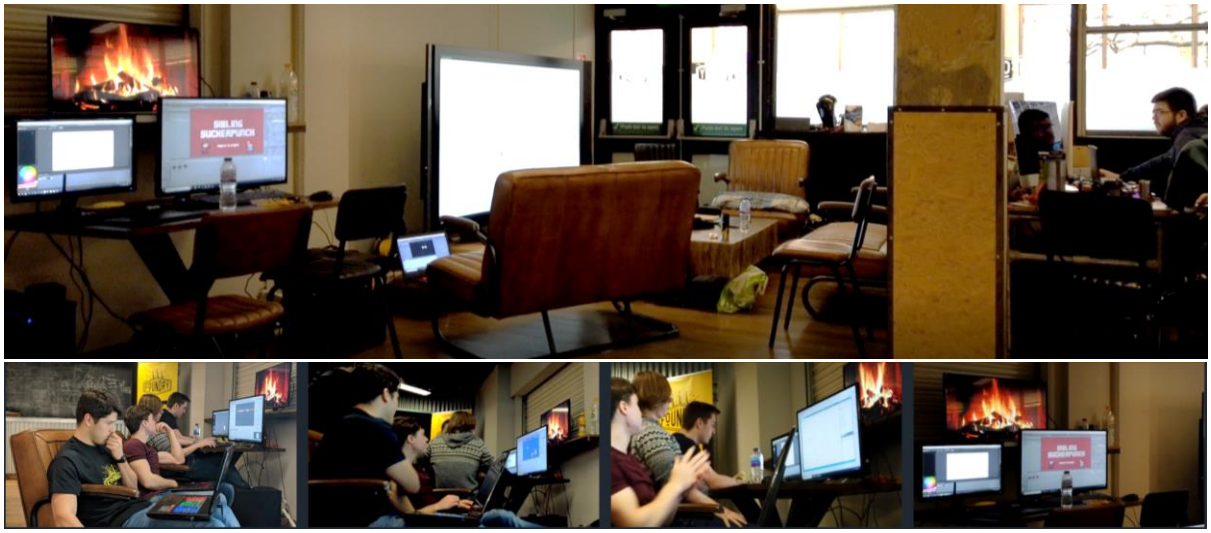


Fig.51 Trabant's first lateral moment was this video of a "roaring fireplace".

The "Roaring Fireplace" was a looping YouTube video of an HD fireplace, complete with audio of cracking logs and popping sparks, that played on an additional screen for approximately half of the game jam (Friday night through to Saturday afternoon)[52].

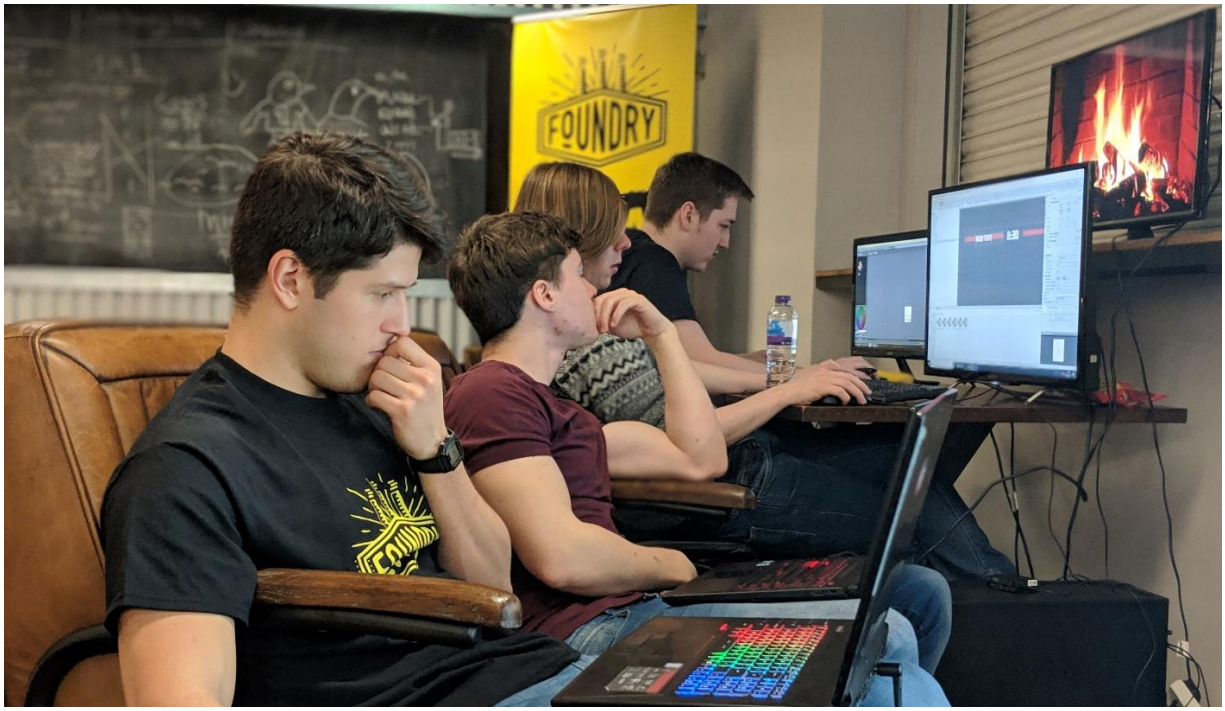


Fig.52 Team Trabant tended to gaze at the fireplace after periods of intensive coding.

[52] The video was similar to this one https://www.youtube.com/watch?v=L_LUpnjgPso and there remains a trend for similar fireplace videos: https://www.youtube.com/watch?v=kOnIAoqQkd4

Trabant's first lateral moment established the overall "vibe" for their jam (Caro, Trabant), and was notable because it was instantiated as soon as Trabant built up their Foundry workspace. I noted that this immediate off-topic behaviour, while perhaps accentuated by the FEAR-less agency of the Foundry, also seemed to be more about fostering the overall conditions of their creative process. This was also a more relaxed approach than that of Tarpan's large red timer, which they softened through being a *view to someplace else*. Asked about the fireplace, Trabant responded enthusiastically:

Smyk: *Well, we had a spare monitor so we figured [we] might as well put it to use and juice out with it.* [53]

Zaz: *It's relaxing.*

Smyk: *Yes. Same purpose as the entire room really [pointing around the Foundry].*

Caro: *Yes. It's just a nice vibe to everything, just makes you feel relaxed and chilled out.*

But Caro's next response was insightful and impactful for me, as it condoned my notion that lateral moments were important and proximal events to flow:

Caro: *Yes, when you need to take a break from coding, you need something to look at rather than more coding, or like screens. And just like, something that's not a plain wall is quite nice.*

Zaz's response to Caro also hinted that there was something proximal to flow in these moments, that appeared more than merely individual distraction:

Zaz: *Yes, yes! You zone out, yes! You look at it and you can zone out and you just think… like catch up on like… it's like… I find when I go in the shower - I think more clearly about my code and I normally come up with solutions. It's a similar effect of that.*

[53] Juice is a game design term, used to imply the finer effects and graphical details of a game to make the game more enticing to players.

C. The Infinite Zoom-in

Fig.53 Tarpan's second lateral moment was a hypnotic never-ending zoom-in animation.

I watched Tarpan change their video on the final day of the jam to one that in a less heterotopic space would have appeared at odds to conducive jamming, such was its apparent distraction. I noted the timing of this switch-out coincided with an often-unhealthy phase of game development known as "crunch" (see ethics, Chapter 6). Crunch often features elevated stress levels, and what can be near chaotic "code like hell then fix like hell" cycles of game development in the run-up to a deadline (Borg et al., 2019; Irish, 2005). For Tarpan, the symptoms of crunch and any apparent time-pressure appeared muted, as the team had a new lateral focus: the "Infinite-zoom in".

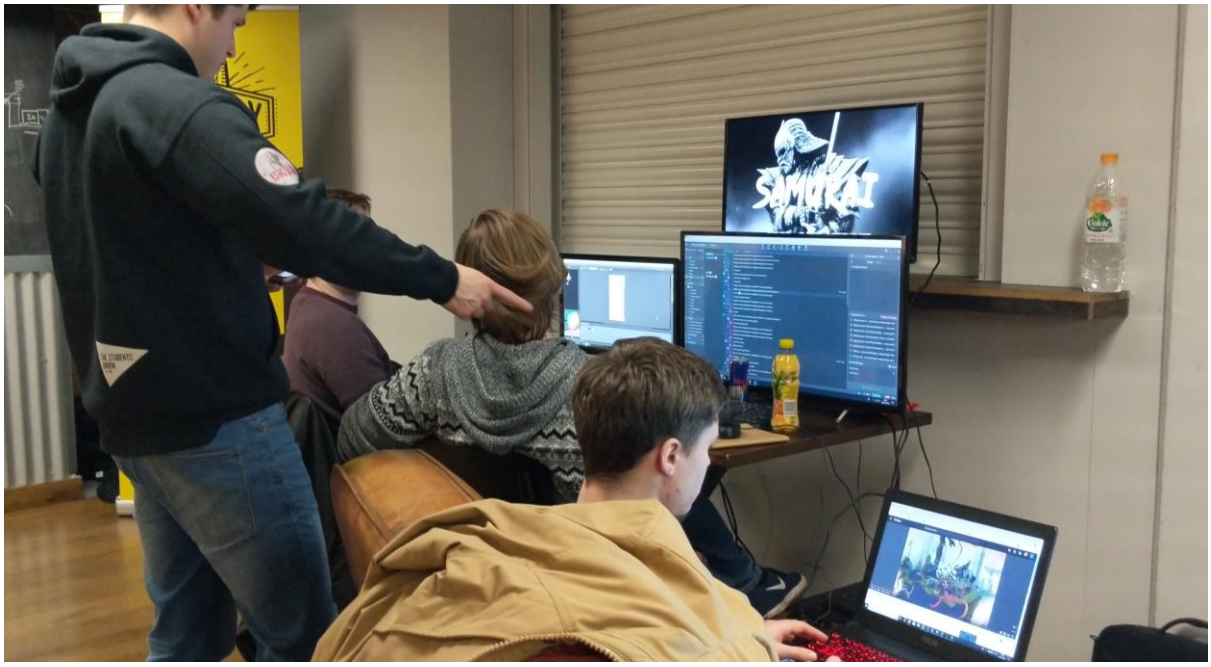


Fig.54 Jammers review progress, while "roaring fireplace" is switched to "infinite zoom-in".

The zoom-in refers to the journey of highly detailed images travelling continually outwards. There is no other animation or movement in the image itself, the camera simply continues to travel towards the centre of the screen. What makes it infinite, is that you never reach the end of the zoom, and the camera never stops moving inwards. I noted that this effect was hypnotic to watch even during a boisterous jam event, and akin to the deep and instant fascination you might feel when you witness an optical illusion or “magic eye” for the first time.

Fig.55 It was hard to tell where the "joins" in the video were due to their abstract nature.

The infinite zoom effect is achieved through a seamless transition between multiple colourful and often surreal images that have shared visual elements at the centre and periphery that are “stitched” together. The stills from my video show scenes varying from alien invasions through to Donald Duck on the end of a fishing hook, and it was rarely possible to make out the near-imperceptible joins between each artwork at the centre of every scene.

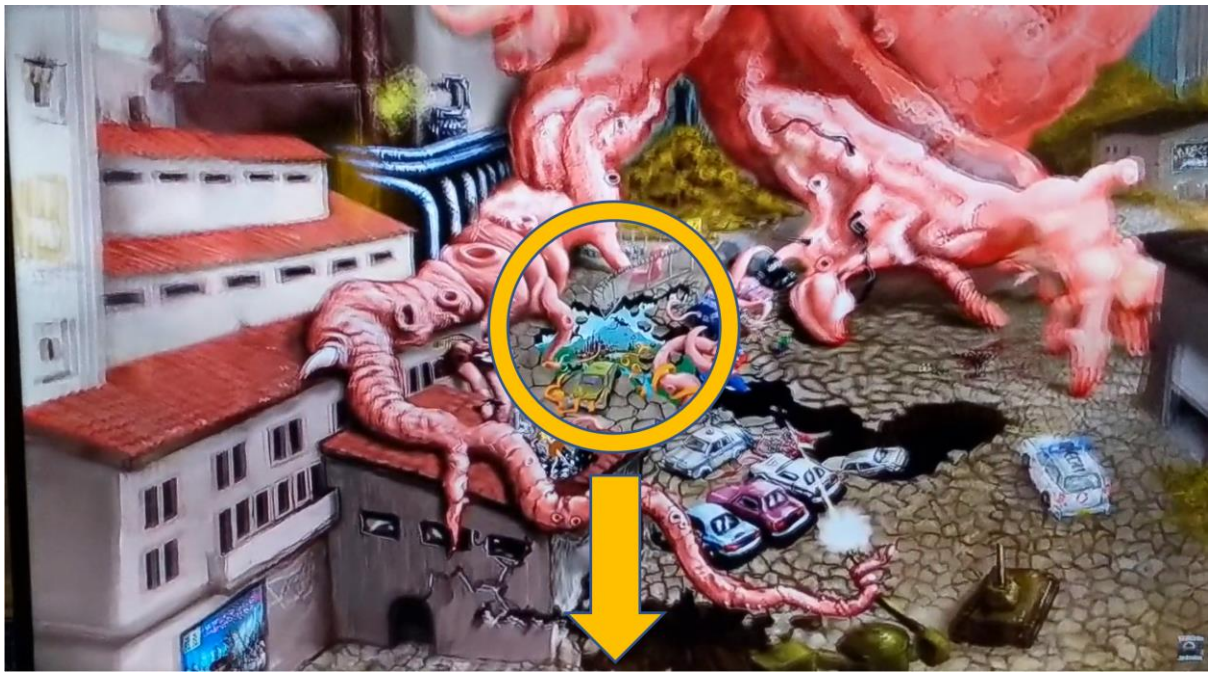


Fig.56 Centre of one scene (circled) zooms-in to become the next (below) - an infinite transition.

My reflective write-up of this moment sought to understand how the effect was achieved. It was through this understanding I realised how similar this "moving through another world" was to that of a train moving through a foreign land[54] and in keeping with Foucault's heterotopia as "other places".

Fig.57 The part when one image scene becomes the next can be visible if you pause the video.

[54] A shorter loop featuring some of the same images is available here: https://youtu.be/PUsF68N7MfE. Infinite zoom-in's were a motion-graphics trend in 2019.

Asked about the infinite zoom-in, and its occurrence late in the jam, Trabant responded as follows:

Zaz: *I think every time you look at it, you notice something new. There's so much in-*

Caro: *…It's easy to look at.*

Zaz: *Yes it is. I look at it. I look up and I'm like, "Oh, I didn't see that the first time around," and then I notice something the next time.*

Zaz: *We all spoke about it and we were all just mentioning how weird it was and how we wanted it just to end so we could stop looking at it.*

Researcher: *Are you saying it was a shared point of focus?*

Smyk: *Yes, at the start.*

I considered if the video was a source of reflection for jammers, and if there was a similar purpose to this video as post-flow activity as when Tarpan had discussed the roaring fireplace:

Zaz: *Yes. Sometimes it is like when I'm sat there and I look up and I gaze into it and I just get lost.*

Smyk: *Yes. Easy way to turn off your brain.*

It seemed staring at this animation was preferential to "not getting things done" when flow breaks down and (as a game developer) you can end up staring blankly at a screen of code:

Smyk: *Well, you usually either spend time just looking at your work without actually thinking about it, but in this case instead we're just looking at a weird, surreal art piece.*

Zaz: *Yes. Yes. At the beginning it was really hard to take your eyes off it. We wanted to see everything on it, and then once we realised it actually looped, we were like, "Oh, okay."*

Dacia's response, spoke to the prospective difference between individual and group lateral moments, as most whole-team off-topic activity seemed the most-disruptive, while individual distractedness from lateral moments appeared more temporary:

Dacia: *I would say at first it was not beneficial because it got us distracted from our work.*

Zaz: *Because it distracted us all and we all sat there, and it's a talking point. So I'm focused on my work, but now [focused on] that…*

Intrigued by this response, I had asked Trabant about the flow they experienced in proximity of watching these videos. What they said next was powerful, as it condoned both what I witnessed during this moment, but also the conceptual grouping of my themes drawn upon in my discussion to situate lateral moments, and therefore flow, in affinity space theory which follows:

Researcher: *Do you look up at it when you've just come out of flow?*

Dacia: *Yes, I personally do.*

Zaz: *Yes, yes. It's normally at points when I'm there and I'm like, "What do I need to do next?" I look away from my monitor - not at the monitor when I'm thinking.*

This "looking to other places" mediated by technology for the purposes of reflection and escapism appears a defining feature of jamming in heterotopic affinity space. It was not only monitors that were a source of lateral moments. Two large touchscreens known as surface hubs were also identified as hosting off-topic activity that was either interacted with up-close, or broadcast across the Foundry.

Unlike the secondary screens of the first three lateral moments, surface hubs were also used for on-topic activity between phases of off-topic use. They were never monopolised by any one team or activity for too long, where the following moments drew jammers from teams across the event.

D. Bob Ross Paints

Fig.58 A "Bob Ross Paints" YouTube video playlist greeted me on Sunday morning.

During my data collection, I dismissed the video of Bob Ross on Saturday morning as a random video left playing in the way YouTube has a habit of automatically playing another video. However, the YouTube playlist had been a conscious decision by team Tico during breakfast. In re-visiting this activity, I recalled more than the narration ringing out across the space, I was struck by the context of this constructionism and the act of creating views to other spaces. Until now, the surface hubs had been used by teams as interactive whiteboards for conceptualising their game designs, but it was naïve I had thought this video did not serve some purpose to jammers at the time. While providing escapism like trains, fireplaces or the surrealist worlds of other teams, the painting was more distant than other moments, even for the team that had set it running.

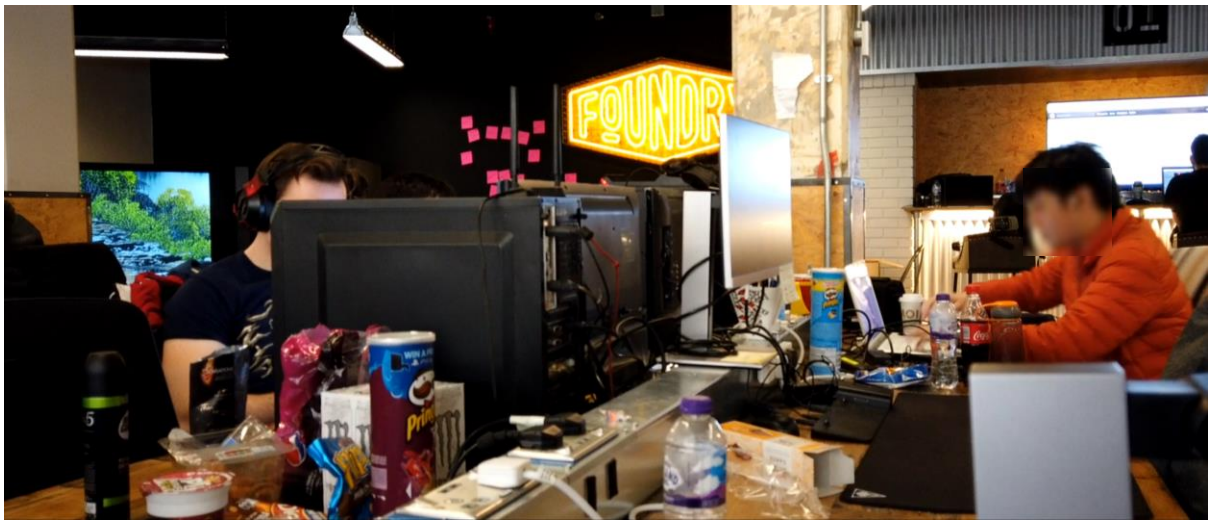


Fig.59 Jammers work on, while thelarge surface hub sees Bob Ross paint new worlds.

Fig.60 Team Tico meet to discuss progress while "Bob Ross Paints" in the background.

This lateral moment coincided with a pivot in Tico's jam - they set this moment going at the same time as they realised, they needed to change the direction of their game radically. I remembered thinking that the screen behind was surely distracting and at a volume level that would have been adjusted by staff in formal labs and classrooms (and fought the urge to quieten it). Nonetheless, the group moved from their pod towards the centre of the space to discuss what had gone wrong, leaving the video running. As they settled down, Bob Ross started to paint a new composition at the far end of the Foundry.

During a later interview I was interested to learn why the group had moved, and if what had been cast to the screen had been intentional or relevant to their situation in any way. Asked if the surface hub had been useful to the group, Felicia responded with a comment I noted might not only be a jammer recognising *otherness* in terms of escapism, but that such activity was proximal to flow and reflection:

Felicia: *Yes, every time I walk by it's something different and something interesting, which is a nice, "Huh, that's happened while I've been working" sort of moment.*

In keeping with affinity space theory, it appeared the content of lateral moments was accessed through portals by jammers as *views to other spaces*, away from game development and the jam itself. The next moment identified led me to discover that it was not just portals to distant lands, but acts of jammer construction and the generation of lateral content.

E. Drawing Competitions

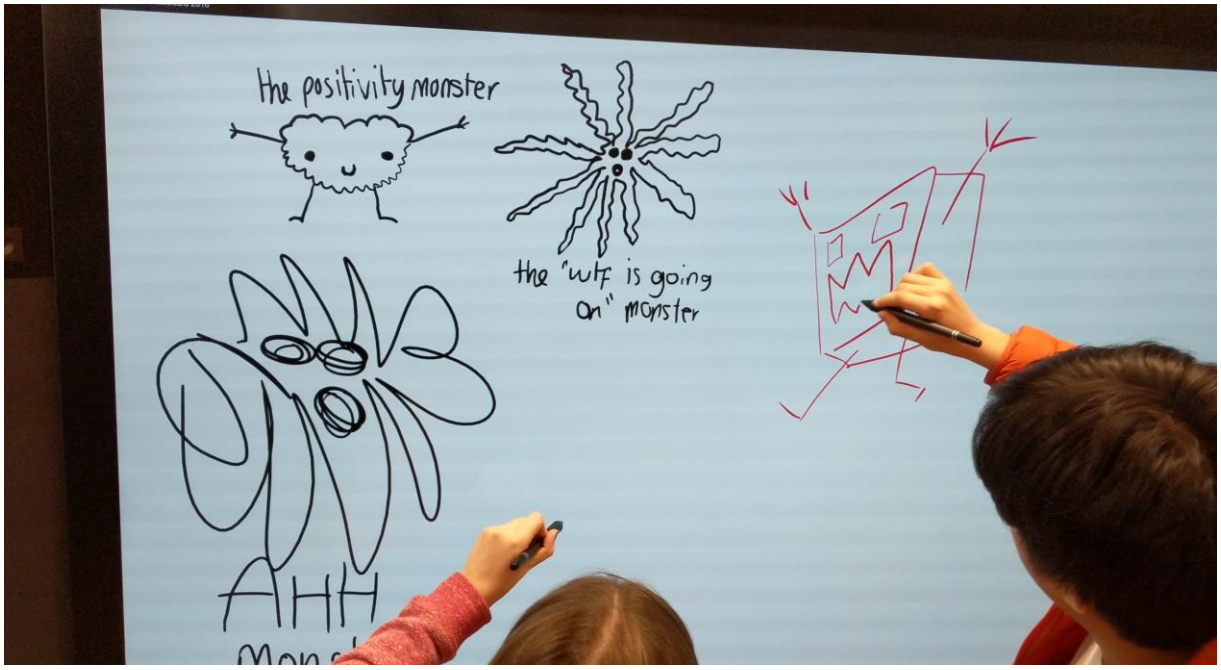


Fig.61 Surface Hub 1 garners off-topic "jam doodles", as another lateral moment emerged.

While Bob Ross painting had been more passive than other lateral moments, Uaz summarised what Tico had loaded onto the hubs, "*It's got some game design documents, some random doodles, some random [drawing] competitions [on it]".* Zaz spoke of the drawing competitions as if they were equivalent to "asking for help" – a parallel to what Bommarito calls groupish-deliberation, where on-topic activity occurs to establish what should be done to address challenges next (Bommarito, 2014). The use of the larger hub touchscreens for drawing competitions fitted this emerging theme of accessing other spaces. While this moment did not come up during interview to a significant extent (in part due to team Tico not attending their final reflective group interview), it in retrospect had been perhaps the most disruptive and extensive lateral moment of the jam. This lateral moment was significant because it engaged jammers irrespective of team identity, across activity lasting several hours before the hub was re-set for on-topic activity.

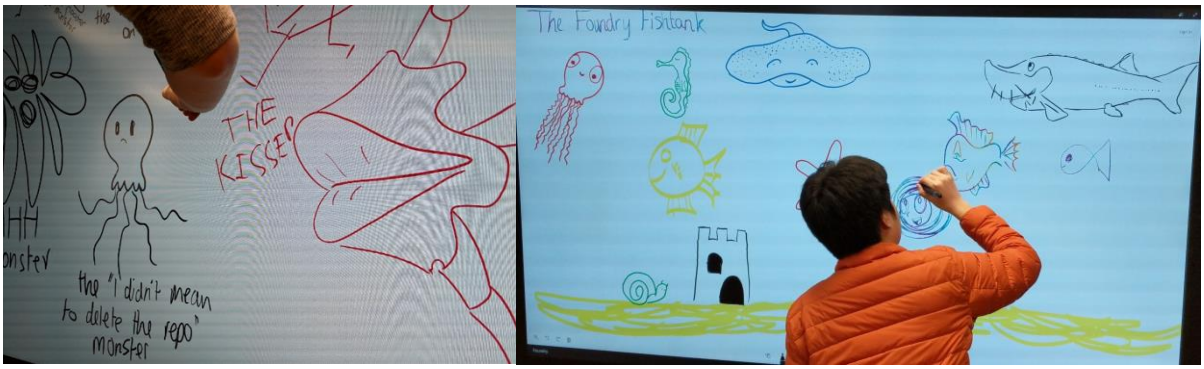


Fig.62 Left: Sketches often referenced gamedev practice. Right: Jammer contributes to a mural.

The trend for other spaces continued with various murals drawn on Saturday. But the day progressed, more playful "now let's draw a…" games emerged. As the moment developed, subjects were increasingly drawn from popular culture, such as memes, the media and gaming. In re-visiting this activity as a lateral moment it was far more disruptive and politically transgressive than I had recognised at the time, raising questions on the distortions of heterotopic spaces, and the extent to which limits to behaviour should still exist.

One challenge was to draw game jam "monsters" (see Fig.612 and Fig.623) where each participant drew different anthropomorphised game development issues. Not all of them made sense, but the "I didn't mean to delete the repo" monster resonated strongly, as during jams it is likely that someone will accidentally "break" the repository where each team's source code resides[55].

After the crowdsourced "Foundry Aquarium", and "Game Jam Monsters" completed, a more competitive and politically disruptive variant emerged: the "head-to-head drawing competition". During this lateral moment, spectators choose a risqué twist on known characters or memes from popular culture for others to draw. Groups of different sizes from various teams participated and observed at different times, in keeping with Gee's notion of affinity space (2005). Of the several hours of off-topic drawing, it was the final rounds that had jammers most boisterously engaged, with themes of internet memes and characters from popular culture, their representations of which becoming increasingly edgy.

NB: The following behaviour was not encouraged or condoned by this research or the institution. The unexpected and unpredictable effects of heterotopic affinity space on jam events was the impetus for this explorative study. Due to the often-bustling nature of jams, the potential for certain jammer behaviour to offend was only recognised post-event. As such, future heterotopic affinity space research should consider where acceptable behavioural boundaries of informal virtual and physical learning spaces lie within progressive education. I address why heterotopia accentuates shifts from on-topic to off-topic activity more than other FEAR-full campus spaces in the next chapter, and pick up issues of on the accountability of heterotopic affinity space in my conclusion "Things go *wrong* in Heterotopia".

[55] The repository is where all of the games code is stored that everyone "pushes" or "pulls" to and from while they are working on different bits of the game. In general, these are non-destructive, so "catastrophes" can be reverted.

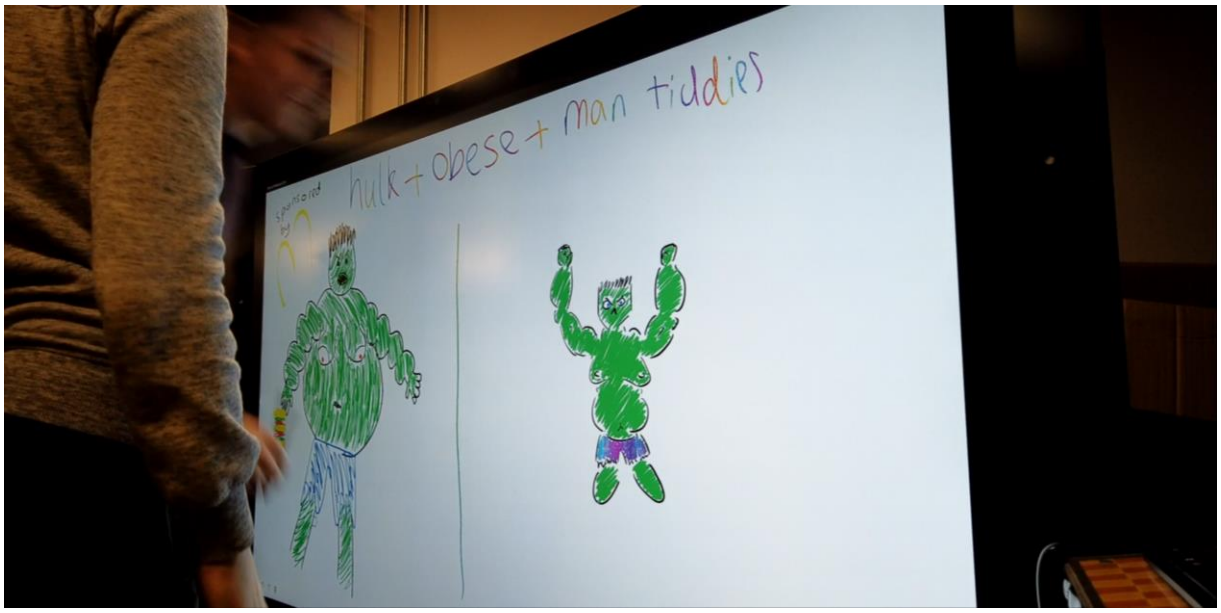


Fig.63 "Obese Hulk" was transgressive, but potentially offensive to others beyond the space without context.

The first round of this game to be on the edge of what could be called "societal perceptions of acceptable behaviour", (or that could cause offence) was a round featuring body image - likely inspired by the obese-hulk memes of the time (see Fig.645 below). Given that "fat shaming" (e.g. when a person has morbid obesity) is grounds for harassment under the Equality Act, this round was the focus of fictitious characters in popular culture, where the real antagonist here was McDonalds, whose logo appears in the far right hand side of the jammers image and the original meme:

Fig.64 A popular superhero meme and fast food brand 'health message' was reflected this round.

The next and similarly contentious round was "Slavic Mario", appearing influenced by the "Squatting Slav" meme that is widely popular among Eastern Europeans (Naydenova, 2018). The meme can be traced back to 2012, where a group of Eastern European netizens ironically embraced and took ownership of the stereotypes and prejudices of Westerners (Nikolova, 2020).

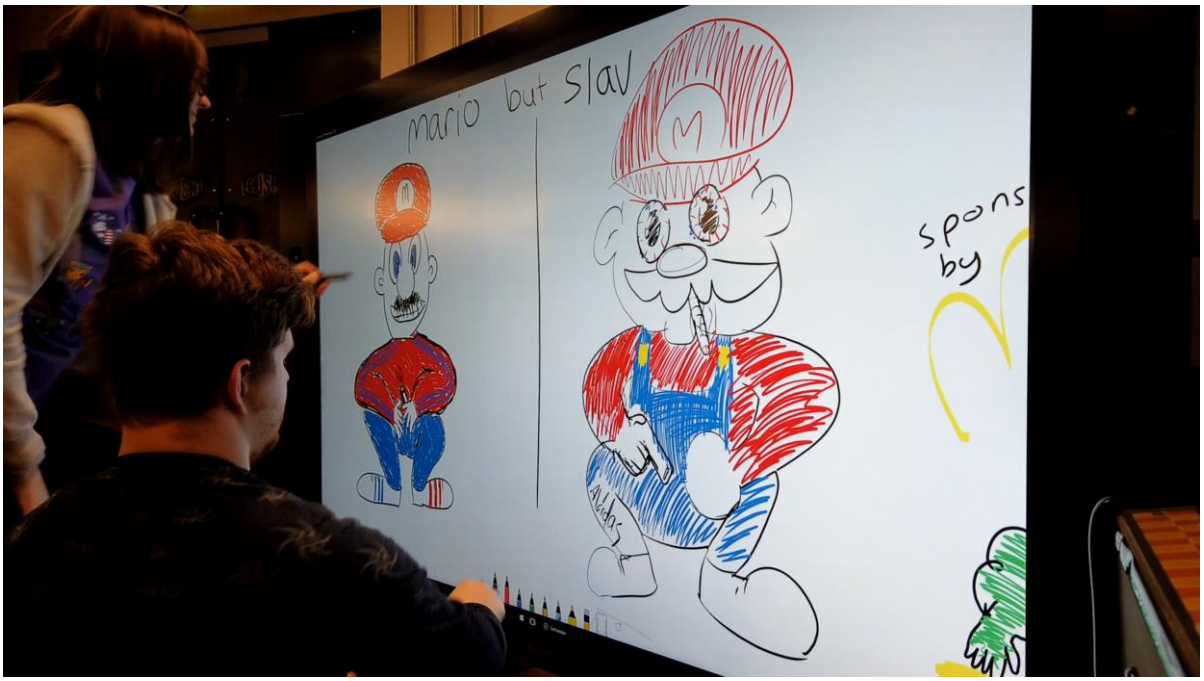


Fig.65 Jammers compete to draw the best Mario in the "Slavic meme" stance.

Seeing this trope combined with the "Italian Plumber" stereotype showed perhaps the fullest extent of freedom in heterotopic affinity space, which Barden suggests are Foucauldian *moments* of boundary crossing - where such artefacts are both products and constituents of the space (2016, p.233). For some, it meant freedom to organise the space, using physical aspects of it contrary to their intended purposes, e.g., using windows and walls as whiteboards, but for others, it was more literal acts of self-expression.

Fig.66 Nikolova (2020) illustrates how the "Slavic squat" has been appropriated by popular culture.

F. Chinese Star-Wars

Fig.67 English-Chinese-English translation resulted explicit, comedic, but short-lived lateral moment.

One of the most surreal lateral moments was the use of a surface hub for an impromptu screening of Star Wars, where the subtitles had been machine translated from English to Chinese and then back into English and dubbed, resulting in an intentionally jumbled, humorous, but expletive-laden foray into a galaxy far, far away. This moment was unique as it was instantiated by someone from outside of the team area who felt the agency to 'trespass', despite Trabant having effectively closed-off their space[56].

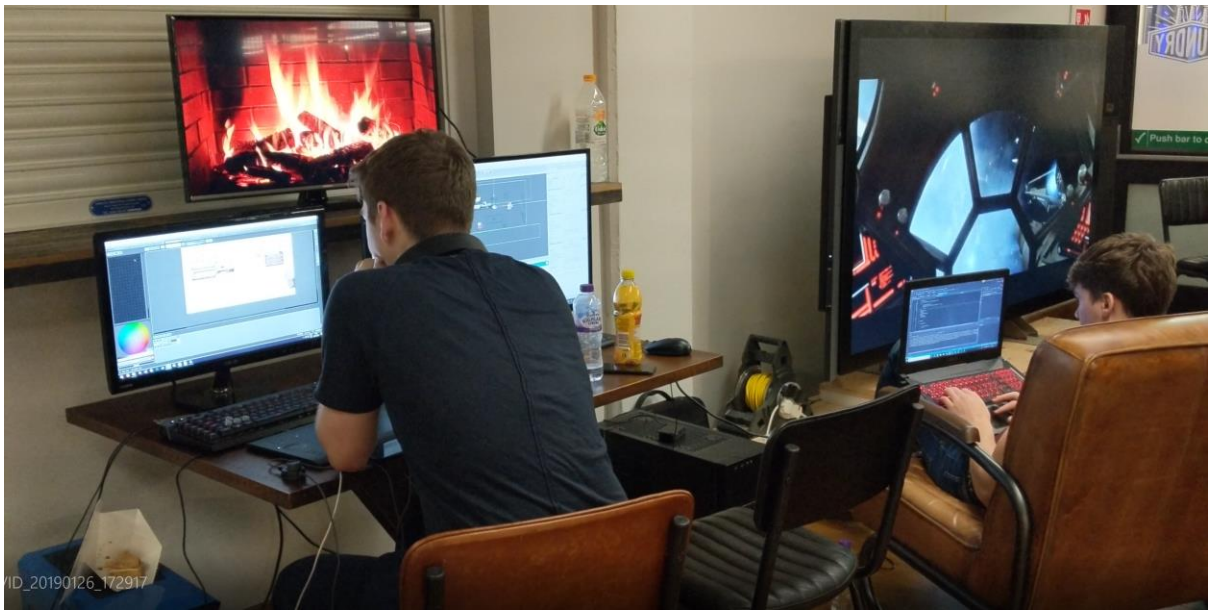


Fig.68 The Roaring Fireplace and Chinese Star Wars visible.

[56] Jammer agency also resulted in Trabant experiencing others entering their area to go to sleep. Perhaps owing to the roaring fireplace or the leather sofas they moved into their area.

Asked if jammers had felt Chinese Star Wars was distracting, Dacia felt it was, at first. But Smyk was quick to chime in to say that it was "b*eautifully distracting"* before referring to that moment and the drawing competitions as times the team had broken from coding to *"cool down, which is important."*

Chinese Star Wars could be said to be transgressive due to vulgar language and often non-sensical dialogue, like that of "Chinglish", where debates rage as to if mistranslation is offensive or not (Hartse, 2014)[57]. Nonetheless, this moment again gave jammers somewhere to escape to. In fact, given the world of content that could have been displayed on these screens, it was interesting that lateral moments continued to be of other times and places. While these large displays were more interactive, they were often more distant and less intimate to jammers than the content of smaller-screened lateral moments. In all, two of the three surface hub lateral moments were acts of construction, interacted or observed, while all three had provided views of other places.

8.3 Spatial Lateral Moments

Although there is evidence uncovered by this study that architectural features of the Foundry also served as a focus of jammer distraction and reflection post-flow, these six lateral moments were all technologically-mediated. Given the emerging and significant heterotopic theme of *looking to other spaces* presented by these moments, it is important to recognise the physical Foundry design (Chapter 2) was not benign in eliciting lateral moments.

The following articulate response from Zaz (Trabant) raises the prospect that other-spaces for reflection post-flow might be what happens before teams regroup for deliberation or in re-preparation of the conditions required by flow. "*I went into a restaurant, and it had a similar look to the Foundry […] the ceiling is like not there, and it's just a load of pipes and like old wood and rust […] You just sit down at the table and it's like you take in the room."*

Zaz went on to say that when he fell out of flow, he would think *"I didn't notice that before,"* and that such moments provided *"something to look at whilst you're… [cooling down], it's like a way to give you inspiration without really… [explicitly knowing]"* and *"you don't look at [them] and then suddenly think, I'm going to make Lara Croft game number two! You look at it and you're like, "Oh yes!" and then you think of something for your game… It's sort of like you look at it and you remember… you think about the job."*

[57] Hartse in Chinglish Triumphant – considers Chinglish / China English as a discourse of modern identity and a fascinating window into China's cultural power, hence the essay title "long time no see".

CHAPTER 9: Theoretical Discussion

While my analysis extracted the emergent heterotopic behaviours pursued by my second research question, this discussion chapter moves to incorporate those findings with new and existing theoretical models, and towards my final question - how flow presents for jammers in heterotopic affinity space.

This chapter conceives four layers of findings about jammer behaviour to a model of affinity space from my theoretical framework which, when taken in combination result in the second significant contribution of this study; the emergence of a recursive model for Phases of Heterotopic Affinity Space Engagement (PHASE), where lateral moments are situated and can then be more clearly understood.

This chapter seeks to understand more about flow in heterotopic affinity space, but also to make affinity space accessible to education, game jam and flow theory researchers elsewhere. Lateral moments are built upon here to develop functionality that firstly provides an opportunity to locate flow and secondly; allows us to explore affinity space behaviour in terms of flow. This discussion provides the context for my conclusion and practice recommendations and finds flow theory and affinity space (while powerful in their own right) bring new understanding to each other when combined.

Lateral moments in heterotopic spaces manifest as Foucauldian worlds within worlds[58] and playful acts of construction proximal to flow. This discussion considers the extent to which shifts in behavioural state (Bommarito, 2014) and activities within all affinity spaces might become visible through new and existing models.

By combining my knowledge of game development and jamming with my findings, I move to apply different interactional "*on*-and-*off*-topic" jammer affinity "states" (Lammers et al., 2012) to research originally intended to visualise "types" of affinity space (Bommarito, 2014). After introducing Dan Bommarito's study, the remaining sections outline realisations I came to through the integration and lateral application of my findings and understandings to his model. This process culminates in a new recursive PHASE model which connects domains of affinity space, game jams and flow theory for the first time, offering compelling opportunities for further research.

[58] Heterotopic lateral moments of galaxies far away, train journeys through distant lands, optical illusions and worlds within worlds, homely places, harsh industrialism, Foundry livestreams and painting and drawing known and unknown characters and places.

9.1 Returning to Bommarito's Model

Bommarito's "Tending to Change" challenges researcher assumptions limiting the progress of affinity space theory (2014, p.411). Despite awareness affinity space evolves and shifts as it is applied to new contexts as it expands "in new, fruitful directions" (Duncan & Hayes, 2012, p.11), researchers predominantly feature online, not physical affinity spaces (ibid, p.75; Lammers et al., 2012), deploying cookie-cutter definitions and applications, declaring alignment with Gee's theory in their work.

Bommarito was interested in the deliberation that arose when focus was lost in affinity space, but also how affinity spaces changed over time (Ibid, 2014; Brass & Mecoli, 2011; Duncan, 2013; Durga, 2012; King, 2012; Lammers et al., 2012). Recognising a model could bring renewed utility, developing one to situate different spaces by types of individual and group activity (Bommarito, 2014, p.407).

Gee said of his theory "we do not have to see an affinity space as an all-or-nothing thing' (2005, p.19). Barden too, here advises nuance as "neither heterotopias nor affinity spaces are absolutes, but [such] spaces may have features which make them more or less like heterotopias or affinity spaces." (2016, p.230). To address the shifting nature of affinity spaces and the behavioural states within them is an important next step for affinity space theory.

In the following sections I introduce Bommarito's key concepts, before aligning jams and game development with his writing. I then map my findings to his model's axes and move to populate the blank quadrants of his model. In situating these layers, I translate his model, so it no longer situates affinity *spaces*, but shifting behavioural *states* within affinity spaces. I posit the PHASE model not only secures lateral moments in space left free for theoretical development and situates flow, but also secures new meaning for the seemingly inconducive off-topic activity of heterotopic affinity space which occurs when on-topic individual and group states deteriorate.

It should be noted that researchers use terms such as *state*, *behaviour*, and *activity* in a variety of ways (and sometimes to mean different things). I bring my interpretation of them to this discussion and summarise them as follows:

Firstly, I use the term *behaviour* to categorise participant activities, just as Gee used nurturing or passionate behaviour to identify passionate and nurturing affinity spaces. The lateral moments of emerging (otherness) behaviour from my analysis are here what makes heterotopic affinity space distinct in the same fashion.

Secondly, I use the phrase *state* in this chapter to consider both the psychological states of participants, but also the specific states of model developed. A jammer's state might be one of clear focus and technical challenge (i.e., flow), or one of an unclear focus (i.e., deliberation), while the model

forms a kind of "finite state machine"[59] where a given quadrant is the "active state" providing meaning to the sequencing of events in heterotopic affinity space.

Finally, to avoid overuse of the term state, I use the term *phase* to refer to the quadrants of the model in their totality – and as patterns or shifts (triangulated by jammer data) become visible. Phases, quadrants and even model states are not mutually exclusive, but instead broadly refer to the scope and scale different events (jammers) or aspects (models). What were Bommarito's quadrants become my phases, both of which contain states (e.g., flow), general behaviours (e.g., on topic or off topic), and examples of specific activities (e.g., coding, writing, playing, or designing).

A. Off-topic Otherness

Heterotopic affinity space "resists, contests, transgresses or disrupts dominant culture and power relations" (Barden, 2016, p.229). This *otherness* equates to Bommarito's discussion of off-topic content (2014; p.408) in discussing the work of Lammers et al. (2012); who analysed thousands of community posts and realised off-topic interactions were important, even if unrelated to the purpose of the space, because they developed "belonginess" and even "community" within an affinity space.

Gee spurned notions of *community* in lieu of *space* to avoid problems of *membership* that he felt rendered Lave and Wenger's communities of practice less effective and because the term "emphasizes belongingness and personal ties" (Bommarito, 2014, p.408). His stance has led to researcher assumptions that affinity spaces are binary, existing in static forms of related content of shared interest or common endeavour. Otherwise, such spaces may be considered "deteriorated" (Gee & Hayes, 2011, p.32). Bommarito rounds on researchers "failing to see the value of divergent and deliberative activity as part of a process of growth or change" here as it narrows "the scope of researchers' analytical vision", "diverting attention away from important, deliberative activity in the affinity space" (2014, p.410).

The six lateral moments triangulated from my data illustrate an escape to Foucault's "worlds within worlds" (1998). Lateral moments occur in heterotopic affinity space when on-topic activity deteriorates, and another on-topic state is yet to manifest. Lammers et al. (2012) posit that all affinity spaces have off-topic activity, which I suggest heterotopia accentuates to form lateral moments. In this light, Bommarito's model condones shifts between on-and-off-topic behaviours of individuals and groups as a more complex representation of affinity space activity.

[59] A finite state machine is a programming device that can only "be" one of a number of states at any time.

B. Flow & Focus

Identifying flow during jams is challenging, because it powerfully distorts participant perceptions of time, where wider event consciousness fades to only a subconscious primacy of the task in hand. Flow is exhibited by jammers as a positive experience that propels them through time (also a symptom of heterotopia). "*We got in yesterday at about 10am and 10 minutes of coding later it was 11pm and we were still doing it... I guess that whole time" (*Smutek, Tarpan). For jammers "*Even if we didn't know [we were in flow], [time], it just disappeared. We had just come in, I started level two, I sat down, okay, I've got five levels to make. Then before I knew it, like, three more levels have just been made and I was like, Oh, okay, that was quick!" (*Ziguli, Tarpan*). And "Yesterday there was a clock behind us, and it counted down how long until the deadline*[60]*. And I looked at it one minute, and it was like 'one day, four hours, something, something'. And then I looked at it what felt like the next minute, but it said '19 hours to go'. And it's like, 'Oh.'" (*Uaz).

Game designers create and sustain player flow experiences. The longer players are in a game, the longer they are not playing a competitor's product. Considering jammers as players, flow deterioration also applies - boredom if challenge is insufficient, anxiety if challenge is too significant. Flow theory makes players want to push themselves "to the next level" yet stay within the game's flow channel (Ainley et al., 2008; Csikszentmihalyi, 1990).

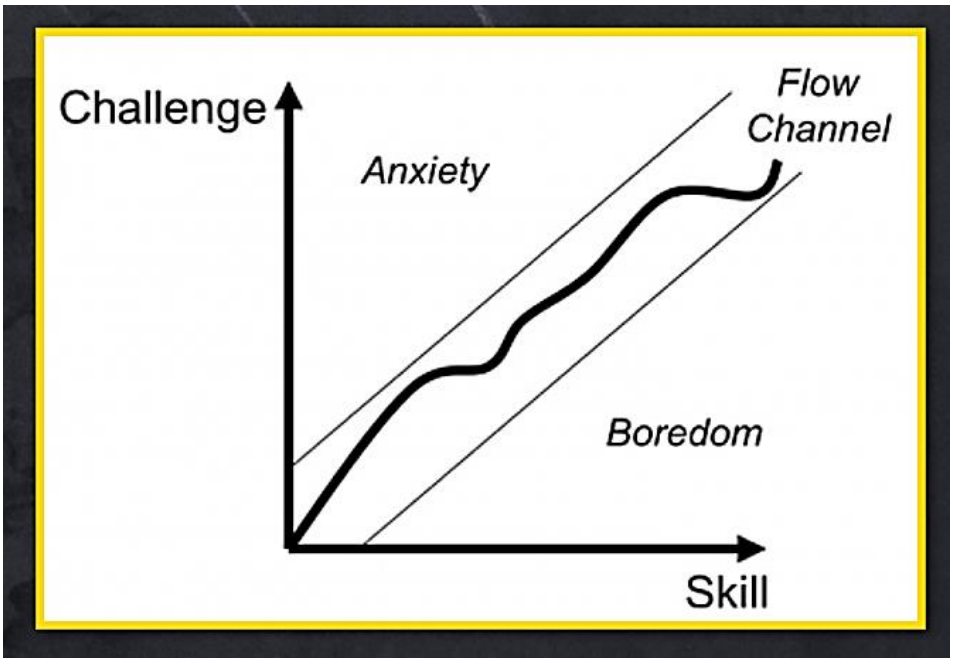


Fig.69 Csikszentmihalyi's flow channel (1990) where player skill "meets" game challenge.

[60] This was in the timer on team Tarpan's lateral moment cab ride screen.

Bommarito as a literacies scholar makes no connection to Csikszentmihalyi's flow. This may be due to online discourse lacking physicality, or a focus on *what* learners *said* they did, not *how* they *did* it. However, learning and flow are closely aligned, for example, any content with too much or too little challenge will result in stressed, bored or no-longer engaged players/learners/jammers and those less willing to return to a game/lesson/jam[61].

Affinity space research has focused heavily on game development (Gee, 2005, 2017; Gee & Hayes, 2012) and research has established game jams as affinity spaces (Jackson, 2016). Flow provides a link between game development and affinity space which Bommarito's model further evidences through inclusion of "passionate seriality" arising from working with clear focus on technical challenges[62]. Csikszentmihalyi & Nakamura (2014) specify three pre-conditions for flow. Firstly, that activity must have clear goals (or Bommarito's "focus") and progression opportunities (or Bommarito's "technical challenge"). Secondly, the activity provides clear and immediate feedback, so changing demands can be accommodated[63]. Thirdly, there must be balance between the challenge that tasks provide and available participant skills. It is therefore likely that flow; a central tenant of engaging games is a powerful construct within affinity spaces.

"…my idea of flow is very much solitary; I don't understand the passage of time. I'm very much in the zone. I'm scathing away. I know what I need to do and I do it."

(Lublin, Tarpan)

In games, game development and game jam events, flow is not required for progress, but progress is less productive, less enjoyable, more stressful, and far from an optimal experience. Considering compatibility with affinity space, Bommarito's central axis of "challenge" is essential to flow. The difference being, his "challenge" is mapped to "focus", not participant "skill" (as in flow theory). But this is not the significant difference it seems, instead it establishes compatibility between Bommarito's model and flow, because flow requires focus as a pre-condition (Csikszentmihalyi & Nakamura, 2014; Abuhamdeh, 2020).

Bommarito's primary criticism was the "present view of affinity spaces fails to explain how participants cohere when the group's focus on a common endeavour is called into question, becomes unclear or disappears altogether" (Bommarito, 2014, p.412). In education, much is made of a need to maintain

[61] Csikszentmihalyi developed seven emotional flow states, but this expansion has yet to punch through to game design. (Csikszentmihalyi, 1997, p 31.)
[62] Focus vs Challenge is not dissimilar to the skill vs. challenge of Csikszentmihalyi three decades previous.
[63] This is also true of game design. Good games 'listen well' and respond to player inputs in meaningful ways.

learner attention, and the requirement of focus is clearly core to Gee's theory. Despite awareness of shifts in affinity spaces occurring, no research has attempted to visualise affinity space behaviour.

Bommarito and Lammers et al. deviate from established views of what happens when shared interest breaks down, arguing upon affinity space deterioration, it is not the failed state Gee suggests (Gee & Hayes, 2011, p.32) as individuals in passionate seriality might reconfigure the space through "groupishness", where "group members are held in place by the infrastructure of a space, and engage in 'deliberative debate' of what to do next, or what the space should next be about" (Bommarito, 2014, p.409). Bommarito's model implies a framework for jammers to switch between passionate, individual states of clear focus and challenge (and I posit flow), to states where teams must overcome challenge through deliberation as next steps are not yet known.

C. Passionate Seriality

Bommarito distinguishes between "serialities" of people and "groups", providing insight to how individuals collectively influence the evolution of affinity spaces. Young defines a "series" as a collective of individuals working on their own, yet still organised by events, objects or social practices pertaining to them (Young, 1997, p.23). Both Young and Bommarito talk of individuals able to collectively instantiate groups should circumstances arise. Bommarito harnesses Young's example of passengers waiting for a bus as seriality. When the bus fails to arrive, previously disparate passengers and of different destinations become a serial collective, united by uncertainty with common cause, to discuss next steps. Considering jammers in this regard, flow might end due to arriving at your destination and a jammer now needs to know where to travel next. But perhaps the bus broke down, or they were unable to repair it and once again require deliberation with others. The notion of a serial collective in flow strongly associates with my experiences and observations of jamming. Jam teams experience flow as individuals. Each works with focus on their own tasks, but the collective journey to the event goal and finished game continues[64]. Flow theory brings new utility to Bommarito's thinking, my research aims and questions on the effect of heterotopic affinity space.

A post-flow phase manifests for jammers who, lacking focus, need to know what to do next. During jams in traditional labs, this deterioration might occasionally result in visible anxiety or even boredom. But in heterotopia, *otherness* appears to pervade jammer minds more readily. Lateral moments gain significance, by locating flow and providing a transitionary construct to transport jammers to more nurturing (heterotopic) reflections of on-topic states.

[64] Research is required into what it means to be in "group flow" known as "a collective state that occurs when a group is performing at the peak of its abilities" (Sawyer, 2003, p.167) but it is beyond this study's scope.

D. Groupish Deliberation

"We quite regularly talked about what we needed to work on, and then once we'd done that we assigned one or two people to work on it." with "members working on something definitely in flow. Just cracking on until it was finished." (Gacek, Tatra).

Groupishness puts a name to the tendency of individuals to group. For Bommarito's model, it condones and situates group work occurring within affinity space and acknowledges group deliberation is symptomatic of how affinity spaces are sustained. Bommarito describes deliberative group states as conversations that consider an affinity space's purpose. Participants "may not be drawing on technical or specialised knowledge related to a common endeavour" but are "nevertheless contributing to the extended life of the affinity space" (2014, p.410). For Foundry jam teams, deliberation manifests as an iterative process steering overall project progress. During jams in a physical space, deliberation does not manifest as an occasional discussion, but a vital cycle of "what are we going to do about this" and "what are we going to do next?".

If the function (i.e., game development) and context (i.e., GGJ) of an affinity space is explicit, and participants have the necessary skills, tools, and facilities; I posit teams with less deliberation, have less *connectedness*, so their projects are less cohesive and their interactions more unstable. So, when group deliberation deteriorates, the shared pursuit and seriality that jammers experience also deteriorates. If these states cannot be revived, development can stall, and the project may fail.
Consequently, I interpret Bommarito's "groupish deliberation" as a beneficial *state* for teams pursuing projects in affinity space between other individual and group states of productivity.

E. Belongingness

Perhaps the result of successful group deliberation, and on-or-off-topic activity in affinity space, this final term is contentious. Bommarito drew issue with Gee's failure to "account for the sense of belongingness felt by participants in affinity spaces" feeling his omission was why affinity space research ran "into difficulties when tasked with identifying the boundaries of spaces." (2014, p.412). Gee distanced his theory from communities of practice (2005, p.214) through emphasis on activity within "space" over that of the relationships, members, and community. But in "avoiding the implication that a group which shares a common endeavour, also shares strong personal ties" Gee excludes the fact affinity space incumbents share a "desire to be linked to other real people on a personal level and to feel a sense of belongingness" that may be "completely disconnected from the group's shared interest" (Bommarito, 2014, p.407).

Bommarito felt the problem was not that Gee did not give community or belongingness primacy in his theory, but that it received no representation whatsoever. This was exacerbated by Gee and Hayes's notion of deteriorated affinity spaces as "sites devoted more to socialisation or popularity", where "fights arise over status, belonging, and how to behave"[65] (2011, p.32), implying social engagement was damaging. It is hard not to recognise Bommarito's argument here, as jams import powerful affinity spaces to host venues, and a sense of belongingness chimes strongly with my experience of observing and listening to how jammers felt about the Foundry, their game and each other.

Given the Lammers et al. study of off-topic content in online affinity spaces (2012), constraining affinity spaces through anti-communities of practice phraseology prevents "researchers from interrogating these seemingly chaotic instances and investigating how they affect the continuation of the affinity space." (2014, p.410). While this consideration pre-dates Barden's concept of heterotopic affinity space (2016) (and the lateral moments of this thesis), it is helpful in recognising that both on and off-topic behaviour fosters belongingness. To study the shifting nature of affinity spaces, there must be consideration of the bonds between participants, and how they may temporarily supersede or precede on-topic work when flow deteriorates. More research is required to understand belonging because "approaching the study of affinity spaces with the assumption that they are stable, fixed entities does not attune researchers to spaces' potential for change" (Bommarito, 2014, p.411).

Bommarito's model is the intersection of two axes. The horizontal represents focus, from "clear" to "unclear", while the vertical runs from "adaptive" to "technical" challenge. Bommarito (2014) draws on Heifetz (1994, p.72) defining technical challenge as tasks for which "necessary knowledge has already been digested and a legitimate process of what to do has been established", and adaptive challenges as those for which "no adequate response has yet been developed", "no clear expertise can be found" and "no single sage has general credibility" (Heifetz, 1994, p.72).

[65] There may be another issue here that new literacies research of websites and discussion boards of fixed theme and purpose (Hayes & Duncan, 2012, p.75) needs to consider more diverse and physical forms of affinity space.

9.2 Advancing Bommarito's Model

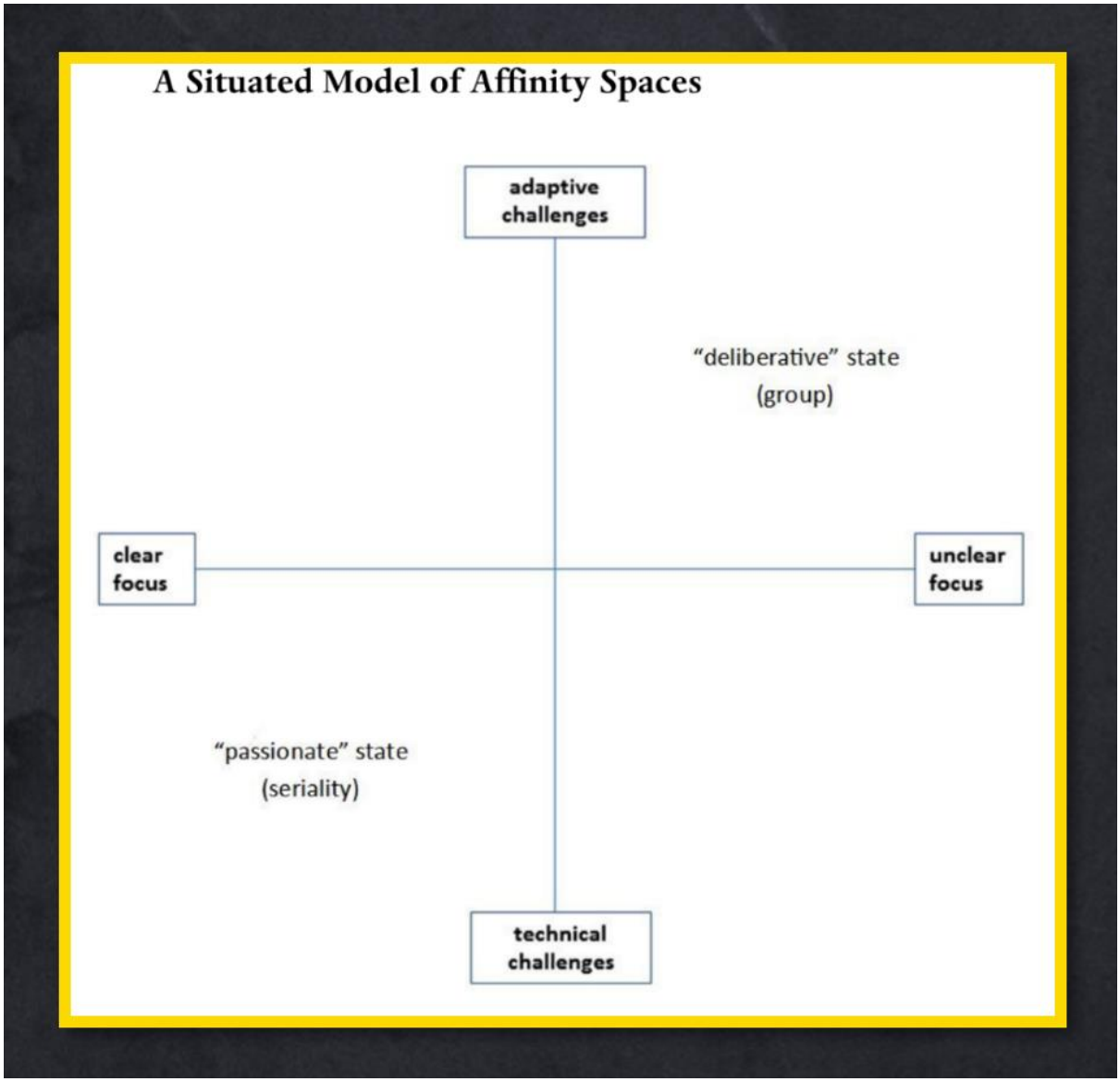


Fig.70 Bommarito's Situated Model of Affinity Spaces (screengrabs from my mapping exercise)[66]

The two populated quadrants of Bommarito's model provide a strong fit for alternating states of individual and group on-topic jam activity. The model positions a *passionate* state of individual seriality between axes of clear focus and technical challenge that is diagonally opposite to *deliberative* group states of unclear focus and adaptive challenge. This second quadrant is where groupishness from the deterioration of prior states lends individuals to assemble for collective problem-solving through deliberation.

[66] This stage of my analysis was conducted on an interactive whiteboard, and latterly a Microsoft Surface Book Pro. They are captured verbatim and include 'rough notes', sketches and clipart.

The quadrant of passionate seriality aligns with flow theory through pre-conditions established by Csikszentmihalyi & Nakamura (2014) and the realisation that both flow and affinity spaces require clear goals (focus) and achievable (technical) challenge. An example of why switches between these individual and group states may occur during a jam can be summarised as follows:

1. Deliberative group states occur when the need to solve adaptive challenges is high.
    1. The product of this state is an increasingly clear focus of "what to do next".
    2. Problems then get broken down into technical tasks and allocated.

2. Passionate seriality occurs when individuals pursue these tasks severally.
    1. When skill is balanced with focus and challenge in this state, flow can manifest.
    2. When flow ends, challenge overwhelms, or focus is lost, deliberation is required.

Crucially, if either of these affinity states deteriorate (Bommarito, 2014; Gee & Hayes, 2012), it may not be easy to return-to or re-enter past states. If individuals fall out of flow, they may re-group with their team. If that re-grouped state fails, and no clearer focus has been established, no new passionate seriality is possible. This realisation led to a breakthrough about what was so different about heterotopic affinity space and the emerging Foundry behaviours. Even without incorporating off-topic states it was possible to reason that when jam-teams fail and abandon their games, one or both affinity states has deteriorated beyond a point of no return.

Understanding more about the emergent jammer behaviour in the Foundry and how it affected engagement was the original motivation for this study. There was now significance in the anxiety or ambivalence that jammers experienced in less-heterotopic, (or more-FEAR-full) jam spaces. The layers of my findings were about to identify differences between jamming in formal and informal settings.

"*The first game jam I did was a cybersecurity game jam. And we were working on that in [lab name], and it felt like we were doing coursework*" (Maluch, Tatra). *But in the Foundry "it doesn't feel at all like a uni lab"* (Maluch, Tatra) especially towards the end of jams where *"usually everybody starts to get a bit sad and a bit not happy and fed up and annoyed, but that happened [here] a lot less*; (Beskid, Tatra).

In the previous sections I introduced terms Bommarito used to rationalise model development. In the subsequent sections I use his rationale and terms to apply my findings as new layers of a model of heterotopic affinity space engagement, because Bommarito left space in his model, calling for research to "chart even more types of affinity spaces and peer more closely at the ways they shift over time." (Bommarito, 2014, p.415).

9.3 Findings as Extensions to Bommarito's Model

My research design went as far as reflexive thematic analysis. I had not set out to create a new model, only to explore accentuated Foundry behaviour, and to understand their implications on engagement. Bommarito's understanding of how affinity spaces deteriorated and regenerated, and the flexibility of the model he developed provided an inspirational medium through which I could realise the stories of my data (Braun & Clarke, 2021). What I had observed, recorded, coded and discovered now led to a further reflexive process - a worked visualisation of my findings, scaffolded by my understanding of game jams, flow and (heterotopic) affinity space which evolved during discussion.

As with the reflexive thematic stages of my analysis, each layer of findings had its own phase of development and reflection, written-up before I developed the next. Each layer was visualised on a Surface Hub (an interactive screen), and each layer is presented here in the order of its development. Only the final layer is any departure from Bommarito's thinking - more due to the granularity of visualising behaviours over spaces than actual incompatibility.

It was only through a phased, reflexive mapping journey, that I was able to recognise each layer was having a cumulative effect. The following layers are compatible with the principles of Bommarito's research. The first layer situates the emerging behaviour of my research questions; the second positions the lateral moments emerging from reflexive thematic analysis; the third incorporates flow principles; and the fourth locates passionate and nurturing activity.

In their entirety, transposing the model's original intent towards a prospective framework for understanding the recursive Phases of Heterotopic Affinity Space Engagement (PHASE). This chapter concludes with a "side-by side" comparison of the mode and complexity of each model.

A. Layer 1: Situating Emergent Behaviour

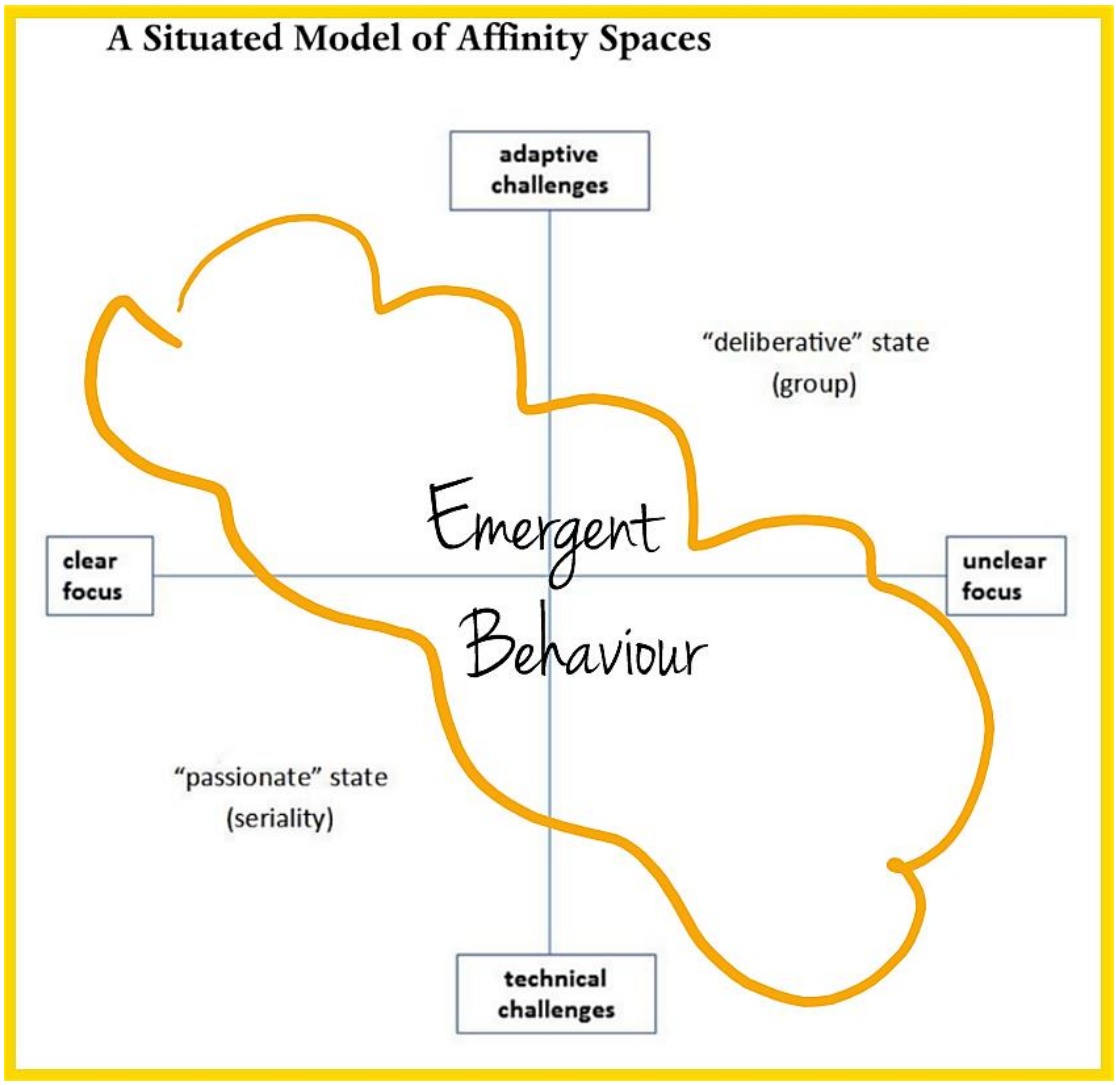


Fig.71 Emergent behaviour as off-topic mirrors (or a cushion) for failed on-topic states.

Once my understanding of Bommarito's on-topic quadrants was established, my first discovery was recognising disruptive emergent behaviour formed a "buffer" alternative state for jammers to go to re-fuel. It was here through heterotopic activities that re-engagement in passionate serial or deliberative activity becomes possible once-more. I also realised from observation that these were literally, moments of *otherness* for individuals and groups that were an *off-topic reflection* of *on-topic jam activity*, and that by diverting to these states, negative emotions could be avoided. This realisation added weight to Barden's conception of heterotopic affinity space. It was not a perfect cycle of activity that was emerging (it was not meant to be), but a place for disruptive behaviour, and I now had the beginnings of a compass for both on and off-topic activity, and the potential to map the location of flow.

Revisiting Foucault's notion of heterotopia as mirror spaces that are both real and imaginary (Knight, 2014), I now realised the jammer-relevance of disruptive behaviour. The Foundry GGJ existed as distinct to the educational institution around it, as a bubble of affinity space (Jackson, 2016) and heterotopia. Inside that bubble was agency, disruption and shared construction, where each team acted out new conceptions of what their game affinity space should be about or reflected on their progress after periods of intense development.

My analysis recognised individual and group emerging behaviours that my coding subsequently refined into lateral moments - a construct situating off-topic disruption as proximal to flow[67]. I was surprised to discover that individual and group activity was not only present in Bommarito's model, but that there was space for these heterotopic mirror-states of individual and group activity I had discovered within it. There were now four quadrant-states of on and off-topic activity.

The emerging behaviour (RQ2) I observed in heterotopic affinity space was different from that of less-heterotopic, more FEAR-full spaces. The off-topic distracted, or boisterous activity of individuals and groups was a cushion, a crashmat, a soft landing, or buffer from the effects of deteriorated on-topic states, so that negative emotions could be avoided when conducive on-topic states (such as seriality or deliberation) deteriorated.

Now, the task of establishing the specific content of each of these off-topic mirror-quadrants lay ahead.

[67] I referred to these as EMB1 (boisterous group) and EMB2 (reflective individual) activities, with lateral moments placing them in proximity to flow.

B. Layer 2: Situating Lateral Moments

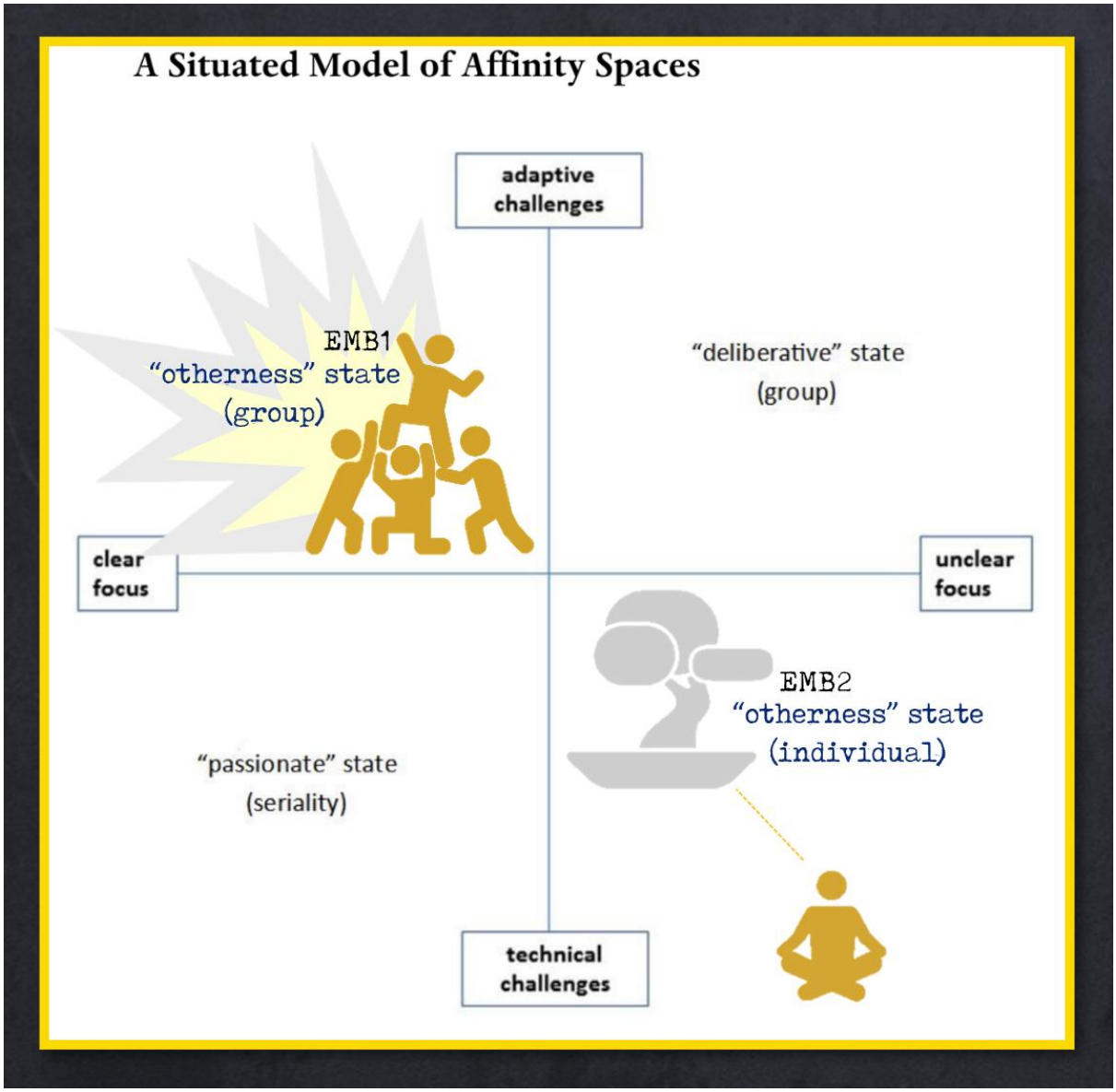


Fig.72 Two emerging behaviours (EMB1 & EMB2) from coding for lateral moments.

Understanding lateral moments were within a cloud of what I originally considered "emergent behaviour", led to the realisation that lateral moments did not only hold implications for the emergence of flow, they also affected group deliberation. Lateral moments appeared formative for individuals about to re-group while waiting for the flow of others to deteriorate; while group lateral moments seemed to be more about re-building team bonds, either before re-entering a deliberation state that had previously deteriorated, or as one last collective moment before transitioning back to flow in passionate seriality.

Realising the end of flow could be considered a deteriorated affinity state also impacted my understanding of affinity space. Flow arose from having affinity with clearly defined and achievable, technical on-topic tasks, but it manifested within the quadrant of passionate seriality. Until this point,

I had perhaps naively considered flow (as the more established theory) needing to be imported wholesale by affinity space research. But my reflective mapping process was changing how I thought about affinity space to an extent that affinity spaces themselves might provide the pre-requisite conditions for flow to manifest.

I came to this position as flow was more evident during jams, seemed a powerful experience for jammers, and because Gee's theory itself was developed through the study of online game modification communities[68]. Flow theory now had much to gain from recognising affinity space, because it offered the potential to interrogate the nature of virtual and physical settings in which flow can be achieved. I had increasing confidence that my conception of emerging behaviour as lateral moments of individuals and groups, and began to interrogate how disruptive or distracted moments were able to bridge between affinity states. The layers of my map were becoming a model to explain how jammers, their teams and projects benefited from formative moments of off-topic behaviour during jams accentuated by FEAR-less space.

Recognising the "fit" of lateral moments (EMB1 & EMB2) to the empty quadrants in Bommarito's model was a breakthrough in my understanding of the "when" and "where" of flow in heterotopic affinity space because it consolidated my findings in context of the literature (Chapter 3) and my theoretical framework (Chapter 4). Lateral moments shared by groups exist between teamwork and individual work and mark the successful setting-off of a team that deliberated conductively, and who are now entering passionate seriality. In this case, group lateral moments provide additional time for focus to be refined in the minds of jammers. But in the case of failed deliberative states, anxiety or boredom can be staved off through shared off-topic moments which teams re-group around to regain shared focus.

Lateral moments for individuals occur when a passionate state of seriality deteriorates, where what might become anxiety or boredom in FEAR-full space is replaced with moments of heterotopic reflection and introspection manifesting as distraction. During such moments individuals appear to process issues of unclear focus, overwhelming challenge or even success, while gazing to other-worldly spaces mediated by screens, architecture, and other acts of construction[69]. These moments deflect the behaviour of individuals from what could be agitation or frustration in traditional

[68] Game "modding" communities make ad-hoc or unofficial (but more recently condoned) extensions to game products. Not entire games in their own right, but smaller extensions or updates to game content or functionality they do not hold the rights for.

[69] Much effort was put into making the design paradoxes of Foundry operate as a form of physical constructionism that was oft-cited as affecting jammers.

computing labs, to that of surreal introspection before teams' re-group for the next deliberative state or passionate seriality (via focus) becomes a prospect once-more.

While not as evident in computing labs and less-heterotopic affinity spaces, lateral moments appear an impactful "warm-up to" or "cool-down from" flow. They are the off-topic states that individuals or teams enter when an on-topic state deteriorates in more FEAR-less heterotopic space, less available to those in more FEAR-full labs. Lateral moments lend credibility to apparently unruly or distracted activity during jams as potentially conducive jammer activity. In FEAR-full spaces the same magnitude of off-topic behaviour is less likely to manifest, especially when temporary affinity spaces like game jams are not well organised, or where behaviour may also be curtailed by academics and campus staff[70].

The existence of lateral moments presents a paradox. For heterotopic affinity spaces to exist within formal education, educators themselves must re-consider what bad behaviour and even "bad play" (Carnes, 2015) in learning spaces means. Because during jams in heterotopic affinity space, lateral moments appear to be a significant factor contributing to a positive jam experience and overall project success.

Recognising lateral moments in heterotopia provides a soft landing for intense flow, *and* that boisterous group activity arises when teams reach an impasse and deliberation deteriorates was a significant outcome for this research. It also raised new questions as to the position, likelihood, and quality of flow across my mapping which I wanted to explore further.

[70] I extend this notion beyond "teachers" here, as during the Global Game Ja, university security staff entered computing labs and broke-up teams, stating that it "did not look like the sort of work they should be doing on campus" despite appropriate clearances being held for the event.

C. Layer 3: Situating Flow

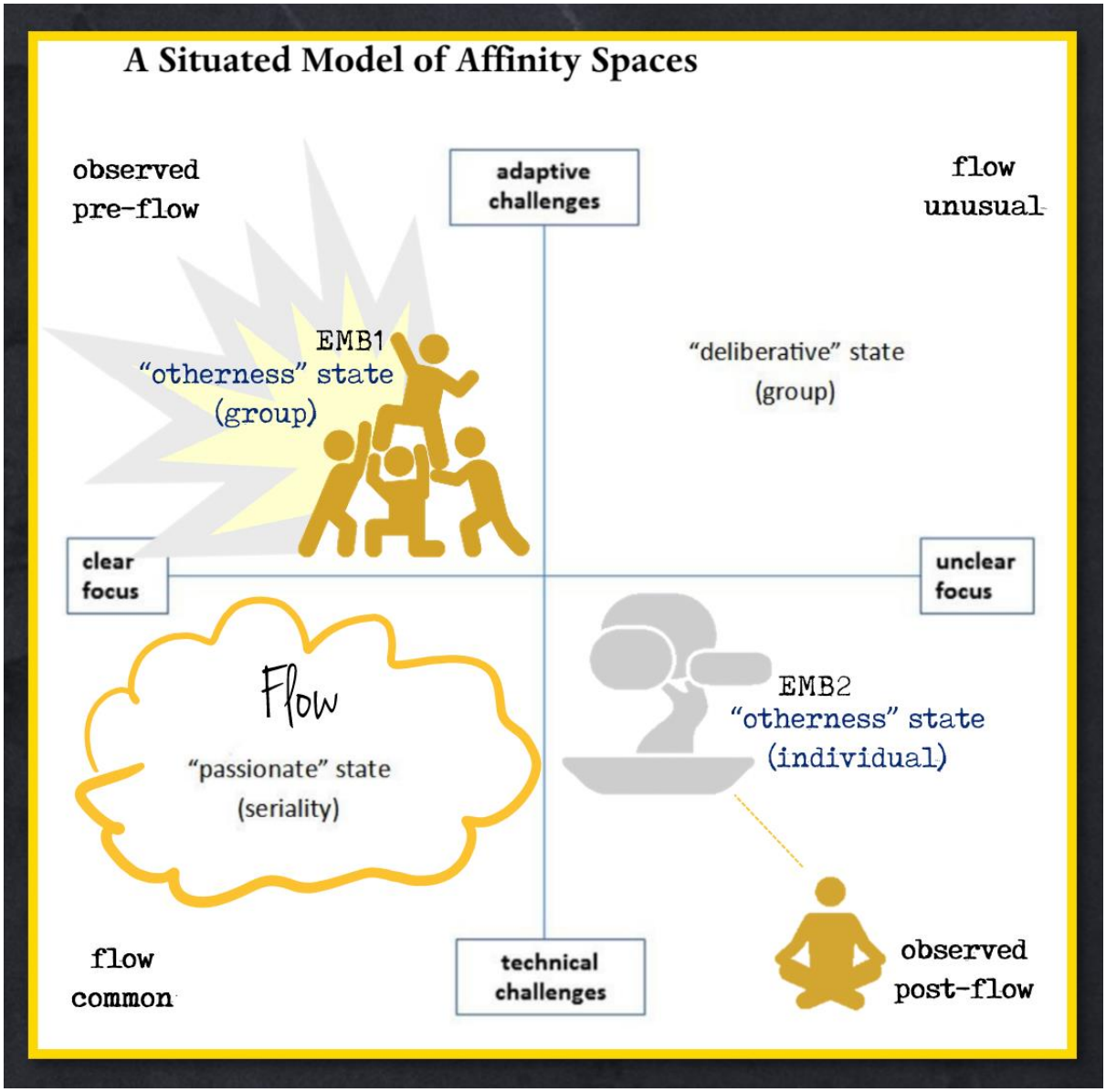


Fig.73 Approximating the "when", "where" and "how much" of in proximity to lateral moments

Prior to this study, when jammers stared at screens, I might have assumed they were in flow. However, establishing if individual activity was on-or-off topic had not been part of my thinking until now. The layers I had created were now detailed enough to situate flow and its implications across all four quadrants, and by adding this layer my PHASE model began to emerge:

1. By locating game jam flow, tangible benefits of affinity spaces in education become visible.
2. By realising the effect of heterotopia on flow, limitations of FEAR-full spaces become visible.

This layer added four flow labels (one per quadrant) drawn from observations and experiences of jams and jammer accounts from the transcripts. It was now possible to situate flow using this model, as it signposted an indication of a "when" and "where" of flow, while raising questions of "how much"

might be occurring. This layer might also serve as an entry point for researchers from across game studies, education and affinity space interested in optimal experience.

While seemingly minor, developing the flow layer was significant because flow, affinity space and game jam behaviours intersected within it for the first time. It also anchored my conception of flow as a state arising from activity compatible with affinity spaces (and potentially accentuated by heterotopia). Prior to undertaking the mapping of this layer, the prospect of grappling with five decades of flow research had seemed an overwhelming prospect (Abuhamdeh, 2020).

It should be noted that at present, the flow layer concerns only on-topic flow of passionate seriality and participants working towards a completed project. Flow undoubtedly manifests during off-topic lateral moments (and especially during those of constructionist activity), as any activity that fosters an interplay of skill versus challenge has the potential to elicit flow, but this is far less predictable than with on-topic states. So flow, during lateral moments for now, remains both literally and figuratively off-topic of this discussion, and is instead the subject of the further research section of my conclusion.

D. Layer 4: Situating Passionate & Nurturing Affinity

Of affinity spaces, Gee and Hayes state, "some are inclusive, supportive, and nurturing, while others are not" and argue "human learning becomes deep, and often life changing, when it is connected to a nurturing affinity space" (2012, p.23). Like Jackson and her study of game jam affinity spaces in schools, jams are a prime example of affinity space[71]. Through energising moments, Jackson recognises shifting states of behaviour more palpable to physical jam spaces, and the behaviours of jammers individuals as opposed to text-based representations of online forums which have remained of predominant interest to affinity space researchers until now.

Adding layers to Bommarito's Situated Model of Affinity Spaces was how I understood jam activity in a physical setting. I was not analysing online communities as Gee, Hayes and Lammers et al. had done. Each new layer diverged further from Bommarito's intentions, towards learning more about jammer behaviour in context of flow. One final layer was required to establish my PHASE model.

The part of me that embraced Bommarito's model had not sought to locate where the Foundry existed within it, only how behaviour shifted over time, and if this behaviour alternated between passionate and nurturing states in the same way Bommarito suggests switches between group deliberation and passionate seriality. However, Bommarito does not position *nurture* in his model like he does *passionate* seriality. He instead infers nurturing *spaces* may exist in proximity to passionate seriality in the bottom left quadrant (2014, p.415).

While it is true nurturing spaces require passion, issues arise (and remain unanswered) around the interwoven nature of nurturing and passionate affinity spaces. For this layer, I took licence by suggesting what Bommarito meant by "around" passionate seriality. I did not want to know where a nurturing affinity space was situated, I needed to know where nurturing *behaviour* manifested across four behavioural individual and group states.

Rendering *nurture* invisible and only proximal or inferior to *passionate* seriality was a disservice[72], as affinity spaces are never purely of one fixed form or strength (Lammers et al., 2012), just as Barden argued there were only more or less-heterotopic affinity spaces (2016). My intention here was not to mirror Bommarito's approach by placing nurturing activity in a single quadrant. Acts of nurture bleed into and across other states and, as more research in this regard was required, I wanted to represent

[71] Jackson found impactful aspects of Gee and Hayes nurturing affinity space could be ranked: i) Newbies, masters and everyone shared a common space, ii). jammers were not segregated by age, iii). interaction transformed content in the space, iv). common endeavour was primary v). people got encouragement from audiences and vi). common endeavour was primary (2016, p. 219).

[72] It seems strange given Gee and Hayes describe both states why Bommarito would map just one.

states of jammer activity in flux, and the cadence between individual and group interactions as a gradient, connecting passion and nurture and because jam groupishness was certainly often nurturing.

In locating passion and nurture for my fourth layer, I discovered more about nurture's proximity to passionate, less-nurturing flow. It was clear nurturing acts did not occur during flow states for individuals, because flow is a predominantly individual experience aligned with passionate seriality. There was also evidence that teammates caused deterioration of flow of others by interrupting with nurturing acts (Maluch, Tatra).

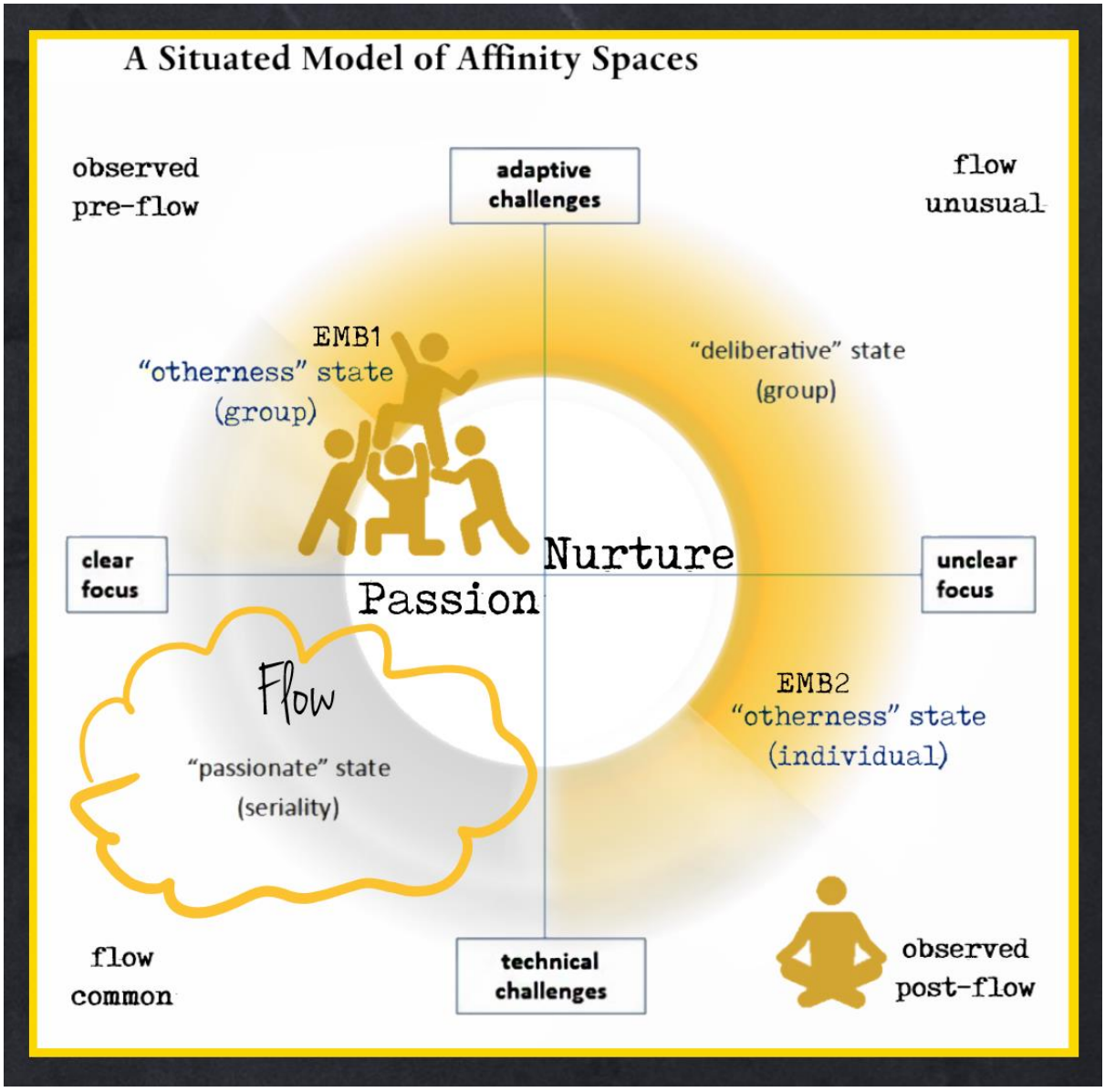


Fig.74 Locating "nurture" as a region "around" passionate seriality strengthens nurture and deliberation.

This final layer was developed from acts of nurture I had witnessed or that were recounted by jammers. I defined nurture as acts of "reaching out", asking for, or aiding with technical tasks, and generally ensuring the wellbeing of others. The latter, being especially important during intense 48-

hour jam events that can be more stressful in FEAR-full spaces. So nurturing activity across three of four *intentness* states was positioned where it appeared to manifest during the jam event:

1. Group lateral moments can be passionate challenge-based activities or more nurturing formative ones, which scaffold and repair in the case of deteriorated deliberative group states. During these moments groups "break out from" or "get back together" for on-topic work when this state deteriorates. Due to this, EMB1 is shaded as having phased nurture (orange) and passion (grey).

2. Individual lateral moments are occasions where jammers looked out for themselves through introspection, but sometimes resulted as a "checking in" with other jammers as they came out of flow to see if they were OK. It is partially shaded with passion phasing to nurture, and also includes acts of becoming the audience for other teams.

3. The strongest occurrence of nurturing activity and the "checking up-on" of other jammers occurred between off-topic EMB2 and on-topic deliberative group states. This was different to the tone of group lateral moments (EMB1), where nurture was more congratulatory reinforcement of "we got this" sentiment and of shared team values pre- flow in passionate seriality or during group deliberation.

This layer visualises powerful switches from passionate to nurturing engagement across on-and-off-topic activity. It indicates lateral moments are nurturing, off-topic mirrors of individual and group on-topic activity. This led me to consider the extent to which Bommarito and Gee agree that technical experience is less of a pre-requisite for nurturing affinity spaces over passionate and more elitist spaces, which "restrict full participation in the space only to people who have already proven themselves by passing various tests" (Gee & Hayes, 2012, p.24).

This final layer represented a way of visualising the significance of passion and nurture across jam behaviours. To me, acts of deliberative nurture meant questioning states which asked of yourself or others; "am I OK?", "are you OK?", "can we do this?", "do you need help" or "are we on track?" and more. This adaptation further distances my PHASE model from Bommarito's original.

On reflection, it could be suggested my model is a heterotopic mirror-state of Bommarito's. His is simple, mine appears complex, his was one of conditions (i.e. the cause of the setting or space itself) while mine considered more behavioural effects (i.e. characteristics and emotional states) which posits flow as compatible with affinity space, and heterotopic affinity space as more nurturing.

9.4 The Recursive PHASE Model[73]

After developing the model for an extended period, I returned to jammer responses and my lateral moments to establish if it was representative of my reading of their experiences and my observations. I was confident my model positioned emerging behaviour as lateral moments appropriately, where such moments were both transitions and buffers between both on-and-off topic activity, *and* individual and group activity.

If my analysis discovered lateral moments as emerging behaviours that were meaningful, this discussion connects flow to affinity space theory via passionate seriality. This connectivity made lateral moments and deliberative group states strongly distinguishable from passionate seriality and flow, as lateral moments only become accentuated when on-topic states deteriorate in heterotopia. The reflective mapping which scaffolds this discussion helped me recognise lateral moments were more than disruptive activities proximal to flow, but powerful transitions between:

1. On and off-topic activity.
2. Individual and group activity.
3. More passionate or nurturing activity.

Bommarito's individual and group states were not intended to be read as some model for participant behaviour. They were for the classification of affinity spaces by activity, which I subsequently transposed to house behavioural states. The PHASE model was more detailed and interwoven than I had anticipated, as each new layer revealed more about affinity space and had scaffolded development of the next.

Detail made it possible to navigate the model in a non-linear manner, and as progressive individual and group jammer states providing demonstration of how heterotopia enhances jams and prevents team progress from stalling. Lateral moments are the defibrillators or battery chargers that keep projects in heterotopic affinity space running.

Before I harness the model to address my research questions in my final chapter, I include the following selective example of chronological responses I used to test and operationalise the model[74].

I capitalise phase names or activities in capitals to indicate state-shifts within the in dialogue.

[73] A tradition in MIT's hacker community was to use recursive acronyms that referred to themselves. E.g. MUNG (Mash Until No Good) becomes "Mung Until No Good" (Cross, 2001). The PHASE model is recursive because its acronym contains itself, and because it requires successive executions.

[74] The reader may revisit the sentiments of jammers in the extracts and transcripts of the appendix to explore the model.

Smutek: *Me and Zil had a decent amount of it* [FLOW] *where we'd have a problem, we'd take one of the sticky notes off the Mac board and put it down on the table* [DELIBERATIVE]. *Then the both of us would just concentrate* [FOCUS] *on doing it for the next X time, until it was finished. Then we'd break out of the flow and either watch some trains going through Norway* [LATERAL MOMENT] *or go and talk to other people* [LATERAL MOMENT].

Ziguli: *…when I'd be working I'd come up with a really cool idea, even if I should just be working on it* [FLOW], *I'd elbow the person next to me and go, "Hey, I had this really cool idea," and then weirdly theorise it in front of my screen* [DELIBERATIVE] *Then after that, because I'm excited* [PASSIONATE] *about it I shoot back into flow* [FLOW] *again and get working on whatever it was* [TECHNICAL CHALLENGE].

While the above exchange highlights all four quadrants and different descriptors for activity, Tarpan's responses support the notion that individual and group lateral moments post-flow help avoid frustration.

The notion of "becoming the audience" and discussing and playing (other) games is a form of emotional scaffolding that manifests strongly in nurturing affinity spaces (Gee & Hayes, 2012), and is also important to jammers – especially when flow ends and jammers say "*I can't work on this anymore, shall I play your game and you play our game?"* (Kasel, Tico), or when seeing other teams play and appreciate their games, while pointing out features they had worked so hard on (Ziguli, Tarpan). In heterotopic affinity space this audience-nurture exists in the time period where crunch usually manifested (Skala, Tarpan). It is also clear the value of lateral moments as departures from on-topic activity is important in maintaining positive emotions. "*We had a lot of banter and a lot of fun* [LATERAL] *moments as well as actually cracking on with proper code* [FLOW]" (Smutek, Tarpan), and jammers felt disruption was a way to "*do the job*" yet still "*make each other smile*" and in doing so, bringing the group closer together to produce something (Ziguli, Tarpan).

On experiencing flow in passionate seriality, many jammers described similar experiences: "*right after we did the* [mood] *board and we discussed ideas, we wrote down what we had to do* [DELIBERATION]. *Everyone just got into their job. We all flowed together"* (Zaz, Trabant). Others described seeing groups in flow as increasing their need to pitch-in, but that once in flow it was hard to notice others (Smyk, Trabant) indicating a switch to passionate seriality that was "*just like tunnel vision*" (Dacia, Trabant).

Zaz also reflected on how the conditions for flow were different in the Foundry compared to traditional labs, "*I've not used my headphones as much*" […] "*Normally when I'm in the lab, I put them*

in to focus on work, to cast out the noise of everyone else". Smyk felt this was like a "*do not disturb sign*" for computing labs, but for the Foundry "*all of the noise in this area is* […] *important noise*", because team members would hear group deliberation and intervene, "*Like oh, actually I've already done this and you can find it here*, [NURTURE] *or just 'listening up' for if anyone needs a hand with work or whatnot.* [NURTURE]" (Smyk, Tarpan).

In terms of individual flow and group flow Trabant felt flow happened individually, but then individually as a group (Zaz). Dacia agreed, feeling the whole team was "*definitely synced*". On leaving flow there was also evidence that jammers went into states of reflection and not negative flow states of boredom or anxiety. For Ziguli, after finishing his levels [FLOW], "*I sat there* […] *I get this realisation every now and then when I'm working on my project, it's like, 'Man, working in games is awesome.' I sit down and I'm like, 'This is the best.'*"

The above sentiments highlight non-linear shifts between individual and group jammer behaviour, and both on and off-topic activity. I also used my model to revisit my fieldnotes and jammer conversations on the use of the Foundry space, and the six lateral moments they took part in to ensure the model was capable of mapping behaviours I observed, heard discussed or that were findings of this project. In this light, Bommarito's model through the incorporation of these four layers results in the recursive PHASE model:

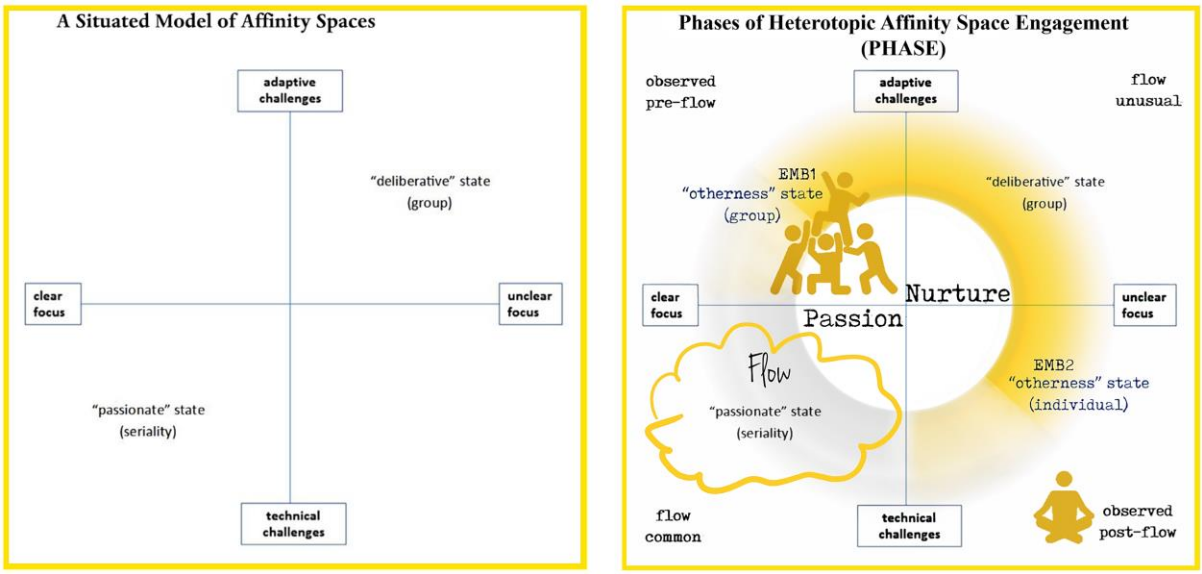


Fig.75 Bommarito's Model (Affinity Spaces) aside the PHASE Model (Affinity States).

The two significant contributions of this thesis, that of lateral moments and the PHASE model which situates them, allows the following conclusion to address my research questions, propose further research, make practice recommendations and to conclude this thesis.

CHAPTER 10: Conclusion

The significant original contribution to knowledge of this thesis is that it identifies the emerging disruptive, off-topic behaviour of heterotopic affinity space to be a positive phenomenon. My analysis defines these occasions as lateral moments, and meaningful states of individual and group nurture. This finding is further developed through the recursive PHASE model which situates the on-and-off-topic activity during game jams to the extent that possible cycles of affinity space engagement become visible.

10.1 Addressing my Research Aims & Questions

In this section I respond to the research findings and theoretical implications of my study, where both lateral moments and the PHASE model are leveraged to conclude this research. Before I revisit and respond to each research question in turn, I provide a summary of the aims from which my questions were first derived (see Chapter 1). Showing how my aims are connected to the findings and conclusions of this thesis is important, as their interoperability informs these final responses to my research questions, practice recommendations and the original claims to knowledge which conclude this thesis. Before I readdress my questions, what follows is a summary of my original research *aims,* and their respective micro, macro, and meta level impact on this study[75]:

1: Understand more about disruptive behaviour manifesting during Foundry jams.

At *micro*-level, this study uncovers a multitude of examples of the accentuated, at first sight disruptive behaviour occurring during the 2019 Global Game Jam event in the Foundry.

2: Explore if prevailing disruptions/distractions during Foundry jams could be classified.

At *macro*-level, through field notes and reflexive thematic analysis, this study triangulates lateral moments as significant occasions worthy of scrutiny, that are relevant to learning engagement and that do not occur to the same extent in more FEAR-full settings.

3: Investigate how emerging individual and group behaviours might influence engagement.

At *meta*-level, development of the PHASE model and re-engaging with jammers and their event-recollections allows lateral moments to be considered not bad behaviour, but restorative activities undertaken by individuals and groups of significance to the flow of optimal experience.

[75] In game design it is relatively common practice to consider game-loops as a hierarchy of interacting loops across micro, macro and meta layers.

RQ1: How do jammers engage with physical heterotopic affinity space?

As my fieldnotes and analysis confer, jammers engage with physical heterotopic affinity space unconventionally compared to jam events held in more FEAR-full spaces. Jammers participate more enthusiastically with spaces they are aware are differently constructed and are also capable of intuiting the FEAR-less or FEAR-full intentions of learning space to a far greater extent than anticipated.

With jammer perception of *otherness,* comes their sense there is less behavioural regulation in heterotopic affinity space compared to FEAR-full spaces; jammers act in new, agentive ways, unfamiliar to those more usually observed in computing lab-based jams, exemplified through their ongoing curation of highly customised enclave-like dens or bases of operation they feel great ownership towards. Contrastingly, no teams in this study established themselves in more open spaces for any great time, unless to participate in off-topic activity. Jammers in heterotopic affinity space also more-freely make changes to the overall environmental conditions of the setting than in labs, adjusting the heat, light and rich media content that pervades the space, and are more tolerant to sub-optimal conditions compared to those in centrally controlled institutional spaces.

Significantly (and despite increased off-topic activity), heterotopic affinity space produces more conducive overall jam conditions, and increased acts of nurture between jammers, their teams, and others across the space. No jammer accounts found heterotopic affinity space to be a less-preferential jam location to other institutional spaces (even their own games technology spaces), despite the Foundry having heavier, less-flexible furniture, little in the way of fixed-computer hardware, and no modern facilities such as air-conditioning.

Jammers are inquisitive and explorative of heterotopic affinity space. This was apparent from the outset, when the Foundry doors were first unlocked and teams explored the space to establish their territories, excitedly investigating hardware, checking if furniture was fixed down, before ferrying different items from across the space to create their “den” for the duration. The FEAR-less agency of the Foundry was especially evident here, as collected items were often used for transgressive purposes, such as beanbags for beds, university curtains for blankets – as well as more task-orientated use of the space (e.g., using windows for whiteboards).

Interestingly, all jam teams felt their area had been the most effective use of space, despite significant differences in layout and game development process. The general configuration of each team's area can be summarised as:

Trabant: Linear transect: A diagonal line from low-to-high, facing the back wall.

Tatra: Linear back-to-back: Sitting closely in two traditional rows back-to-back.

Tico: Inward circle: Single large desk, everyone faces each other, laptops back-to-back.

Tarpan: Perimeter circle: Facing inwards or outwards around the perimeter of their space.

As mentioned above, jammers were perceptive as to the intended purpose of the space, aware it was especially different to labs, intentionally productive, and a space where artefacts were constructed. Paradoxically (and aligning with the Foundry's design intent), jammers also found it to be informal like home, and playful. None of the Foundry design documents or design paradoxes were ever disclosed to jammers, and all but one jammer had never witnessed the space prior to the jam. Foundry jammers also appeared more aware-of how other teams used the space, reflecting on the approaches of other participants well beyond what can be witnessed in computing labs and jammers were also more reflective (and reflexive) of their own individual and team processes.

RQ2: What behaviours emerge while jamming in heterotopic affinity space?

The fieldnotes, reflections and conversations on how jammers engaged with heterotopic affinity space proved a rich dataset for analysis, which found off-topic behaviour significant to overall progress and wellbeing while jamming in heterotopic affinity space.

In heterotopic affinity space, jammers do a lot more activity that does not seem conducive to creating a game in just 48-hours. Prior to this study, I might have equated this activity to unruly behaviour and distraction, but as heterotopias are reflections of societal norms beyond their boundaries, and spaces of transgression - there was literally and figuratively more at play than met the eye. Two types of emerging behaviour that are accentuated or manifested by heterotopic affinity space were identified through my analysis.

Emerging behaviour becomes meaningful through wider consideration of heterotopic space and the affinity of activity within it - particularly with regards to learners maintaining engagement and achieving positive overall outcomes. The emerging behaviours of this study appeared contrary (or later *lateral*) to activity directly related to positive jam progress. When such behaviours ended, jammers were able to get back on track more effectively, a finding which is contrary to Gee's established view of "deteriorated" affinity spaces.

My findings conceptualise emerging behaviours as "lateral moments", manifesting as either technological or spatially mediated activities that allow jammers to access, interact or observe *otherness*, and perhaps a purer form of Foucault's "Des espaces autres" (1967). This study finds that heterotopia leverages lateral moments, (be they spatially or technologically mediated) as occasions which establish windows to other worlds or other worlds of activity. Lateral moments conceived by this thesis are heterotopic mirror-states of on-topic participant behaviour which do not manifest to the same extent in less-heterotopic (and more FEAR-full) spaces. Instead, they are repeated and sometimes sustained off-topic behaviours that *appear contrary* (or lateral) to conducive project progress, I find to be proximal (and important) to Csikszentmihalyi's flow of optimal experience (1975).

Lateral moments are occasions where participants take-part or spectate in off-topic activity together or severally. They are sometimes more muted introspective states where individuals reflect and/or recover, but also boisterous states with the potential to bond and re-energise teams. What classifies lateral moments is whether they are actions of individuals or groups, and the extent to which they are boisterous and extroverted or reflective and introspective. Through the PHASE model which began by situating these emergent behaviours it also became clear that lateral moments shift in state, scale and participant make-up over time.

RQ3: How does "flow" present for jammers in heterotopic affinity space?

Flow for jammers in heterotopic affinity space is a state arising from passionate pursuit of individual tasks but performed towards shared project goals. Flow manifests where clear focus permits jammers to apply their skill to technical challenges. This is true of affinity spaces, where activity tends towards passionate individual and then deliberative group states where the next challenge is decided, and most activity remains on-topic. In more-heterotopic affinity spaces, mirror-states of individual and group on-topic activity become more possible, and this is where lateral moments manifest, as inversions of on-topic activity.

In heterotopic affinity space, flow is part of a larger journey through alternating behavioural phases of individual and group on-and-off-topic-activity. In this light, lateral moments, which might at first seem like spontaneous bursts of disruption or distraction (a metaphoric and sudden puncture on the road of project progress). But these are nurturing activities, increasing the likelihood of project success, or states where the group's punctures are repaired, and where other potentially problematic potholes ahead can re-navigated or repaired.

In affinity space, flow ends when passionate seriality deteriorates. In more formal spaces, jammers at this time can experience anxiety, stress and even boredom (from too much or too little challenge).

This time spent waiting for the team to re-group "with nowhere to go", can also lead to extended experience of negative emotions such as frustration.

In more-heterotopic affinity spaces, lateral moments are a buffer, a transitionary construct I liken to a cool-down, switch-off, or re-fuelling where jammers consciously or subconsciously reflect and prepare for future on-topic activity. In these immersive views to heterotopia's other worlds and spaces, the potential negativity of the sometimes-abrupt end of flow is lessened, where jammers subconsciously prepare to re-enter on-topic states such as group deliberation, what the group should do next is discussed, or flow conditions can be established once-more.

Failure to make a game during a jam occurs through a failure of group-deliberation resulting in unclear-focus, or poorly scoped and overly ambitious challenges that make the project difficult to produce within a limited timeframe. In more-heterotopic spaces, this study suggests that failed deliberative group states are renewed through group lateral moments, after which teams more successfully re-enter deliberation.

Even when on-topic group states are productive, jam teams can still be observed entering lateral moments to reinforce shared pursuit before individual flow states are witnessed. It is also true that post-flow, jammers may go directly to a group lateral moment in-progress, as any quadrant state in the PHASE model may be entered upon the deterioration or completion of another. This suggests shifts between on-and-off-topic activities (and states in the model) for individuals and groups are non-linear, and transitions or patterns between them may be different at different times, for every jammer, team, event (or space).

This study finds the overall jam experience to be enriched by lateral moments in heterotopia, forming a nurturing buffer, crash-mat or safety-net for flow and indeed entire projects and teams. I witnessed jammers recounting the intuited heterotopic *otherness* and constructionism of the Foundry, reassuring teammates that something other than their (prospectively anxious or boring) on-topic tasks existed for them. This is vastly different to the task-oriented apprehension associated with failing to complete jam elements in traditional computing labs, where prospective lingering vacuums of negative emotion (true to the notion of FEAR-full spaces) threaten jammer engagement until group deliberation becomes possible once more. This negative experience of anxiety or frustration is processed differently in heterotopic affinity space post-flow, as lateral moments are often proximal to the recovery from such experiences, as *otherness* provides an escape from reality and external perceptions of conducive engagement through the disruption of time and escape from reality to other places, until it becomes possible to re-enter on-topic states.

10.2 Limitations of this Study

This study does not seek to identify a new formula for future learning spaces, or directly assist in generalising the Foundry design so others might replicate it (although it carries three practice recommendations in the following chapter), because as Dewey said of his classroom projects:

"We do not expect to have other schools literally imitate what we do. A working model is not something to be copied; it is to afford a demonstration of the feasibility of the principle and of the methods which make it feasible"

*(*Dewey, *2008, p.64).*

This thesis does not seek to establish the extent to which the Foundry is optimal in the manner of its design-characteristics, as there is yet no taxonomy or framework to apply regarding the pedagogic utility of heterotopic affinity space. There are also no other "from the ground-up" physical heterotopic affinity space settings, or dedicated jam spaces with which to perform a comparative study. This research is bound to the specific context in which the Foundry is situated at the University of the West of England, Bristol. The manner in which certain physical features of the space and technology within it was subverted by jammers is likely non-transferrable without further research to develop a framework for physical affinity spaces within formal education.

The work to create the Foundry drew conceptual leaps from case-studies into MIT's "Building 20" and the work of a key B20 alumni to establish appropriate Foundry features. For example, Seymour Papert brought constructionism, hackerspaces, makerspaces and the birth of the democratisation of coding required for game jams and hackathons to exist (Basawapatna et al., 2014; Halverson & Sheridan, 2014; Hopkins, 2013; King & Reed, 2020). Research is still exploring affinity space, and despite growing consensus of their nascent power, there remains much to understand about their configuration (Bommarito, 2014; Brass & Mecoli, 2011; Durga, 2012; King, 2012; Lammers, 2012).

The use of the Foundry for research only during game jams, and specifically the GGJ 2019, could be viewed as a limitation to the scope and extensibility of this research. Instead, it has proven a valuable and repeatable mechanism through which phases of jam engagement might be interrogated. It was never the intention of this study to observe events that might be incorporated into normal curriculum activity in FEAR-full spaces.

There are also extensions and discussions in flow theory not incorporated by this study, such as "team flow" (Kiili et al., 2010), "social flow" (Walker, 2010) and "group flow" (Sawyer, 2013) which could in the future be used to consider enriched phases of jammer engagement. But these are not widely

mounted concepts and are beyond the scope of an inductive study of jammer engagement in and with heterotopic affinity space.

While this project may be transferable in terms of outcomes beyond game jams and hackathon events, game studies, flow theory and those interested in progressive learning spaces, I do not intend this study to yet be generalisable to a broader population (Silverman, 2000). The Foundry is a prototype, and this thesis represents an exploratory "first foray" into jam engagement in a progressive learning space. Attempts for wider generalisability at this stage would have risked the study's internal validity, and research into the implications arising from this study are suggested in the following section.

10.3 Further Research

The recursive PHASE model I developed at the interface of findings and theory in the previous theoretical discussion is based on Bommarito's situated model of affinity spaces, and in part answers his call for research to understand how passionate states and affinity spaces might shift into deliberative ones (Bommarito, 2014, p.416). As with Gee's affinity space, questions persist that must be addressed if affinity spaces are to be sustained in mainstream education as anything other than outlier approaches for non-standard activities such as game jams (e.g., Jackson, 2016) or workshops (e.g., Barden, 2016).

The findings of this study offer an opportunity for further research in game studies and a cross-section of educational fields, as there are significant implications for the intersection of flow theory, affinity spaces and game jams as FEAR-less learning. I present the following specific considerations for my further research, as micro, macro and meta-level approaches I intend to pursue. I then conclude with broader issues pertaining to these fields, this project and the world's "pivot to digital" (Deloitte, 2019).

A. Micro: Mapping Flow into Passionate Seriality

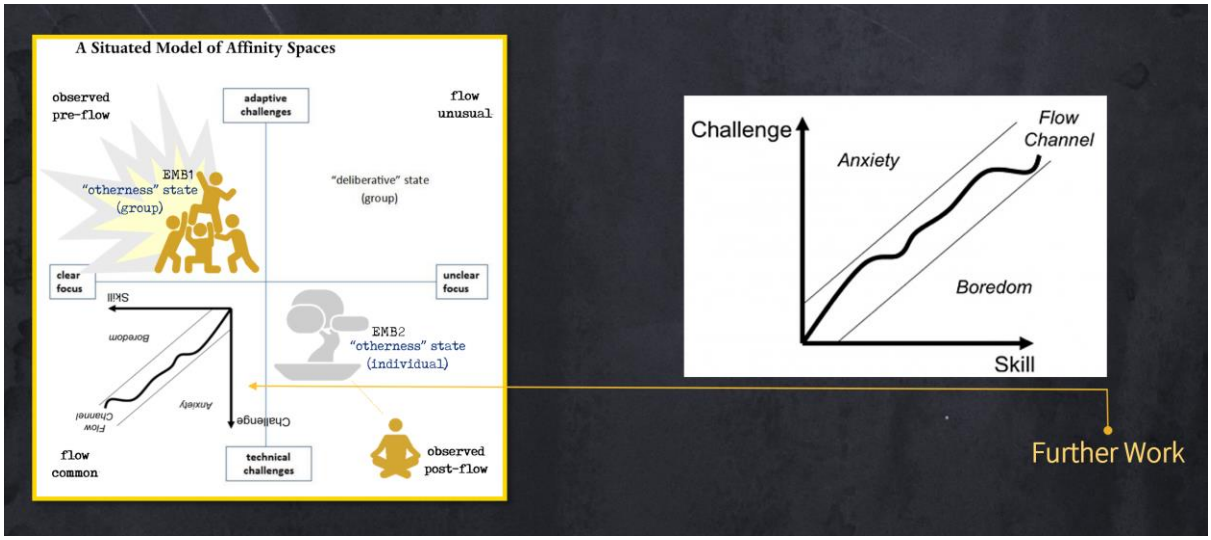


Fig.76: The prospect flow might somehow be visualised within passionate seriality.

While this thesis posits flow arises within passionate seriality where there is focus and a jammer's skill is balanced by the challenge of a task in hand, an important aspect will be to seek to understand what the "flow channel" of optimal experience could mean for the PHASE model. Csikszentmihalyi's model of skill, challenge and focus presents an interesting opportunity to consider what a graphical overlay of flow within the PHASE model might look like. A compatible visualisation would be invaluable to research into engagement states and perhaps help understand the journeys of individuals and groups entering and leaving flow at different times. If successful, this work might also lead to the mapping of the full range of Csikszentmihalyi's emotional states.

B. Macro: Flow within Lateral moments

Once the above is concluded, and considering that if Bommarito's model positions different affinity spaces, and the PHASE model positions different affinity states (strengthening Bommarito's assertion that off-topic activity can be meaningful), it may become possible to establish where else in the model flow manifests beyond off-topic activity.

This project was undertaken to understand the impact of heterotopic affinity space on flow, and it identifies shifting states of jammer and team engagement. Currently, the PHASE model only considers what we might call "on-topic" flow, but looking at flow arising during lateral moments of "off-topic" activity. Here the PHASE model offers several avenues of prospective enquiry:

1. Does heterotopic flow manifest in a meaningful way during lateral moments?
2. If so, is off-topic flow impactful to the same extent as on-topic flow?
3. If so, would off-topic flow carry implications for heterotopic affinity space?

The third point speaks to wider implications of this thesis, around condoning off-topic boisterous or distracted behaviour (something running contrary to contemporary teaching practice *and* the majority of affinity space research). If affinity spaces are to have greater connection with formal education, questions remain to "how we might effectively coax these [affinity] spaces into existence and sustain them, especially in traditional school contexts" (Bommarito, 2014, p.415). Heterotopic affinity space might also be better understood through examination of optimal flow during off-topic engagement.

C. Meta: PHASE Model Evaluation

Delineating different phases of engagement and optimal experience across a continuum of formal to informal (or regulated to transgressive) learning spaces could prove a powerful tool to illustrate the benefits of virtual and physical affinity space to a wider research audience.

In this, the largest of my future objectives, the contributions of this study would be evaluated in settings and contexts beyond the limitations of this study. One research strand would look to operationalise the PHASE model for game jams in other more-or-less heterotopic spaces besides the Foundry, before considering other technology events like hackathons. The second would consider group technology projects in more longitudinal, less progressive settings. The aim of these strands would be to develop more readily generalisable implications for lateral moments, and the positive engagement with and in-proximity to them.

The second strand might also consider the group technology projects for industry remit of the Foundry, so that other constructionist project-based learning conditions might be compared. Given that interpretations of "bad" behaviour exist to some extent in most learning settings, so too may lateral moments in all but the most FEAR-full spaces. This research could then look to projects in more FEAR-full spaces to establish the existence of less-accentuated lateral moments beyond heterotopia, rendering a continuum of formal to informal learning engagement visible for the first time. If lateral moments can be identified or even made available to more FEAR-full spaces, learning engagement might be improved without need of dedicated spaces.

D. The Future of Virtual and Physical Spaces

As we near twenty years since Gee developed the concept of affinity space, there is a renewed need to revisit or expand certain aspects of the theory beyond the scope and context of research considered by this study and across fields of progressive education and game studies.

Much of this thesis rests on the interpretation of literature predominantly (but not exclusively) drawn from the study of online affinity spaces and the work of new literacies scholars. There is now a need to re-address the virtual vs. physical nature of affinity space - in part due to Gee's theory pre-dating

the widespread availability of social media - but also other technologies that are now more widely available (e.g., virtual reality headsets). “Virtual” means more than what we call an online affinity space, and the latter is perhaps now insufficient for the classification of websites as virtual affinity spaces, especially in light of how Covid19 forced society to engage in online learning. This is not to say online spaces are not virtual, only to recognise that historically, physical affinity spaces have received much less attention than online ones, and the forums and user groups formerly considered by researchers are now a dying format and there is a pressing need to enhance, delineate or re-classify what Gee means by virtual and physical affinity spaces, especially given the interactional quality of current generation consumer VR headsets.

Fig.77: Foundry GGJ 2021 moved to a virtual jam affinity space due to Covid19.

GGJ 2021 was held amid the Covid19 pandemic, where no-one could meet in physical space. Instead, the event was hosted within AltspaceVR, an accessible VR platform owned by Microsoft. The central stage for presentations was a giant arcade machine, with a screen that live-streamed jammer computer screens and Discord chat channels for everyone within and beyond VR to see. The world was itself paradoxical, and of real-world jammer bedrooms, kitchens and living rooms, beamed into a paradise of tower cranes, shipping containers, volcanoes and sandy beaches where jammers met to play, reflect, assist, and finally present their games. This virtual affinity space was important to jammers, who often as incoming university learners of the TikTok generation, may have little experience of real-world collaboration due to pandemic restrictions.

Fig.78: Foundry GGJ 2021 featured an arcade stage streaming in discord chat & zoom video.

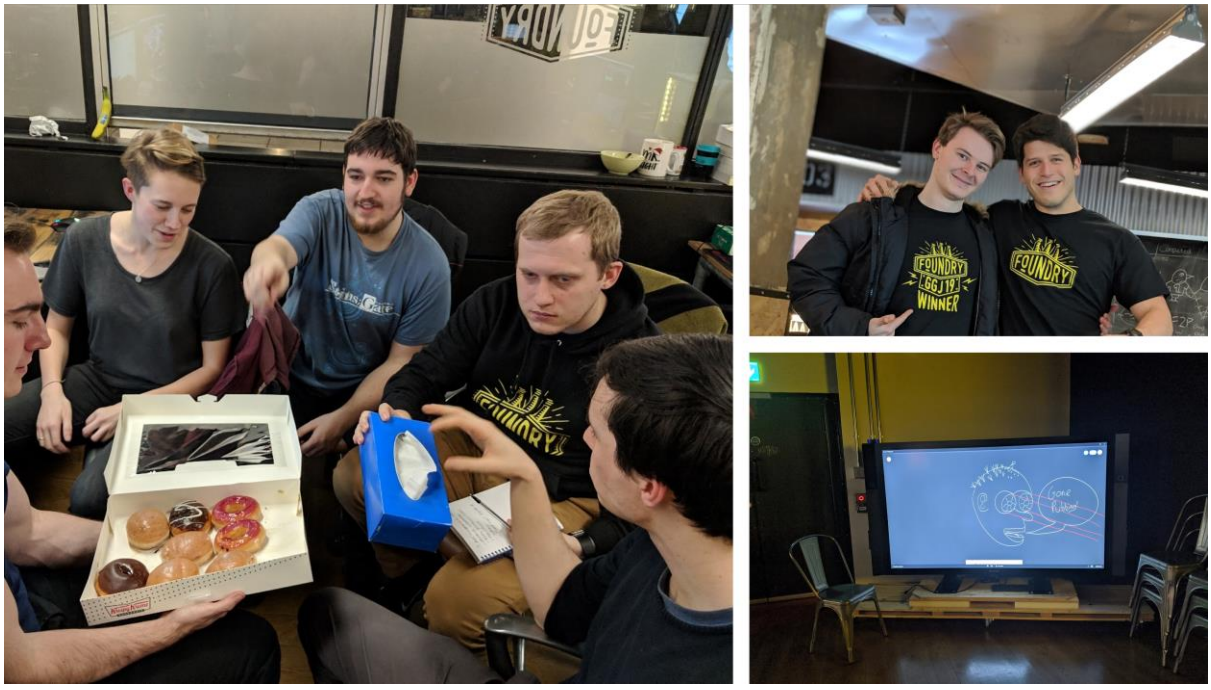
This VR jam site was unlike existing definitions of virtual or physical affinity space. Simultaneously more tangible and physical (i.e., more concrete) than forums and Facebook groups, yet also a purer form of virtuality than Gee could have envisaged while developing his theory in 2004. Foundry island was another heterotopic space, from which lateral moments emerged throughout the event[76] and views were possible to other spaces away from on-topic jam activity.

This thesis hints at the extent off-topic activities may scaffold positive on-topic engagement and attainment, but it is not a clarion call for developments of Foundry-scale proportion, or for researchers to map its findings to FEAR-full contexts. Instead, it hopes to catalyse work to further investigate the concept of heterotopic affinity space in other educational contexts.

The strongest implication of this study is also its simplest; a step towards institutional and theoretical recognisance that transgressive off-topic behaviour may provide meaningful on-topic (re)engagement opportunities and that lateral moments in heterotopic affinity space are a restorative safety-net which lessens anxiety and replenishes task focus.

[76] At one point a jammer dressed as Jesus and jumped on stage to conduct a sermon. The throwing of cars, pizzas, marimbas, paper aeroplanes, fireworks, quizzes and hide and seek also provided disruption.

Fig.79 (above & below): Foundry interns and jammers after a weekend jamming in heterotopic affinity space.



10.4 Practice Recommendations

Research has already considered the extent to which game jams are passionate or nurturing affinity spaces, and settings within which "energising moments" were a repeated occurrence (Jackson, 2016). This study finds that transposing a game jam site to a FEAR-less heterotopic affinity space will result in heightened energy and accentuated off-topic behaviour – where the latter is found to be a nurturing phenomenon resulting in improved well-being, engagement, and attainment during jam events. However, jams in such spaces raise the realistic prospect of transgressive behaviour and content presenting during lateral moments of *otherness*, and unless organisers and researchers take precautions for this edge-case, formal education may not see the risk of informal spaces as being worth the reward. The following practice recommendations are drawn from the findings of this study:

A. Academics proposing events in heterotopic affinity space:

Consider briefing site organisers and jammers on the effects of the space and offer reporting methods (perhaps through an app or similar) to learn more about the types of lateral moments which occur, otherwise the benefit of such spaces might be lost due to the FEAR of content within them. While in most cases participants are bound to institutional codes of conduct, lateral moments (and even jammer PHASES of engagement) could be communicated to participants during the well-being section of the jam welcome presentation.

B. Researchers proposing projects in heterotopic affinity spaces:

Consider the inclusion of revised project ethics, to include appropriate responses for the handling of potentially transgressive participant behaviour. Recognise the extent to which researcher responsibility goes beyond the wellbeing of participants, and on to those beyond the space who might be exposed to its content without context (of the space, project or event) required to frame it. A simple rule of thumb might be "would a reasonable person beyond this space be OK with this" so content and events towards the edge of acceptability (and accountability) may be triaged.

C. Staff proposing new physical heterotopic affinity spaces:

Consider using concepts of FEAR-less space, agency and engagement to justify new affinity spaces. For the activities within, introduce flow as a design goal of the space, and discuss how, through making the space "other" to the institution around it (via design paradoxes), so that both on and off-topic work may be condoned. Think carefully about what you might want the catalysts for your lateral moments to be in that space, and how your incumbents might escape to Foucault's "des espace autres" (1967), disrupt conventions and achieve great things.

10.5 Final Reflections & Knowledge Claims

> *"Successful commercial game studios recognise game professionals are humans who need time to decompress and reflect, especially during "crunch" in the final stretch of game development as a title nears completion"*
>
> (Kultima, Alha & Nummenmaa, 2017).

If lateral moments are a lens through which significant off-topic activities are rendered visible and of benefit to the engagement and wellbeing of individuals and groups, a need arises to re-consider education's predominant concern for on-topic pedagogy, and what is meant by phrases like "learning engagement". Given that industry and learners are adopting different paces and dimensions of learning beyond formal education, there is a need to explore remaining institutional hurdles for adoption of (heterotopic) affinity spaces without diluting their learning potential too greatly.

There also remains broad consensus that mainstream education has much to gain from the adoption of affinity space, yet trends for university refurbishments appear to show little appetite for progressing the design of physical settings which maximise engagement. New campus spaces are flexible, modern, yet so often ultimately forgettable and unable to punctuate the minds and experiences of learners.

Module and timetable friendly spaces may consider functional collaboration in their layout, but do not yet consider learner agency or the damage of perceived FEARs of formal education and academic regulation. If 21st century education is to rise to the challenge of 21st century learners (who already blend their formal taught education with the informal through a mix of YouTube tutorials, Discord channels, sub-Reddit's and extracurricular events), research must also consider spaces optimised for this activity within mainstream education.

The most significant hurdle for affinity space to be for anything other than temporal extracurricular activities remains the segregation of learners by year, level, or capability - despite it being a hundred years since Dewey posited that future learning spaces would include diverse ranges of age and ability (Dewey, 1938).

In the following final sub-sections I reflect on the significant claims to knowledge of this thesis and the implications of developing, operating, and researching a physical heterotopic affinity space in context of my research aims and questions.

A. Significant Original Contribution #1: Lateral Moments

In developing the conceptual lens to identify significant emerging behaviours during analysis, I learned that "looking-to other spaces" for reflection and acts of lateral construction were proximal to individual flow and group deliberation. Now the recursive PHASE model existed, and this study neared completion, how did I feel about lateral moments as a classification of the behaviour my aims sought to examine?

Reflections on Lateral Moments:

1. The emergent behaviours presented as lateral moments are important off-topic behaviours because they are accentuated by the FEAR-less *otherness* of the heterotopic Foundry setting. Lateral moments remain significant due to their occurrence both pre and/or post flow, and in proximity to deliberative group activity as a result of deteriorated flow where skill has become mismatched with challenge and activity is no longer enjoyable or engaging (Nakamura & Csikszentmihalyi, 2014).

2. FEAR-less actions do not themselves necessarily constitute a lateral moment. For example, when Maluch (Tatra) "acquired" university-branded curtains, and fashioned them for use as a blanket, it was certainly transgressive, contrary to behaviour in formal spaces, and an act of FEAR-less agency. However, it was not necessarily significant to renewed productivity and did not bookend intense engagement. While more work is required to ascertain the extent heterotopia constitutes lateral moments, the examples I present in Chapter 8 are lateral catalysts of energy and enthusiasm (for groups) or moments of reflection and introspection (for individuals) proximal to the beginning or end of flow.

3. There is a regularity to individual and group behaviour in affinity space made visible through lateral moments in heterotopia. Flow on the other hand is more subtle and requires nuance to identify without a construct. Lateral moments render flow states visible to those interested in optimal learning engagement in physical affinity space for the first time. Realising there is a cadence of such moments – even without the PHASE model – sparked my significant and novel realisation that flow and affinity space align theoretically. This connection was explored and developed further through my discussion (Chapter 9) where lateral moments were found to sit firmly within frameworks laid out by established affinity space researchers.

B. Significant Original Contribution #2: The Recursive PHASE model

Bommarito's study was an important breakthrough in my understanding of affinity space. His was a model for situating *types* of affinity space based on behaviours recognisable within them, while mine developed a model to highlight shifting states of on-and-off topic behaviour within them. The PHASE model positions flow as a conceptual enhancement of what Bommarito calls passionate seriality. It supports the extent to which flow manifests within affinity spaces and is both enhanced and situated by lateral moments arising in heterotopia. A second tool for understanding affinity space, the PHASE model visualises the significant interconnectivity of flow and affinity space that has gone entirely unnoticed in literature until now.

While there is evidence to suggest spaces such as MIT's Building 20 (Chapter 2) may have been heterotopic affinity spaces, there is little other than historic accounts of the success of incumbents (Beam, 1996; Campbell, 2017; Degroof, 2021; Peterson, 2011; Smith, 2017) to make the benefits of FEAR-less space tangible to formal education, and little for 21st century researchers to interrogate in modern literature beyond B20 and the researchers central to this thesis. By positioning Foundry jams as a both passionate and nurturing heterotopic affinity space, accentuated states of activity I define as lateral moments become available to individuals and groups, resulting in improved satisfaction and engagement over that of FEAR-full spaces.

The PHASE model provides a footing for addressing my research aims and questions of how jammers engage with heterotopic affinity space (RQ1); the behaviours that emerge while jamming in heterotopic affinity space (RQ2); and how flow presents for jammers in heterotopic affinity space (RQ3). It is particularly effective basis for considering the effect of all known kinds of affinity space on engagement, and especially the implications of flow in affinity spaces. As such, it provides grounds for researchers in the fields of game jams, game studies, progressive education, digital literacies and learning spaces to consider heterotopic and physical affinity spaces in a renewed light, and a rational for piloting and sustaining informal campus learning spaces.

The work of Barden, Bommarito and Jackson shows that affinity spaces can, and should be, made compatible with education as it exists today: This is contrary to the view of Gee and Hayes that institutions as we know would have to disappear and society would have to adopt "a different paradigm of schooling" before this became possible (2011, p.86). However, while Dewey's (1938) visions of a classless educational future remain someway off, research has continued to embrace the possibility of affinity space. This thesis supports Barden's notion that if physical heterotopic affinity space is given due consideration, the potential of more FEAR-less campus spaces may be realised.

C. Things Go "Wrong" in Heterotopia

While to some degree less important than the two previous contributions, the final significant finding of this study was a personal one (and perhaps obvious in retrospect), but nonetheless one which returns squarely to my first research aim and its subsequent question: The disruptive behaviour manifesting during Foundry jams.

This study finds that by transposing already energised events to FEAR-less spaces of increased agency, the boundaries of educational acceptability may become challenged (especially given the propensity of heterotopias to be spaces of transgression from societal perspectives). The unexpected or unpredictable effects of heterotopic affinity space on jammers were the impetus for this explorative study, as jams themselves had not featured in the design of the space. Potentially offensive activity on the limits of acceptability was neither expected, encouraged, or condoned by this research, or the Foundry's host institution, but this study formalises why (lateral moments), when (PHASE model) and benefits to engagement of such behaviour in conjunction, resulting in a third claim to knowledge.

Future heterotopic affinity space research must consider where such boundaries of acceptable behaviour for disruptive spaces lies, and the extent to which the consequences of extreme actions can be communicated to participants, without limiting the heterotopic potential of the space. Undertaking this consideration would be to knowingly foster a paradox - making transgressive behaviour and disruptive spaces acceptable within the boundaries and confines of formal education. While this may sound unfeasible, it is worth noting that jams make acceptable behaviour clear during the welcome presentation, and all jam sites have nominated responsible persons (usually academic staff for campus-based jams), so there is a precedent of establishing acceptable behaviour without significantly eroding the FEAR-lessness of a heterotopic affinity space.

Considering the "drawing competition" lateral moment specifically as an example, which highlighted challenges in terms of research ethics and the deviation of behaviour from FEAR-full norms, issues of subjectivity-to and interpretation-of participant activity are clear:

1. It is only after a jam concludes that it becomes possible to unpack the intense range and richness of jammer activity across days of non-stop activity, especially for larger campus events with hundreds of jammers. Not everything can be experienced in real-time.

2. it is only from beyond a heterotopic space that lateral moments may be contrasted with a backdrop of normalcy. By this I mean the extent to which heterotopia presents conditions akin

to the "boiling frog" problem[77]; that by being *within* a heterotopic space (the saucepan), a researcher may become less aware of the implications of the setting (boiling water) and fail to act (or jump out) without a view from society into the "bubble" of affinity space (Jackson, 2016) being made available.

3. Without context, these events could be interpreted as blunt characterisation (i.e., the "obese Hulk" meme of body image and junk food), and the appropriation of national stereotypes (such as the "Slavic squat" meme). But with context of gaming and popular culture, Mario is already a trope of male heterosexuality (an Italian working-class plumber rescuing a princess in distress), while the hulk (who changes in shape and aggression due to his mood) might infer neurodiverse conditions such as autism, and such traits have been featured in videogames and media for over four decades[78].

Lateral moments that had felt like a breakthrough in my understanding of jam engagement in heterotopia (and a mechanism for locating what was important activity in my data), had led to an apprehension I had not accounted for. I set out to examine unexpected behaviour, not the extent to which it might be deemed offensive by others beyond the space. While Barden describes heterotopic affinity space "as a way to conceptualise learning environments characterised by deep, authentic, political, disruptive, agentive learning" (2016, p.234), lateral moments during the Foundry GGJ still revealed participants sailing "closer to the wind" than I had previously considered prior to this study[79].

This was not to identify a weakness in my ethical process per se, as it could well be that the academic (frog) *always* jumps from the boiling pan of water (as scientists later discovered, contrary to the myth). I the researcher, would have acted to intervene, should I have recognised potentially harmful moments. However, harmful activity is not in keeping with nurturing affinity space, and both the university and the GGJ organisation have clear codes of conduct, while jams are observed by organisers at every event site. Nonetheless, behavioural acceptability remains a challenge for adoption of more disruptive forms of informal learning space.

In heterotopia, behaviour is accentuated, but the intentions of jammers remain passionate and/or nurturing (Gee & Hayes, 2012; Jackson 2016). Researchers should be mindful that participants in flow may no longer be aware of the outside world and its eventual perception of their behaviour (Aleksic,

[77] I refer here to the (debunked) 19th century myth that if a frog was thrown into a pan of boiling water, it would jump out, but if it was placed in a cold pan which was heated, it would fail to realise it was being cooked.
[78] The Avengers: Endgame (in which the Hulk features) presented the world with "fat Thor" in 2019, and itself was accused of fat shaming (Christie, 2019).
[79] Barden's group projects featured mild curse words and the characterisation of political dictators as (literal) grammar Nazi's in context of artefacts on the perceptions of and prejudices visited upon dyslexic students.

2016). This is not condoning behaviour in heterotopia as defensible or otherwise. In Foucault's own examples of prisons as heterotopias, there is a paradox of visible rules yet rule-breaking, where rule-breakers are pervasive (1998). Spaces in society such as playgrounds are examples of accepted heterotopic paradoxes, where a child's playful joy exists in context of the spectre of potential harm, where parents grow fearful of spaces designed to be safe and withdraw their children (Pitsikali & Parnell, 2019).

Reflecting on this mini-ethnographic study, I feel that spaces like the Foundry may be a necessary and rewarding presence in formal education – as necessary as that of the playpark. The playpark legitimises playful behaviour in public between children and adults by disrupting societal hierarchy and sidestepping cultural norms that would otherwise prevent adult-child interactions. Similarly, we should acknowledge the benefit of disruptive learning spaces, and move to develop the means to manage extreme "edge case" behaviours, because the agentive potential and benefit to learning engagement that heterotopic affinity spaces bring could by far outweigh the risk of rejecting norms. heterotopic campus affinity spaces could yet be nettles worth grasping in formal education.

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TABLE OF FIGURES

APPENDIX

The Foundry Build

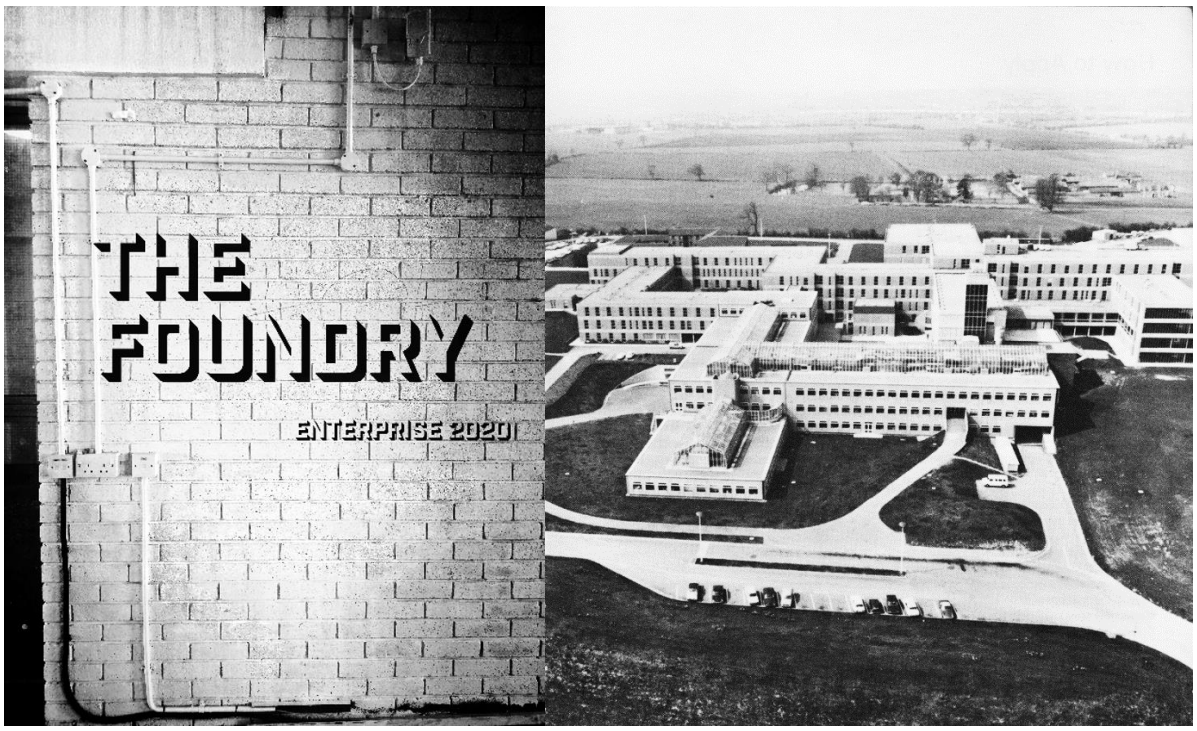


Fig 80 Left: Foundry pitch title slide. Right: UWE Bristol photo of Frenchay campus 1979.

With a budget of £118k, the plan was to include paradoxical aspects designed into the space to destabilise it. The idea was to keep learners off-balance, so their internalised authority would never settle on institutionalised perceptions. The design process began by sourcing relevant examples of co-working spaces and incubators with technology research and development function. Many of these spaces had post-industrial aesthetics in keeping with the derelict former student union I had secured. I was able to avoid the universities "preferred suppliers" framework on the grounds of economics and sustainability and the project being researcher-led. The up-cycling and re-purposing of old items serving as cost-mitigation in lieu of a budget that would have been consumed by architects, had they been appointed in my stead.

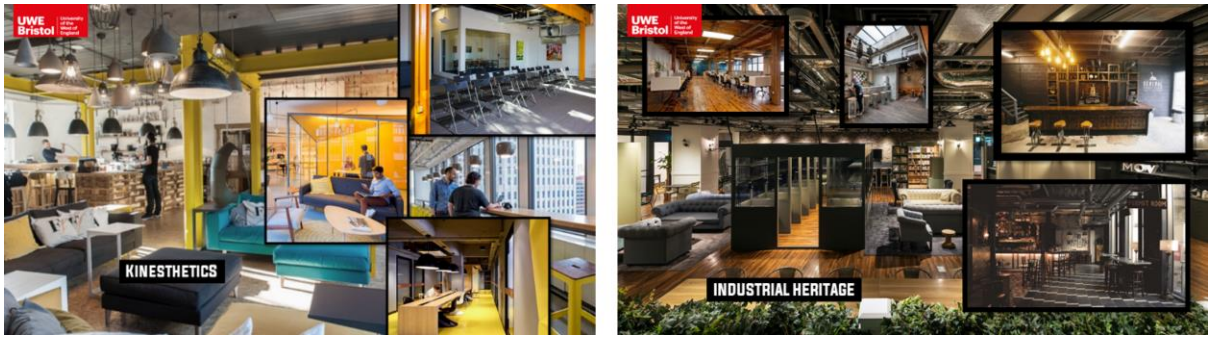


Fig 81 Foundry mood-boards highlighted an upcycled, industrial aesthetic.

The purpose of the mood boards (Fig.9) to ease institutional concern regarding the progressive nature, short timescale, and high ambition of the project, soon gave way to research into other disruptive institutional spaces. But it was the discovery of MIT's "Building 20" (B20) which would come to inform the Foundry concept.

B20 was a temporary wooden structure hastily erected in 1943 as part of the US war effort, intended to house scientists for the duration of WWII that was predominantly home for R&D in nuclear, aerospace, plastics, acoustics, and electronics (Campbell, 2017). Despite violating fire codes (it was exempt in time of war) it survived a further 55 years and became known as "The Magic Incubator", spawning 9 Nobel Prize winners, the "atomic clock" and the founding of Bose Acoustics before its demolition in 1998 (Degroof, 2021).

Fig 82 MIT Building 20 firstly in the post-war era, and secondly during demolition in 1998.

But B20 incumbents also acted with free will, disrupted authority, pulled pranks, and hacked systems beyond what was institutionally acceptable, even hanging a large "MIT Deactivated" banner from the building when closure was announced, and signs in the rubble stating B20 was still standing, merely concealed by an all-new "invisibility cloak".

The construction, disruption, and researchers were exposed to in B20 multidisciplinarity (Smith, 2017) might have been little more than the "happy accident" of an un-loved building used as an overflow for projects that did not fit elsewhere on campus. But B20 alumni accounts (Beam, 1988; MIT, 1998) are significant to the Foundry design as they speak to how the building affected their behaviour. B20 was loved by incumbents who felt they had the agency to knock down walls, punch out ceilings or otherwise transform the space to suit (Beam, 1996; Peterson, 2011).

While disruptive activity may have been due to the temporal (near dilapidated) nature of B20's existence towards the end of its life, it was ground zero to what would later become known as "hacker" culture - long before the dawn of the internet - becoming an early student hackerspace via

Seymour Papert's constructionism (himself a B20 alumnus) spawning hackathons, makerspaces and the game jam movement (Ackermann, 2004; Rosenfeld & Erson, 2014; Stager, 2013).

The Foundry project was successful because we became hackers, disrupting institutional space-making practices, developing the first of what we called "design paradoxes" drawn from a B20 case-study towards our own heterotopia, and a space where students could act beyond their internalised authority.

Foundry Phase One

The Foundry's industrial theme featured wood, iron and other upcycled items symbolic of the past with bold angles, and a neon yellow sign reminiscent of molten metal. Galvanised trunking, brushed steel surfaces, copper mesh, wooden flooring, scaffolding, chains and bulkhead lights completed the effect.

Phase one design principles were as follows:

1. Distressed, old, unfinished surfaces – fostered project constructionism and productivity (a need to construct and complete). Lowering barriers to ownership and belonging. Despite being less easy to work on, reducing FEAR.
2. A space relevant to technical disciplines, industrial fixtures and heavy furniture; no fixed IT or data cabling; Primarily bring your own device (BYOD).
3. Re-use of old/abandoned hardware disconnected from the institution also reduced FEAR.
4. Hard industrial, formal space that is "open-but-closed" forcing transection of people and projects with intentional "crunch points" as per B20 layout; separate but connected.

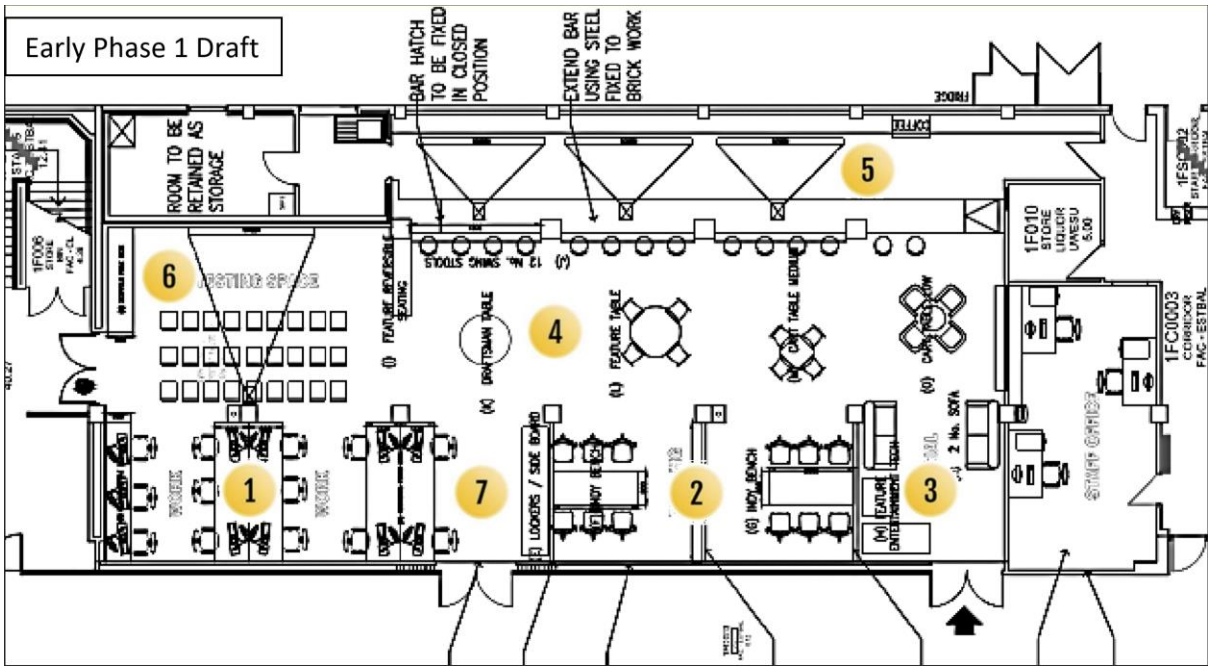


Fig.83 Phase one "activity zones" 1-7.

Zone 1: Five benches of upcycled timber and scaffolding with stainless office chairs.

Zone 2: Two "open but closed" 3x3 metre activity pods, caged with copper mesh.

Zone 3: 86" Microsoft Surface Hub, "car-seat" sofas, coffee table & tea-making station.

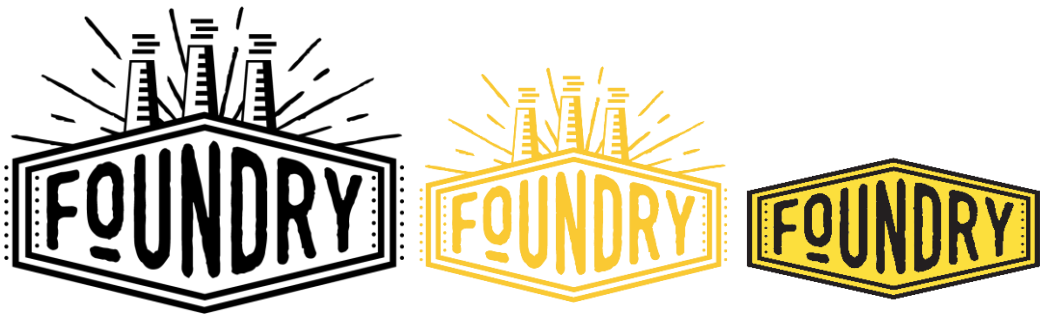
Zone 4: Heavy metal, riveted industrial tables with drop down power for teamwork.

Zone 5: Three bar height booths, stools running along the former bartop. Each with 50" TV.

Zone 6: Presentation corner, 12 x stacked tolix seats. (Became Surface Hub with no fixed seating).

Zone 7: Two upcycled car plant workstations for 3D printing, electronics & hardware work.

I designed the logo and worked with a company to create a rusty cage to protect the neon tubing. The neon was a centre-point of the space, and was eye catching once illuminated, triggering a string of conversations about ownership of the space (negative) and involvement with the project (positive). I also co-designed the factory lighting for the space, which offered a significant cost-saving compared to preferred-supplier alternatives.



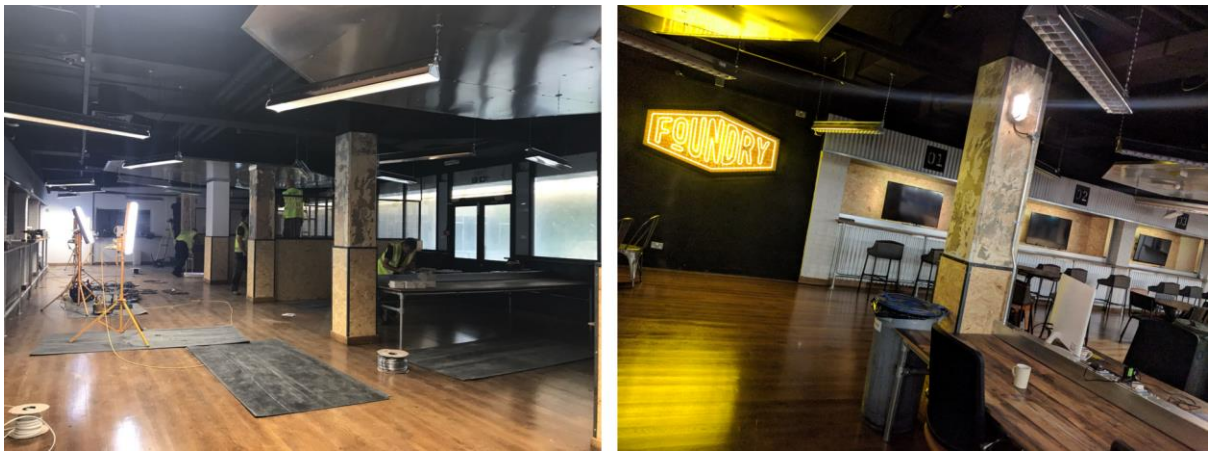


Fig.84 Stainless ceiling baffles, offset lighting, intentionally "distressed" constructionist surfaces.

A high degree of proactiveness was required to secure approved university contractors who could undertake the project on time and to budget. By phase one completion, only the "air ministries" cast iron tables had been rejected by estates on the grounds of health and safety (deemed too heavy to unload). This would be addressed along with a significant design update in phase two.

Fig.85 Sketch and subsequent render of Foundry mural for phase one (demolished during Phase 2).

Foundry Phase Two

Phase two introduced new zones made possible by removing the rear and side walls. More open-yet-closed spaces and increased design paradoxes (industrial/homely, open/closed, high/low and playful/serious) were implemented. A playful meeting room disrupted the notion of "serious business" which included a secret arcade and bowling alley conference table. A relaxed space was added to balance out the hard surfaces of phase one. A small lounge and quiet working room along with a kitchen was also added.

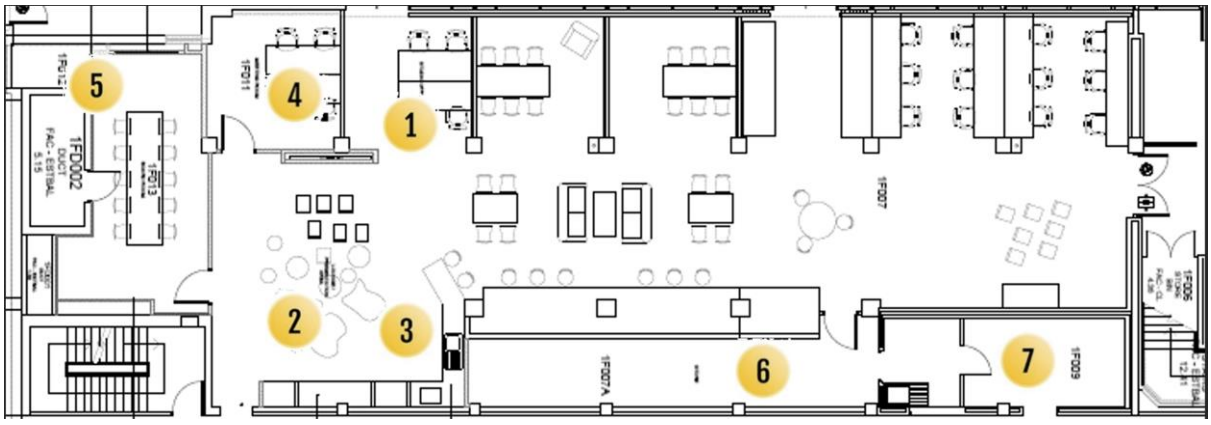


Fig.86 Phase two added seven ground floor zones and a 1st floor cyberspace.

Zone 1: New lounge area with steam crane mural, printing facilities & maker space unit.

Zone 2: Soft / Chillout work area with beanbags & Surface Hub "kennel" for presentation.

Zone 3: Fully featured kitchenette with fridge, microwave, sink, dishwasher and storage.

Zone 4: Quiet flexible working room for resident staff / students / stakeholders x 2.

Zone 5: Boardroom w/ table made from bowling alley deck, atop forge base plus arcade.

Zone 6: Foundry projects storage area, featuring rapid racking for misc. hardware & supplies.

Zone 7: Acoustically treated room for quiet or noisy projects; drones, 3d printing or audio.

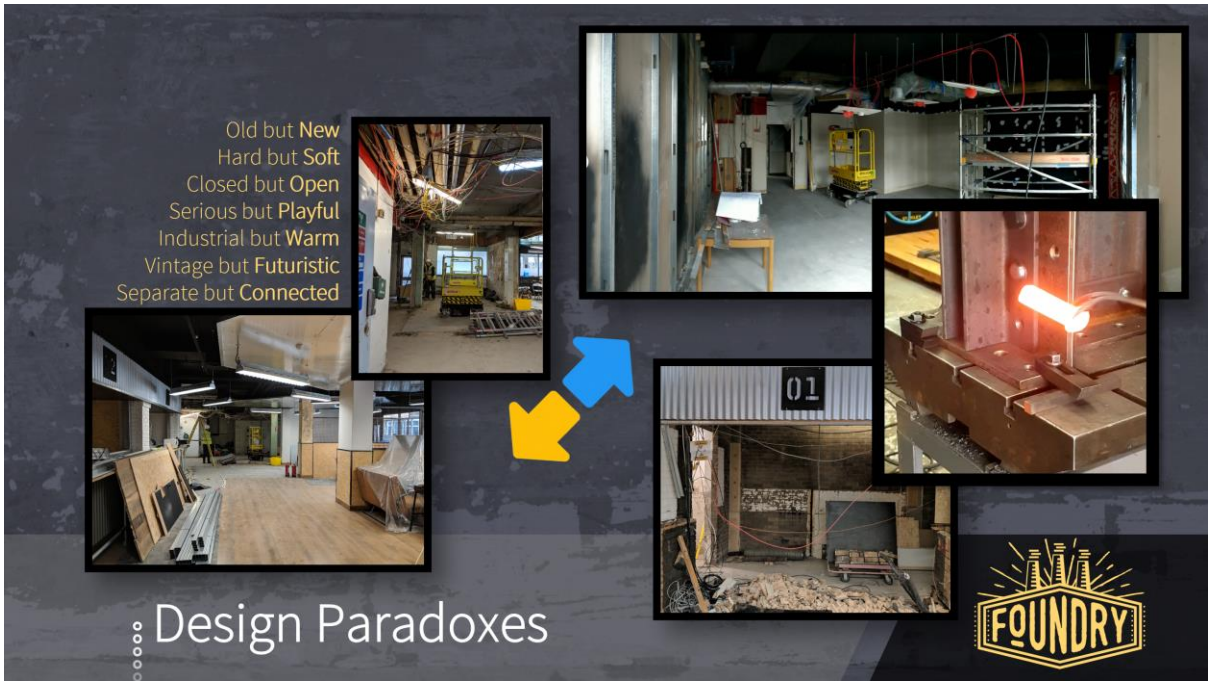


Fig.87 Conference presentation slide, listing phase 2 design paradoxes.

The boardroom was the centrepiece of phase two, featuring a replacement for the two air ministries tables rejected by estates during phase one. Our design was playful yet industrial and “safe but dangerous” (Crawford, 2003) manufactured using traditional techniques which could be transported and assembled in sections.

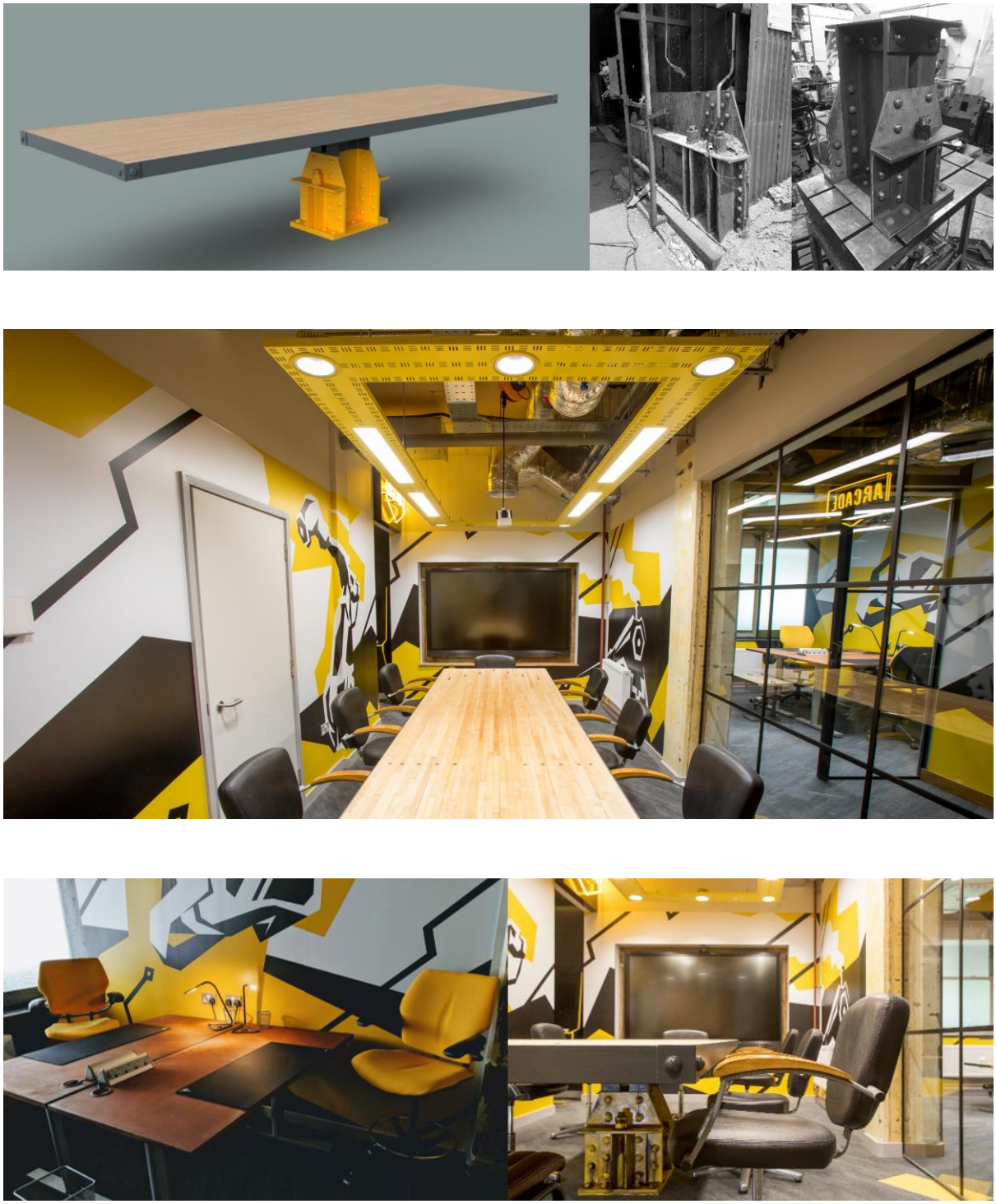


Fig.88 The Boardroom table (design & installed) plus quiet working area.

There were many more challenges to the completion of the Foundry (beyond those of converting a 1960s building containing asbestos) than can be discussed here. But the most significant was the extent to which academics were viewed as high-risk to project success or as untrained lay people with no perspective to lend. A great deal of time was required to maintain conducive relationships.

Other issues included the potential encroachment of institutional signage and the erosion of the Foundry's aesthetic, as the contractor was picked up by estates to create other campus spaces due to the success of the Foundry. Despite these risks, phase two completed on schedule and was opened by Jacqueline de Rojas, president of TechUK, and Chris Skidmore, the then Universities Minister in 2019.

Fig.89 Jacqueline de Rojas (President techUK) & Chris Skidmore (Universities Minister) meet Foundry interns.

Video Files & Links

	Video Filename	Unlisted YT Link
1	GGJ2019 Foundry Global Game Jam Trailer	https://youtu.be/VSHpL_RyeWk
2	GGJ2020 Foundry Global Game Jam Trailer	https://youtu.be/Q3Hr_2ajhAU
3	Trabant Timelapses	https://youtu.be/F2mxxsVp7t8
4	Tarpan Timelapses	https://youtu.be/sa7yucEJY44
5	Tatra Timelapses	https://youtu.be/oAtA4SWF1lY
6	Tico & Bob Ross Timelapse	https://youtu.be/iAA5ctYf3JI
7	Twitch Stream Timelapse	https://youtu.be/QeIhFdCw1Js
8	General Foundry & Teams Timelapse	https://youtu.be/JigqkznbPOM
9	Drawing Competitions Timelapse	https://youtu.be/pKVpuAAw0SQ
10	Trabant POV Video Sample	https://youtu.be/0GrFjr4fMuY
12	Tarpan POV Video Sample	https://youtu.be/7VJtGy3nS5M
11	Tatra POV Video Sample	https://youtu.be/oAtA4SWF1lY
13	Tico POV Video Sample	https://youtu.be/j8ZCqqi8v40

Key Assumptions of Reflexive Thematic Analysis:

1. Unbiased or objective knowledge generation makes little sense within reflexive TA. Researcher subjectivity is the primary tool as knowledge generation is subjective and situated. Subjectivity is not a problem to be eradicated, but a resource for analysis.
2. Analysis of data cannot be accurate or objective, but it can be weaker (e.g. unconvincing, shallow, superficial) or stronger (e.g. compelling, rich, deep, nuanced).
3. Good coding can be achieved alone or through collaboration
4. Good quality codes and themes result from a). Immersion and depth of engagement; and b). giving analysis some distance (takes time, even taking a break from the process).
5. Themes are patterns anchored by a shared idea, meaning or concept. They are not summaries of everything about a topic.
6. Themes are analytic outputs, built from codes (which are also analytic outputs), and cannot be identified ahead of the analytic process.
7. Themes do not passively “emerge” from data. They are actively produced by the researcher through systematic engagement with, and everything they bring to, the dataset.
8. Data analysis is always underpinned by theoretical assumptions, and these need to be acknowledge and reflected on.
9. Reflexivity is key to good quality analysis; researchers must own their perspectives.
10. Data analysis is conceptualised as an art not a science; creativity is central to the process, situated within a framework of rigour.

(Braun & Clarke, 2021, p.8)

Foundry Global Game Jam 2019 Submissions

Country Road

Country Road is a Wild-West-themed, cooperative multiplayer semi-infinite runner game. Each player controls a horse all of which are pulling the same caravan back home. Working together they must...

Crustate Agents

"Need a new crabitat in a pinch? Don't shell out, scuttle down to Crustate Agents! Our experts are dedicated to delivering your dream decapod dwelling, at a price that won't leave you...

Dash and Dodge (D.a.D)

You play as a father who leaves to get cigarettes but never comes back. D.a.D is an infinite runner where you dodge oncoming traffic, pick up cigarettes and milk and get as far away from your son...

Finding Home

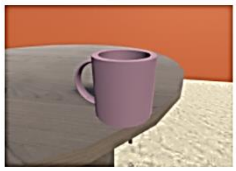
A game based on the theme "What does home mean to you?"

Get Juan Home!

Get Juan the Penguin back to his igloo! and grab fish along the way!

Haze

A story driven puzzle walking sim in VR. Follow our main protagonist as he re-discovers what's most important to him. Figure out his story from within a mental realm and learn why he needs to...



Home Catastrophe

You are cat, your owners did not give you your favourite treats in a while. Time to make them pay!

Homeward

Flock this! We're going home. For most of us, nothing beats the feeling of coming home after being away for a while. For no one is this more true than for the mighty ducks, who along with...

JazzCat

A spherical JazzCat tries their best to collect spherical fish. Literally . A prime example of why game programming and design should be left to game programmers, not musicians. Press M to miaow.

Leave Me Alone

From the studio that brought you "Please Don't Take My Lunch Money", a new adventure awaits in which pests are coming to steal all your hard earned cash right from your home! Use your...

Manic Mumday

You are a mum hosting a dinner party. There are many chores around the house that need to be done. Get the house ready in time for the guests arriving!

Moving Day

Assert dominance over your new housemates by making a house a home, your home. An up to 4 player party game where you try to move as many of your items in the house as possible all while keeping...

Owlina!

Owlina has to juggle her newfound motherhood with her survival skills as she stays at home to ensure her eggs are warm, but also ventures out to sate her belly! A single-player game about eating...

Princess of Light

A brave princess saves the world from eternal darkness.

Roast Royale

A fast-paced pick-em-up where you compete against your family to acquire the optimal roast dinner! Use improper table manners such as grabbing food with your hands and underhanded tactics like...

Sibling Suckerpunch

Reminiscent of fighting with your brother, in this 2.5D 2-player brawler you need to fight it out without destroying too much of your room! If your mother hears too much havoc she'll tell off...

Spun Together

What is a home? A home is built, and we all build them differently. Some build their home with a large family, others fill it with feelings of comfort, such as that feeling you get when you take off...

Stab In The Dark

Last Camper Remaining Wins! Will it be you?!

Stumble Home

Top-down maze of obstacles that cause varying amounts of noise as you drunkenly stumble your way to bed, collide with too many objects, make too much noise and wake your parents then

Taken Away

Taken away is about family, the reason Chris feels home is home. Hes prepared to do anything to get his family back.

The Place Where I Belong

A 2D home defense game, where you must fight off hordes of creatures using only household weapons.

The listing on the previous page includes the 4 jam teams observed during the event. I include links to their games below. To download and play any other games games above, visit the global game jam website: https://globalgamejam.org/2019/jam-sites/foundry-uwebristol-playwest-uwegames-2019/games

Tarpan – Country Road: https://globalgamejam.org/2019/games/country-road

A wild-west set four player horse racing game, where players must collaborate as all horses are tethered to the same wagon.

Tatra – Homeward: https://globalgamejam.org/2019/games/homeward-1

A mobile game where you fly a flock of geese home for the winter, through increasingly periolous worlds of many hazards such as wind turbines and volcanoes.

Trabant – Sibling Suckerpunch: https://globalgamejam.org/2019/games/sibling-suckerpunch

A nostalgic game about sibling rivalry (bedroom fighting), the twist being, make too much noise or mess your room up too much and your mother will come tell you off.

Tico – Moving Day: https://globalgamejam.org/2019/games/moving-day-3

Assert dominance over your new (student) housemates. 4 Player game where you win by keeping your things where you want them, and removing all other items from the house.

Interview Schedule & Opening Questions

Interview	Max Duration	Time/Date	Starting Questions
In-jam 1	30mins	22:00 - 24/01/19	Opener: "Tell me about what your team is making". 1. Engagement - How have you been using the Foundry space so far? 2. Behaviour - How is the team working together? 3. Flow – anxiety/apprehension How are you feeling about the tasks ahead of you?
In-jam 2	30mins	10:00 - 25/01/19	Opener: How is the game shaping up? 1. Engagement - Are you using the Foundry space differently today compared to yesterday? 2. Behaviour - Have any sub-teams or specific responsibilities emerged? 3. Flow (highs) - What have been the most energizing moments of the jam for your team so far?
In-jam 3	30mins	22:00 - 25/01/19	Opener: How has the scope of your game changed since Friday night? 1. Engagement - Are you planning to make any adjustments to how you are using the space ahead of the final sprint / crunch tomorrow? 2. Behaviour - Has any of the team been doing anything completely new? How have you been getting support for this? 3. Flow (lows) -What have been the most critical moments so far and have they changed the course of your jam
In-jam 4	30mins	10:00 - 26/01/19	Opener: How do your team feel now on the final day? 1. Engagement - Freeform 2. Behaviour - Freeform 3. Flow - Freeform
Post-jam 1	5mins	19:00 - 26/01/19	How did the Jam go? How are you feeling? How was the Foundry?
Post-jam 2	60mins	14:00 - 27/02/19	1.How was the Foundry different to previous places you've jammed in? 2. Looking back, what were the most standout highs and lows of the event for you? 3. What role did Flow play in your team between these highs and lows? 4. Did you learn any new skills / anything new? 5. Do you think the Foundry positively or negatively affected the overall outcome of your jam? 6. When you think of GGJ2019 what do you think of? 7. Did this event make you feel connected with anything? If so with what? 8. Is there anything I've spoken about (or not) that you'd like to say something about? Anything else?

Draft game jam interview timetable

Jammer Conversations About Foundry

NB: If is from these conversations jammer perceptions of the Foundry are developed during the fieldnote reports of Chapter 7. Each set of team conversations is ordered here by the respective themes of their feelings to the space.

Productive Space

Team Trabant (mid-jam):

Ziguli: *I mean when I walked in, personally, this morning, I just thought to myself "Let's do this, let's get on with it." I'm excited to get on with it and just produce something.*

Lublin: *There was no negative connotation when we walked in. There was no dread to it. It's not like, "Oh my God, now we have however many hours to finish this." It's just very chill, let's just get on with it kind of thing.*

Dacia: *…I felt like I actually want to go there and do it, like I felt like I wanted to go and spend all day there and just do the Game Jam. Whereas in other times, it's been kind of like, "Oh, I've got to go in and do this.", It's something I have to do and not something that I necessarily want to do.*

Mikrus: *There were quite a lot of us tinkering away through the night. Whereas I'm pretty sure if we'd been in a lab pretty much everyone would have gone home.*

Team Trabant (post-jam):

Lublin: *I found when I was walking in the Foundry it very much switched my mindset to a productive one. You have this idea of you're in this space, you have to work on this now.*

Skala: *The Foundry felt like a proper workplace.*

Team Tarpan (post-jam):

Ziguli: *…we accomplished a lot as a group in such a small space of time. I think the Foundry really benefited that because we could really be close to each other and really talk things over. If we just had to look over to somebody else's screen, we could. If we wanted to play test, we had the spare screen, ready to go, so we didn't have to disrupt someone's workspace to move everything around to try that.*

Gacek: *…in previous jams we've stuck to our group and that's been it. But this time I think we branched out a bit more and collaborated a bit more.*

Constructionist Space

Team Tarpan (mid-jam):

Ziguli: *It's kind of weird but the raw look of the room that looks like it's almost been constructed out of weird bits and bobs, it almost makes me think about making things. I suppose that works with making games, makes me think constructively, I suppose.*

Lublin: *It brings out the fact that you're doing this outside of educational- not educational, but you know what I mean, it's not a formal education. It's like you're doing your own thing, you're in this new area, it's very different. You feel very much at home I feel.*

Dacia: *It feels a lot more informal than being in a lab, like when you're in a lab.*

Beskid: *Yes. There are way more people walking around, just talking to each other and mingling, than in other groups. In 2Q24 everybody's just sat in their sep-*

Gacek: *It's segregated.*

Beskid: *Yes, there's no reason to walk around.*

Smyk: *And it's a line of computers…*

Beskid: [The Foundry] *It's much more open than the other lab settings, where it's just rows and rows of computers. And in that sense, the different rows split the room up into different areas. Where you kind of stick to your row, at best. Whereas this one, people walked around the whole space instead of just a particular area.*

Zaz: *Yes. [Here] It's like you're in a living room if anything, but like a working living room [but] instead of like a TV it's a whiteboard!*

FEAR-less Space

Team Tarpan (mid-jam):

Skala: *We could just literally lay it out how we wanted to do and some of the other places I've done game jams and haven't been able to do that.*

Smutek: *It's definitely nice having the free spaces on walls and stuff to just stick ideas on and a decent amount of just empty space to fill with our shit.*

Skala: *And there's no one in our way either…*

Team Trabant (mid-jam)

Zaz: *Like it doesn't feel like you're not allowed to eat [like] in the lab; You're not allowed to drink in the lab.*

Smyk: *There's not a poster saying, "No food or drink here," and stuff like that…*

Team Tatra (mid-jam)

Mikrus: *It's informal enough, but also caters to productivity really well.*

Team Tico (post-jam):

Zastava: *[Our workspace] was kind of like "…" a blank space that we had. I think if we had dry wipe markers we would have been writing on the window as well.*

Team Tarpan (post-jam)

Lublin: *There's no one to tell us off.*

Ziguli: *It was GO NUTS! Rather than you can do stuff but don't do certain things, like with post-it notes, I wouldn't even consider putting them on the windows [in a lab], you'd be like, "I'll mess up the window, I don't want to do that." It's like, "Go for it, just whack it on there if you want, just do anything."*

Nurturing Space

Team Tatra (post jam):

Maluch: *It's actually quite nice to see people going to each other and trying to have a chat, and seeing what other people are doing. I think that's actually quite a good thing.*

I did a couple of walks at night. I approached other groups to ask what they're doing. I gave them some advice. They showed me their progress, so I tried to reach out to some other people, obviously if I have time. It's actually very easy to approach someone and ask them to play test the prototype.

…with people sleeping in the Foundry, the other people working just tried to be quiet as well.

Gacek: *Yes. Maluch was sleeping behind me and I was just tapping on with my work.*

Maluch: *Yes, even [other] people in the Foundry, everyone, we took care of everyone. Maybe not actually knowing that we do that, but we knew that there were other people and we took care of each other, basically.*

Beskid: *Yes. Especially in the later stages of the game jam. Usually everybody starts to get a bit sad and a bit not happy and fed up and annoyed, but that happened a lot less.*

Maluch: *Yes, people take care of each other as well. Gacek was asked whether he was alright.*

Gacek: *We kind of hit our milestones.*

Maluch: *We forgot about the lows.*

Team Trabant (post-jam):

Smyk: *Best jam ever probably.*

Caro: *That was fun.*

Smyk: *The most relaxing jam and actually got a really good thing out of it. Far better than the previous ones, to say the least.*

Configurable Space

Team Trabant (post-jam):

Zaz *We had a really chilled area and we worked in our space like that (Trabant – Linear-transect). And then you looked over to the second team and they had it [configured] differently as well.*

Smyk: *Yes. Theirs was a lot more enclosed (Tarpan – Perimeter)*

Zaz: *Yes, theirs was a lot more […] and they had like a table, and then [a team] all sat around one single table (Tico – inward circle). [another] team had a long table there and a table in the middle (Tarpan – Perimiter). They didn't all sit around one, and then the [final] team […] had like rows. I think that's what make- it was very unique, each working space, and I think that gives you like more possession over your space.*

Smyk: *Yes. It feels like this one is unique. Well, a lot of other people also felt their little area was the best.*

Zaz: *…it felt like home for those two days, and everyone got that same feeling. They were like, yes! This place actually felt like a good workplace, but then it didn't feel too formal, like you could go in their work and talk and chat and then it didn't feel like stressful. So that's why everyone must have thought their section was the best.*

I think if we went in [to jam] again and had a different workspace, we would probably say that one is better because you sort of make it your home over the two days and you get a connection to that.

Team Tatra (post-jam):

Maluch: *My bed was made out of three chairs. I used the black sheet [curtains] with a UWE Bristol logo as my pillow [from outside Foundry]. There is also a shower behind the Foundry, next to the cycle hub. So yes, I basically had everything in here. I had my milk in the fridge, I made myself breakfast in the morning. So it was basically a second home for me for three days.*

Preferential Space

Team Tatra (mid-jam):

Maluch: *I think it [the Foundry] also has quite a motivational factor. The first game jam I did "…" we were working that in the Games Tech lab and it felt like we were doing coursework.."*

Gacek: *I think I definitely prefer it to being in a lab. Just the more open area. It's less stuffy and just way more relaxed.*

Mikrus: *Yes, it's less formal…*

Maluch *I couldn't imagine working in another space, because it's so comfy, it's so cosy. You have people around you, so it doesn't feel at all like a uni lab, which is perfect.*

Team Trabant (post-jam):

Zaz: *I think of the [games] lab, everything is the same. All the rows are the same. All the computers are the same..*

Ziguli: *The labs are nice for working on your own, but with the ability to move things around as well rather than the rigid straight lines of computers, it just gives a lot more flexibility of that. I like that.*

[Foundry] *It just gives you a fresh new space, even if you're in there a lot you can just move the space around and it gives you a fresh new feel to it. It's just really nice to work in.*

Smutek: *It's a bit more comfortable than working in regimented desks.*

Uaz: *I think workflow would have been a bit less"…."if we were working in [computing lab name]. It's a lot better to just work together in this smaller space, I guess.*

Skala *Given the choice...*

Lublin: *Foundry every time.*

Skala: *...Foundry every time.*

Team Trabant (post-jam):

Smyk: *The Works[80] is a bit too harsh […], like the lighting and the space is open but it kind of feels a bit too open because the ceiling is like incredibly high.*

Zaz: *I've not used it so I can't really say, but from looking at it, it looked like just another library workspace.*

Smyk: *It's a bit nicer [than other library spaces] though.*

Dacia: *It's got better-*

Smyk: *Because the tables are far larger.*

Dacia: *It is newer though.*

Zaz: *Yes, it's got like- but it reminds me of working in the library last year. That's what I-*

Dacia: *It's just another computer lab. There's nothing else to it. It looks prettier, but it's still just a computer lab*.

Smyk: *Yes, doesn't have the character.*

Dacia: *It's got a lot of natural light in though. I like that.*

Smyk: *Yes. I love artificial lighting as well.*

Dacia: *True. Anyway, the point is the Foundry is better. if I went [computer lab name], I wouldn't feel like I can actually configure lightings or all that.*

Zaz: *Yes. We could do that in the Foundry as long as most of the teams agreed and we could just turn down our section of lighting, which did happen. Like one team turned*

[80] The "Works" is a sister space to the Foundry, that occupies the floor above it. It was built using standard institutional processes and did not harness the design paradoxes of the Foundry. Since the study was undertaken, the Foundry has now converted some of this floor into heterotopic affinity space for hacking.

down all the lights and it was like everyone all found it better. But I feel like in the [computer lab name] you couldn't really do that.

Zaz: *…because we were all doing the Game Jam, or it was like we were all in a similar boat. And it's like when it got later people were getting more rested so we needed to turn down the bright lights.*

Team Trabant (post-jam)

Lublin: *It was clean, it wasn't smelly. It was nice to work in.*

Ziguli: *It felt like our own little private sanctum where we could work away rather than being mixed in with everybody else.*

Lublin: *I found when I was walking in the Foundry it very much switched my mindset to a productive one. You have this idea of you're in this space, you have to work on this now.*

Uaz: *I think workflow would have been a bit less … if we were working in [computer lab name]. Usually in [computer lab name] everyone's separated*.

Skala: *The Foundry felt like a proper workplace.*

Skala *Given the choice...*

Lublin: *Foundry every time.*

Skala: *...Foundry every time.*

Ziguli: *I just felt like we accomplished a lot as a group in such a small space of time. I think the Foundry really benefited that because we could really be close to each other and really talk things over. If we just had to look over to somebody else's screen, we could. If we wanted to play test, we had the spare screen, ready to go, so we didn't have to disrupt someone's work space to move everything around to try that.*

Skala: *And there's no one in our way either.*

Ziguli: *Exactly, there's nobody else, it's just us.*

Skala: *Somebody warded off our cubicle, we didn't have to interact with other groups unless we wanted to.*

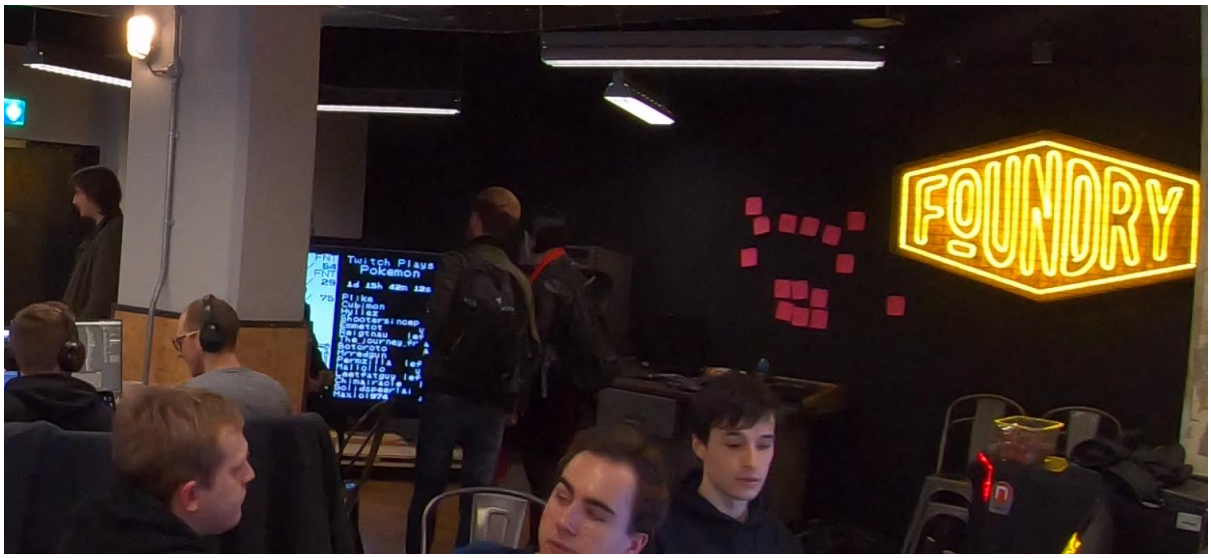
Ziguli: *Yes, exactly.*

It felt comfortable. It was "go nuts" rather than "you can do stuff but don't do certain things", like with post-it notes, I wouldn't even consider putting them on the windows, you'd be like, "I'll mess up the window, I don't want to do that." It's like, "Go for it, just whack it on there if you want, just do anything."

Near-Lateral Moments

These two lateral moments are not included in the six fieldnotes of Chapter 7, yet still show some of the important traits of lateral moments as they are not only powerful markers for how "streaming" media was harnessed during the Foundry jam, but also examples of why moments were discarded from further analysis due to reasons of rigour.

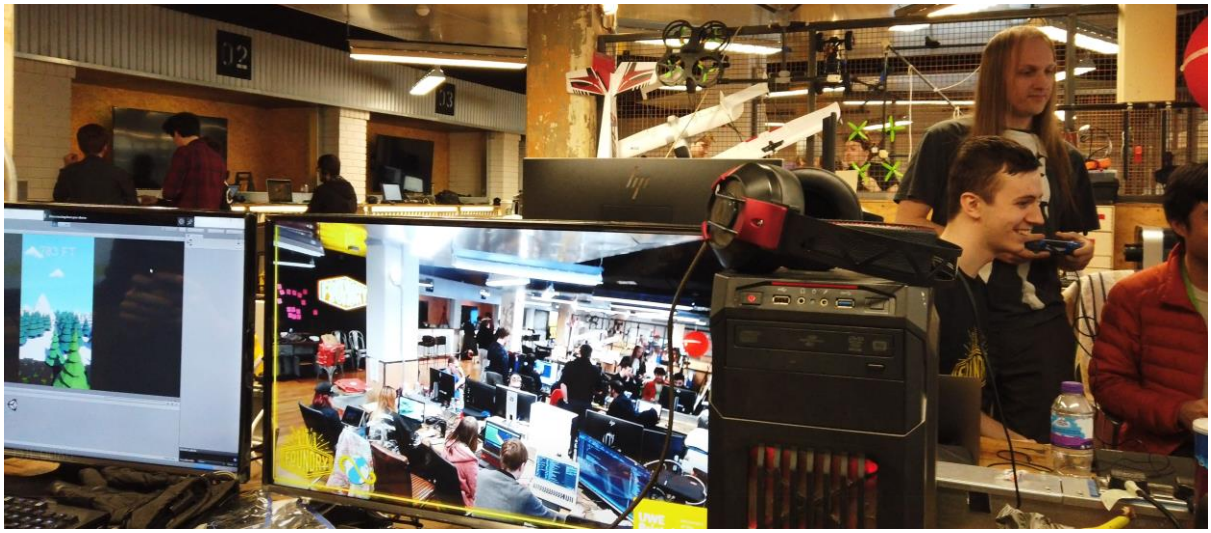
Twitch plays Pokemon- Surfacehub #1



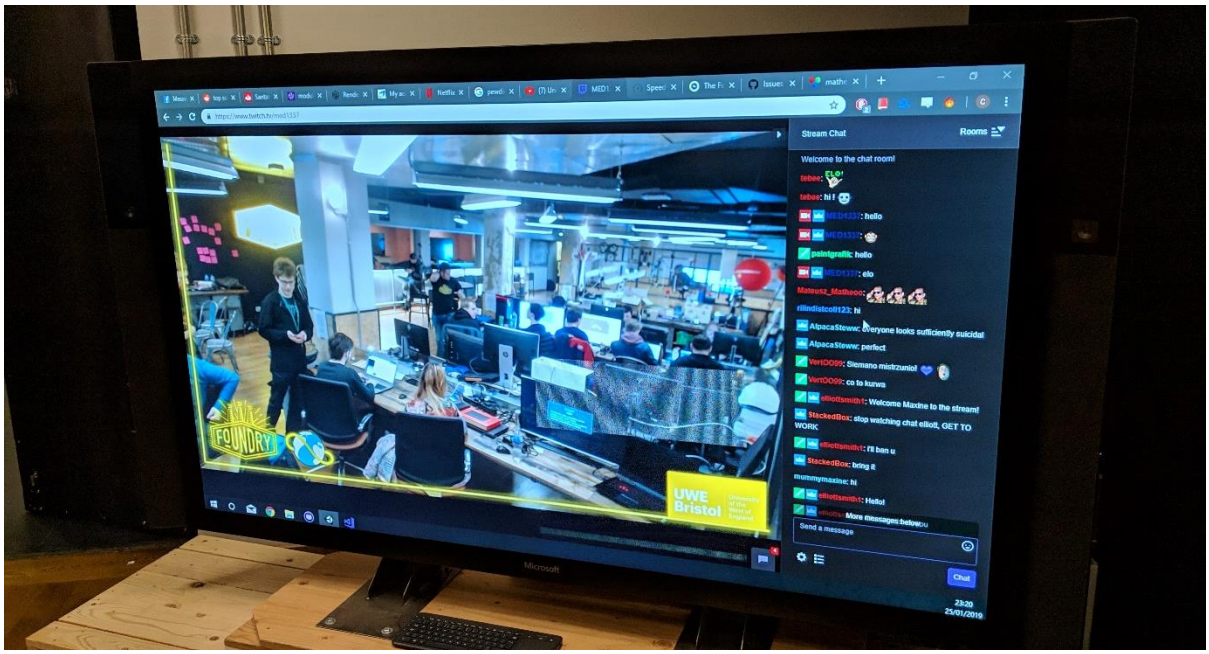
Jammers stop to view a Nintendo Gameboy era Pokémon match being played by a Twitch chatroom audience.

A moment that could not be included due to a lack of substantive jammer responses during the interview was "Twitch Plays Pokemon" on Surface Hub 1. The phrase "Twitch plays" does not mean it is a Twitch "streamer" personality playing and/or reviewing games to an assembled virtual audience in a chatroom. In a Twitch plays, the audence actually plays the game through the crowd-sourcing of opinion as to what action the game should do next collected automatically; There is no streamer personality and the chat room is the player en-masse. From my observation, a reasonable few stopped to watch a Pokemon battle, but it was usually on leaving the Foundry. At least two jammers consistently observed this screen, but it appeared short lived, and the jammers that instigated this particular moment did not attend the final reflective interview. Had they done so, this moment might have added something to a discussion about games played within a game-creation event.

GGJ “Livestream” Surfacehub #1 & Monitors



In keeping with the Twitch stream featuring Pokemon battles summarised above, another jam team nearby had Twitch loaded in a browser showing a view of the Foundry space throughout the entire event. My reasons for not including this lateral moment were perhaps more contentious, especially as the stream featured on both large and small screens, and genuinely appeared to be a means of reflection for one team in particular.



Team Tatra had loaded the Twitch stream of the Foundry jam space onto Surface Hub 1

Had I been aware of lateral moments before interviewing jammers, I would have pressed team Tatra much more over why they had a second monitor showing a view across the Foundry that most prominently featured the backs of their own heads and on a hub elsewhere in the Foundry itself.

The live-stream was available on the GGJ19 homepage, and was fed from a web-camera installed on the entrance wall, which looked towards the centre of the space. It is included as a supplemental or lateral moment as I failed to recognise the significance of this activity at the time, and had even dismissed its appearance as owing to the fact that one of that had helped site organisers get the stream broadcasting at the start of the event. But in going back to look for off-topic activity proximal to flow and re-living this "near-miss", as was common to my aforementioned lateral moments, these events were more profound than they first seemed:

Gacek: *A few of my friends were watching the live stream. So they would say to me, "I didn't see you in there but I saw your team."*

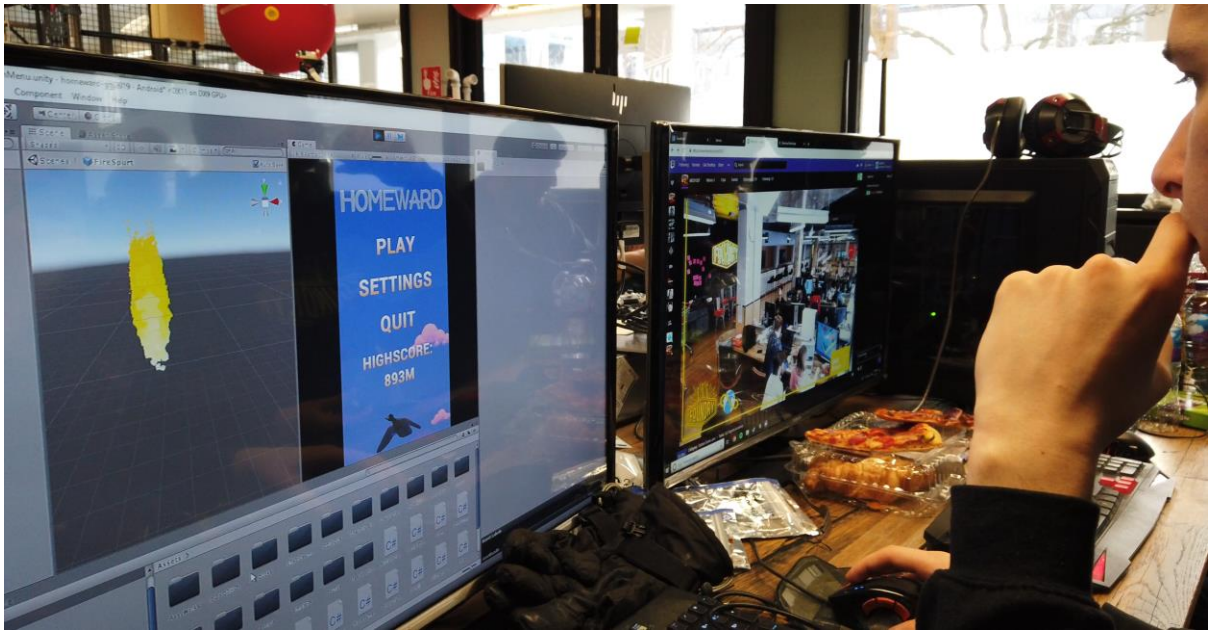
And that was kind of a motivator;

"Oh, I need to get in and join the other guys."

So the live stream was a nice way to monitor what was happening.

Mikrus*:* *Yes, almost like the work is still going but you need to have a little break so that you can recover and then catch up with that work when you get back again.*

It is possible individual reflection was taking place during the live-stream screen-interactions of jammers, and that it was a way to gain a new perspective of their space if not an entirely new world. It was a reflective activity that gained new perspective, and that might have aligned it with the previous technology-mediated lateral moments that were triangulated. But it was harder to identify as "off-topic" activity, as it was not lateral to jam progress and therefore not heterotopic and due to this had fallen short of my gaze during observation and questioning.



After Surface Hub 1 was re-purposed for other activity, Team Tatra ran the stream on a second monitor.

Sample Transcript: Team Trabant

File: **fi8c4573_GGJ19_Research_Group1_TRABANT**
Duration: **1:20:03**
Date: **10/03/2019**
Typist: **835**

START AUDIO

0:00:00

Researcher: Can you tell me how you've been using the Foundry space so far?

Smyk: It's pretty nice because we use one of the tables to set up both of our rigs and this area to brainstorm. We moved the other sofa over to make it more of like a work area and relaxation area, which is nice.

Researcher: And when you said this area, are you referring- to it's…?

Smyk: Whiteboard and sofas.

Zaz: Yes, sofa and whiteboard area.

Researcher: Okay. Right. No, that's good.

Caro: Hopefully I've said everything I need to say.

Researcher: No, that's good.

Smyk: The ghost member.

Researcher: So far, how is the team working together?

Smyk: Pretty good. We've had a few disputes on whether we should make it an isometric or 2D.

Zaz: Yes.

Caro: Yes, that was a bit of a longwinded dispute but we got there in the end with a friendly vote.

Smyk: Yes. Yes. Well, I'm not going to be working on the isometric part as much as these two are so I figured I might as well let them. I'll just let them.

Zaz: Yes.

0:01:12

Researcher: How are you feeling about the tasks ahead of you?

Zaz: It's definitely doable, like the juice of the game will probably be not as great as…

Smyk: Well, it'll take time.

Zaz: Yes, it'll take more time to juice up the game, but like doing an isometric game will definitely give it more room for the characters to work with and the players to play around with, the fighting game.

Caro: Yes, definitely. Definitely feel pretty confident about the task though overall.

Smyk: But being able to write all of the tasks down on the whiteboard and being able to tick each one off as you do it as a lot easier.

Caro: Yes.

Researcher: For the benefit of the tape, it's not one of the whiteboards it's a surface hub.

Smyk: And it's like a 100 inch!

Researcher: Yes, 83 inches, yes. Can you tell me what the team is making?

Smyk: Sure. We're making a brawler where you fight your sibling over playing a game together. When you've destroyed your room too much then your mother comes in and tells you both off and the person who's the most damaged wins, instead of the vice versa.

Zaz: Yes, yes. It basically comes back to the theme, like the home. When we were talking about it we went down the nostalgic route, like thinking back to when we were home and we all have siblings so we all fought with them.

Smyk: Some less than others have fought with their siblings.

Researcher: That's really interesting.

Smyk: For the note, Zaz is the one who came up with the idea.

Zaz: Well, I had five other siblings, so fighting-

Smyk: You're going to fight with one of them.

Zaz: Yes, yes. Fighting happened a lot in my childhood.

0:03:05

Caro: Did you not fight with your siblings?

Zaz: Yes. Well, everyone does.

Smyk: No, no, not really. I had one brother and he was like one and a half years older than me so there's not really that many disputes from it.

Zaz: Yes, my older brother who's like three years older, but whenever we played games he'd always play it and then whenever I'd get a go he'd steal it off me. So it comes back to that.

Smyk: Luckily we had a PS2 and we had two controllers so didn't really ever need to fight.

Zaz: Yes, but you have single player games back, yes. So we went-

Smyk: We only had like 'SSX Tricky' and 'Battlefront 2', so both the best parts of those were the co-op.

Caro: Yes, yes, definitely.

Smyk: So it doesn't make much sense to fight.

Zaz: Yes. That was another thing that brought us to this game is split screen because it's like I remember playing like local multiplayer games, so that's why we're going with a two-player local multiplayer game rather than-

Smyk: Yes. We also want to make it so it supports two controls on the same keyboard because that's the really familiar feeling you have as a kid.

Zaz: Yes, like fighting.

Smyk: Like a free online multiplayer game was always two people on one keyboard.

Caro: Yes. When you get those flash games and stuff, like Tanks and that. Yes, brilliant.

Smyk: Yes. And like one of them is like IJKL for some reason, even though they could just use the arrow keys and one use the WSD, but, no, it's fine.

Zaz: In things it's so relaxed in here.

Smyk: Yes, like the colours are far harsher, far less harsh than the Works or 2Q24, which is-

0:04:52

Researcher: Oh, the colours. That's really interesting.

Zaz: Oh, yes. Oh, yes.

Smyk: Well, it's less harsh because the lights are not as harsh, yes. Less harsh.

Zaz: I think it's like the rustic look in here as well. Like you sit down on these chairs. See, I'm near down this end and it's like nice, soft chairs.

Caro: Yes. They have this nice area to chill out in between work sessions.

Researcher: Did you come straight for this area when you came in? What was the plan?

Smyk: This was the only area left, but we managed to make a- I took one of the tables and moved it over to the wall to make it into a better area.

Researcher: Yes. I noticed you moved the sofa sort of halfway between the metal table and the surface hub.

Caro: That was Caro because he wanted to work in-

Caro: Oh yes. So I was originally working here on my own and the other two were over there, so I thought, "No, it's too far away from the rest of the team."

Smyk: Well, it's nice to work in a, like…

Caro: Yes, work in a small group, like close together so you can talk and everything.

Smyk: Because there are similar other workspaces like the industry.

Researcher: Okay. Fantastic guys. I will catch up with you, maybe before this but in about 12 hours' time.

Smyk: Perfect.

[CONTINUE TALKING ABOUT MULTIPLAYER GAMES]

Zaz: And they would actually punch me in real life if I've got the controller and then he would kill me back. He would actually punch me to make me drop the controller.

Caro: Yes. When 'Halo 3' came out, me and my cousins and my brother used to play four player on a screen that big and just play four player split screen. Everyone would sit like really close like that, and like if someone is winning you'd just slap the controller off.

Zaz: Yes. That's like the big TVs in like ___[0:06:30] room.

Caro: Yes, yes, yes. There were a few of those.

Zaz: We had to do that too. We had a rubbish TV and you're playing in this tiny little corner.

Caro: Yes, it was like that big.

Zaz: And you had to be this close to each other so we'd get right into each other's area, like space.

0:06:50

Researcher: I can't help but notice that we have Bob Ross painting at the bottom. He's painting landscapes. We have a train going across Slovenia which is just in front of you and you have the warmth of a roaring fireplace.

Smyk: Well, we had a spare monitor so we figured might as well put it to use and juice out with it.

Researcher: But, I mean, I'll ask you my formal questions in a minute. This is kind of a supplemental first then, as you mentioned the fireplace. What practical function do you think it's serving for the group?

Zaz: Well, it's relaxing.

Smyk: Yes. Same purpose as the entire room really.

Caro: Yes. It's just a nice vibe to everything, just makes you feel relaxed and chilled out.

Zaz: Yes, yes. You zone out, yes. You look at it and you can zone out and you just think, like catch up on like- it's like I find when I go in the shower I think more clearly about my code and I normally come up with solutions. It's a similar effect of that.

Caro: Yes. When you need to take a break from coding, you need something to look at rather than more coding or like screens and just like something that's not a plain wall is quite nice.

0:08:01

Researcher: Yes. I think that's really interesting. I think another similarity I've noticed is that you've got- for the benefit of the tape, you've got the fireplace. You've got your own screens, but you've also got the surface hub displaying, at the moment, a to-do amongst other things. I think that's interesting because the other group has also got the train and the deadlines at the end of the Jam, so there's something in that kind of, "This is what I've got to do. This is something nice to look at," you know? An offset.

All: YEAH, yeah, agree.

Zaz: And I looked at the timer a couple of times to see how much time we had left, so I've been using that too.

Smyk: This one isn't as stressful either though because as you tick things off, it becomes a more pleasant experience.

Caro: Yes. Like personally I don't like the timer.

Smyk: Yes. That seems a bit too like…

Caro: Because like especially when you haven't got much time left, you'd be like, "Oh, no," looking at it."

Smyk: Yes, that seems like more of a deadline than just a, yes, having fun because you never have a timer when you're having fun.

0:09:09

Researcher: So in general, how is the game shaping up now? It's 12 hours since we last spoke.

Smyk: I'd say we're on track.

Zaz: Yes, we are. We have assets now from Smyk and we have animation sorted, menus sorted, UI. We have the basic mechanics of the gameplay, so punching. We've just got to merge them all together and get it a bit into a game now.

Researcher: Are you planning to use the Foundry differently today compared to yesterday?

Smyk: No, I think it's working for us how we are using it now.

Zaz: Yes. Yes, definitely.

Researcher: You kind of answered this one already when I asked about, how is the game going? Have any specific sub-teams or responsibilities emerged since we last spoke?

Zaz: Well, yes. When we started the Game Jam we just decided to go into separate parts where we don't have to worry about two people working on the same bit of code.

Smyk: Yes. Certain components are dependent on other components, and that's how we delegated it.

Zaz: Yes. Same with the menu and the UI. We wanted a similar theme throughout the game. You delegate that to one person, yes, and they can keep it.

0:10:29

Researcher: Okay. What have been the most energising moments for the team so far?

Smyk: I'd say after we jotted all our ideas down, settled on a thing, broke it down into components and then said, Carois doing this. Zazis doing this. I'm doing this," then we all got onto working.

Caro: Yes. We all worked or knew what we were doing, knew what we had to do. We just got to it.

Zaz: I feel like once we actually see the gameplay and the animation together, that's going to be another point which is going to be an energising moment.

Caro: Yes. Yes, definitely.

Zaz: But, yes, that's going to happen at some point today.

Caro: Yes. Mixing in the art assets with the gameplay will be really nice. It's always satisfying when that happens.

Smyk: Yes, like seeing some of the weird ping-pong-like twists is like nice.

Zaz: Yes.

Zaz: I think we all got a good night's sleep because we wanted to have a long day today to get most of it down. We want to get the game finished by today.

Smyk: Because you don't want to be running out of steam on this day. You want to be well-rested, so yes.

Zaz: Yes. It's like the majority of your time in the Game Jam.

Caro: Yes.

Smyk: Plus if you go home and rest today then you're more refreshed on the components that you're going to be working on and the ones you have been working on, so it's easier to get a bit of rest spent from that.

Researcher: Thank you very much.

0:11:56

Researcher: Okay, so 12 hours since the last questions. How has the scope of your game changed since you started?

Smyk: Not at all.

Caro: Not really, no.

Zaz: No, no.

Researcher: So that's a positive indication of…

Smyk: Planning.

Researcher: Group direction, yes.

Zaz: Yes, good planning.

Smyk: I made sure we were in this fixed.

Researcher: Okay. I noticed is that you move around quite a lot but you're moving around between these kind of slightly two different spaces. So you're connected, but it's interesting, you're moving a lot but in a smaller spacE?

Smyk: Yes, it's enclosed.

Researcher: You're moving a lot but it's in a smaller space. So I guess that leads into my first question, which is, are you planning to make any adjustments for as you move towards crunch?

Smyk: We'll probably make a crunch list like of all the tests that we need to have done.

Caro: Yes, I feel like priority lists, sort of thing.

Zaz: Yes, priority lists.

Smyk: Yes. We'll probably try and put down all the ways we can juice the game and just do as many as we can.

Caro: Yes, that's true. That's a good idea.

Smyk: Yes. Also we need to implement the audio when we get the audio.

Researcher: Okay. And are you sitting in roughly the same place because of your rigs and things like that, or are you moving around?

Dacia: I think we're staying in the same places really.

Smyk: Yes. I think the change is that Dacia is on the sofa.

0:13:11

Researcher: Okay. You had the fire on before. Now you've got these kind of, I mean for the benefit of the recording, infinite, abstract kind of-

Smyk: Yes, surreal art.

Researcher: It's probably got a proper name, but the kind of almost fractal image.

Dacia: It's called the infinite zoom-in, right?

All: Yes.

Caro: The infinite zoom-in, yes.

Researcher: Okay, infinite zoom-in, but you've got music now as well.

Zaz: Yes. That's more- that's the video to the music.

Smyk: Yes. At the start it was really distracting until we realised it looped, and then just lost interest.

Researcher: Is it conducive to your working, and if so who for and how is that working?

Dacia: I think most of us listen to that sort of music in the background when we do work anyway, so we're kind of used to it.

Zaz: Yes. Sometimes it is like when I'm sat there and I look up and I gaze into it and I just get lost.

Smyk: Yes. Easy way to turn off your brain.

Researcher: Do you think you look up at it when you've just come out of flow?

Dacia: Yes, I personally do.

Zaz: Yes, yes. It's normally at points when I'm there and I'm like, "What do I need to do next?" I look away from the monitor, not at the monitor when I'm thinking.

0:14:22

Researcher: Right, okay. Before we move onto the proper question, has anyone else got anything else to say about the screen that's doing that or any thoughts about it either way?

Zaz: Yes. Yes, I think we mentioned it, but at the beginning it was really hard to take your eyes off it. We wanted to see everything on it, and then once we realised it actually looped, we were like, "Oh, okay," and then-

Researcher: So now how- oh, yes, I've just noticed the Donald Duck.

Smyk: Yes, that's the-

Researcher: How short is the loop or long is the loop?

Smyk: I think it's two minutes.

Caro: But we don't know.

Caro: Well, it's the Donald Duck. That's only been-

Researcher: Mind blown, okay.

Smyk: I noticed the Donald Duck and then I just lost interest about seeing it all.

Researcher: But how long- for the recording again, there is an image of Donald Duck who's on the end of a fishing hook I think or worse.

What is it that do you think that is making you look at it? What is the trigger that makes you go, "Oh, now I'm looking at the TV?"

Zaz: I think every time you look at it, you notice something new. There's so much in-

Researcher: But what makes you look at it?

Caro: It's easy to look at.

Zaz: Yes it is. I look at it. I look up and I'm like, "Oh, I didn't see that the first time around," and then I notice something the next time.

Smyk: Well, you usually either spend time just looking at your work without actually thinking about it, but in this case instead we're just looking at a weird, surreal art piece.

0:15:51

Researcher: Would you say that it's conducive to the overall progress of the team?

Smyk: I'd say neutral because we're going to sit and just look at our screens, so I'd say this is just more interesting to look at.

Researcher: So it's beneficial then.

Smyk: I don't know. Neutral.

Zaz: I think at first it wasn't beneficial.

Smyk: No, not at all.

Zaz: Because it distracted us all and we all sat there, and it's a talking point. So I'm focused on my work, but now that-

Researcher: So it's a "point". Are you saying there that it was a point of focus? Because like-

Smyk: Yes, at the start.

Zaz: Yes. Yes.

Zaz: Yes. We all spoke about it and we were all just mentioning how weird it was and how we wanted it just to end so we could stop looking at it.

Dacia: I would say at first it was not beneficial because it got us distracted from our work.

Researcher: Okay. So once you'd recognised that it was a loop, you tuned it out.

Caro: Yes.

Zaz: Yes, yes, yes, yes.

Smyk: I don't know if being on a fishing hook would be worse than just being hung. I'd say that being on a fishing hook would be worse.

Caro: Yes.

0:16:58

Researcher: Have any of you been doing anything completely new? Have you learned anything new?

Caro: Used the collision matrix to Unity for the first time.

Researcher: Okay. And how did you support getting to grips with that?

Caro: I mean, it was pretty easy. I just did a quick like Unity documentation and I just looked at it and thought, “Oh, wow. How haven’t I used this before?”

Researcher: So more generally, when you want to do something new in Unity, how do you get ready to do that new thing?

Caro: I’d say for me its documentation.

Smyk: Yes.

Zaz: Yes, documentation.

Smyk: Or looking at existing examples helps.

Dacia: Yes, at YouTube tutorials.

Researcher: Okay. How do you find those examples?

Smyk: Just Google.

Dacia: I use YouTube a lot for Unity stuff.

Researcher: Do you confer with each other when you’re looking for these new things before you go and find things?

Smyk: Yes, usually you ask me I guess.

Zaz: Yes, we’ll ask each other.

Researcher: Okay, so you raise that question.

Zaz: I sit next to people I know who I can ask questions because it’s more useful than going online, finding somebody else doing it and then just writing it out yourself.

Smyk: Yes. Because you can’t talk to the person online. It forced everyone to work on a pixel-perfect scale, which was nice.

Caro: Yeah exactly

Zaz: Well, I also learned new things with animation or how to use Unity’s animation system because in previous projects I would use the connection, or in animating it.

Smyk: Yes, the transitions.

0:18:35

Zaz: Yes. I would use the transitions, but I found out that you can actually just cool a state.

Smyk: Yes, set the state, yes. Run time.

Zaz: But I didn’t know about that before. I was always using it like- so I would use a Boolean to make it transition from one state to another rather than just-

Smyk: So it’s a lot easier for things that don’t require a lerp transition like in a lot of Unity effects.

Zaz: I think it’s more beneficial to our game now because it’s all 2D. So like changing from one sprite to another.

Smyk: All of its flipbook.

Zaz: Yes, yes, not the works. But I feel like animation in a 3D sense, doing that it wouldn't look as good because they had like the transition in walk.

Smyk: Yes, to make it more fluid.

Zaz: Yes, 2D you can just jump.

Smyk: Yes, since there's enough of a frame gap your mind kind of fills in the gap.

Zaz: Yes. I wish I knew it was there before.

Smyk: Yes, instead of having to say, "Jumping is true," so now it goes 'whoop whoop' to jump in.

Zaz: The only reason- I just thought there must be an easier way. So I went- this was like at 9:00am this morning. I just went and Googled, "Can you do this?" and then the top guy was like, "Yes, you just do this." I was like, "Oh."

0:19:54

Researcher: So while the time has passed, have there been any critical incidents?

Zaz: I think right near the beginning of the project, me and Smyk , we had like a-

Smyk: Yes. It was the choice of either making it 2.5D or just 2D.

Zaz: Yes, yes, and then I also made a comment on your first piece of art and I said the legs were too thick or something and then you disagreed.

Smyk: Kept on backseat arting.

Zaz: Yes. Yes, which then I didn't do after because a little wobble right at the beginning and then we realised, wait a minute, we're going to be here for like 20-

Smyk: It's been pretty easy really.

Dacia: Well, Caro didn't get that Hawaiian pizza.

Caro: Oh, yes. To be fair, I got that before.

Smyk: He didn't like Hawaiian pizza.

Dacia: That was very…

Caro: That was a bit of a sad moment.

Dacia: You were unhappy about that.

Smyk: It didn't stop him from eating like a third of it though.

Caro: No.

Zaz: If I was there I would hate that. That's my favourite pizza.

0:20:56

Researcher: At one point you were watching ‘Star Wars’ that had been translated into Chinese and then back into English and then dubbed, voice acted over. Now whilst they might not directly relate to your game, I’d like to know a little bit about why that happened.

Smyk: Go on Zaz.

Caro: I don’t know.

Smyk: Yes, I don’t. I wasn’t paying attention.

Zaz: It’s mainly Moskovitch coming around. Moskovitch came around and we started talking about the equipment, the stuff for this hub. He was explaining stuff about it, and somehow we got in a tangent to this full movie he’d found on YouTube. It was like one with the hoppers. I can’t remember the- it was like ‘Star-’ I can’t remember the name. But he was like- we ended up looking it up on YouTube on the big screen. And then it just led on to, “Oh, man, you can get a full fingers ‘Star Wars’ if you watch it translated to Chinese and then back to English again.” So I watched that for a bit.

Smyk: And then that was shortly turned off after Moskovitch was distracting.

Dacia: It was very distracting, yes.

Smyk: Beautifully distracting. Yes, we’ve had a few times where we’ve had brief breaks. It’s like when we did some drawing competitions on the whiteboard or went to the shops together.

Caro: Yes.

Smyk: It’s just time to cool down, which is important.

0:22:36

Researcher: Do you think there’s a type of activity that the screens and these interruptions represent that bring you closer together?

Zaz: I think this is one of the reasons I come into university to do work. Like a lot of the time, me and Smyk would come into uni to do work on advanced technology because it’s like even if you don’t directly work together on the project, there’s somebody there to talk to. Like you’ll talk about stuff. It’ll probably distract you.

Smyk: Yes. It’s similar to like how some lecturers want you to talk your problems to a duck because you usually find out the problem yourself just as you’re explaining it. Similar to that.

Zaz: Yes, yes. Yes, there have been many times when I-

Smyk: Yes, Zaz. You’re nothing but a talking duck to me.

Dacia: It’s just easier having someone like helping you to motivate to do the work. It’s like going to the gym with a gym body.

Smyk: Yes. You lose focus really quickly if you work for so long. Well, they say I think you need a break every hour in studying.

0:23:45

Researcher: Well, your group is oriented to the wall.

Zaz: We're not really distracted by anything else behind us. We're like walled off in our own section, so we look over here. We see this like section here, but, yes, we're not in this section.

Smyk: Yes. We've got our own music. We've got our own visual aids. It kind of secludes us to the rest of the distractions.

Zaz: Yes. I tend not to look at that blackboard too behind us.

Smyk: Yes, because they're someone else's ideas.

Zaz: Yes, someone else's ideas, so I sort of like-

Smyk: It's not help-

Zaz: I don't want to look at somebody-

Smyk: Yes, because it's like a waste of brain power.

Dacia: I think if I was facing that way, I would get really distracted. My friends are on the other side of there.

Zaz: Yes. You would see people you like. You would want to talk to them.

Dacia: Yes. I've only been using mine (screens) for watching YouTube videos. Other than that, I'm not using them at all.

Smyk: You what?

Zaz: Well, yes, I feel like one of the key things to a Game Jam is not to get distracted. Like in any situation, deadlines, all of this. You get on it early. You plan out ahead.

Smyk: You make sure it's manageable, within your ballpark, but you're still extended slightly.

Caro: Yes, because the whole time we've just been pretty confident that we can do it and we're not stressed at all. We've all felt pretty relaxed the whole time.

Dacia: I feel like if this was a project for a module, I would have gone home like five hours ago.

Zaz: I think it also comes down to having a capable team.

Smyk: Yes. Like I've worked with all of you before.

Zaz: Yes. We worked together before and I feel like I- even if they're messing around now, I know that they'll pull it out in the end. We'll make something good.

Smyk: Yes. Like I trust each of you to work.

Zaz: Yes, yes, like if somebody has been-

Smyk: So I don't have to worry about, "Maybe I'll have to do their work as well." I only to have to share my own workload instead of everyone's.

0:25:45

Researcher: If you had not had this team and you'd had a more random team, you hadn't agreed on a team so quickly, would you have still arranged things like they are and would you, you know, in that-

Zaz: Well, I feel like it would change on the people you have.

Smyk: Yes. I would have liked to arrange it like it is now, but I feel like certain people might not like that. And, well, it's been working.

Zaz: Yes. And I think we actually all put our points forward in the group. At the beginning when we had our big list on the board, Ben was pretty set on a different type of game and I was like, “No, it’s going to be boring.”

Smyk: And I was fine with that changing as long as we took parts of my ideas and put them with yours, I was fine with that.

Zaz: Yes. Like I knew that, because I’d worked with Ben before, I could say something like that. If I was somebody new, I would probably be a lot less like-

Smyk: Reserved. You’d be more reserved, yes.

Dacia: Yes. Yes, I’d be more-

Dacia: If it was a random thing, it probably would have been a more stressful experience.

Smyk: Yes, because you don’t know how other people work.

0:26:52

Researcher: Okay. Does this space make you more or less able to talk to people that you don’t know?

Zaz: Yes, I definitely do because being relaxed in a chair or in like this chair is very relaxing and I feel more like I’m not as like-

Dacia: It feels a lot more informal than being in a lab, like when you’re in a lab.

Zaz: Yes. It’s like you’re in a living room if anything, but like a working living room because instead of like a TV it’s a whiteboard.

Zaz: I definitely think the microwave and the fridge there though is actually one of the things aiding us because I just see a fridge and a microwave and I know how informal this area, or it feels more. Like it doesn’t feel like you’re not allowed to eat in the lab. You’re not allowed to drink in the lab.

Smyk: Yes, loads of things like that.

Smyk: Yes. There’s not a poster saying, “No food or drink here,” and stuff like that, which is nice.

Zaz: Yes, it’s just sort of we set up our PCs.

Smyk + Zaz: Yes, we moved the table over.

Zaz: We moved the table and we set them up where we wanted to set them up, so I feel like we’re a lot more in control of our area here rather than in the lab or your PCs are there. You sit at your desk.

0:28:06

Smyk: Plus this is a lot more organic because this is the only area that’s set up like this and most of the other areas are unique in how they’re set up. So a lot of the labs are more orderly. I think most of them are identical apart from the last row of computers, so it feels a lot more homely as well.

Zaz: And that sort of like- like down that end of the Foundry, it’s more like the labs, and that’s why it’s like when we were first coming into the room I thought maybe that section would be better because we would work harder. And then I was like when we got this section, we were left with it because no one really took it. I was like, mate, I feel like this would be a more relaxed area. Maybe we wouldn’t get as much work done.

Smyk: Yes, but we got more work done.

Zaz: I feel like, yes, this is a low table. This is a low table here, and then you've got to bend over and all of this. But with like a desk, it's there. You're used to sitting at that height.

Smyk: It's what you're familiar with.

Zaz: You're familiar.

Researcher: So do you think you're more productive here than you would be if you were in the benches?

Smyk: I don't know. I think we're not as- I wouldn't say we're as productive, but we're far less stressed and I think we're making a better game because of it.

Dacia: Yes.

Caro: Yes. Yes, I'd agree with that.

Zaz: Yes, yes.

Dacia: You're saying we would have gotten more work done there, but we're getting better work done here.

Smyk: Yes. The brain power that we're putting into the game is being used more efficiently.

0:29:46

Researcher: Okay. It is how many hours to go, maybe five, six hours?

Smyk: I think it's five or six.

Researcher: When are you aiming to upload?

Smyk: Four hours. Four, five hours.

Researcher: It's day two. How does your team feel?

Dacia: Good.

Zaz: Well rested.

Caro: Yes. Yes.

Dacia: Had a good night's sleep.

Smyk: Yes, it's nice.

Zaz: Yes, good night's sleep.

Researcher: I couldn't help but notice someone sleeping on the sofa.

Dacia: That wasn't ours.

Caro: That wasn't our group.

Zaz: It was a person from a different group, yes.

Zaz: That was a random dude.

Dacia: From the first group over there.

Researcher: Oh, right, okay.

Dacia: Riva.

Smyk: This area is just that good.

Researcher: Were you not here when that happened?

All: Yes, yes, yes.

Smyk: We were the last people to go and we lasted like-

Zaz: I just came in this morning at 9:00am and he was just sleeping there, like whatever. I was like I'm just doing my work, check my computer.

Researcher: Okay. Now we're sort of hitting the final stretch, how do you feel about the Foundry space?

Smyk: I like it.

Zaz: I like it a lot, yes.

Caro: I really like it, yes.

Dacia: I wish we could stay here and live here.

Researcher: Okay. So even though you've been jamming flat out, you've walked in this mooring. You didn't feel knackered or negative.

Smyk: No, it's more just fun.

Dacia: No, it's definitely fun.

Smyk: Zaz is lucky because he hasn't all the hellish experiences of jams where you're not prepared.

Caro: ___[0:31:00].

Zaz: It's because I'm in the team. That's why.

Researcher: Has there been anything in particular that you've done, supporting each other, learning anything new, since you last spoke?

Caro: So Ben has just written a formula for the curve for me because I was doing the knockback curve. He's just written a new formula that I can use.

Researcher: Knockback is because this is a beat 'em up game, you need the player to be repelled when they're hit.

Smyk: Yes, and sometimes PB hits so hard you'd like fly off the level, so needed to cap it at some point. So I just made a like log.

0:31:41

Researcher: Okay. And did you request that help? How did that come about?

Smyk: Well, we put on the board.

Caro: Yes. It was more like we all knew that it needed to be like tweaked.

Smyk: And I do like balancing curves very often.

Researcher: Okay. What have been your longest periods of flow, and what were you doing at the time or what were you doing when that flow finished?

Zaz: I think my longest piece of flow is probably the menu system because I knew exactly what I was doing and I just sort of zoned out and just did it, and then I could be as creative as I want with the

menu system as well. So my flow is normally when I know what I'm doing. But if I'm getting stuck on stuff, my flow is interrupted and I have to go and look it up online.

Smyk: Yes. I'd say mine would be like when I made the two sprites for the brothers since it wasn't too difficult and they looked quite nice, so it's satisfying. That was nice.

Dacia: I'd say particle systems because you can just start tweaking all the values and see what the feedback is. It doesn't really involve a lot of problem solving. It's more tweaking values and you kind of know what you have to do.

Smyk: A simple process.

Dacia: So you don't have to stay there and think about how to solve it or how to approach the problem.

Caro: Yes. For me it's just like when you know exactly what you've got to do. It doesn't matter how you do it but you know what you've got to achieve, and then when you've got a clear vision in mind of what you want I can just code and code until I get to that point.

0:33:22

Researcher: Do you feel that in that process, you're not just iterating in what you're doing, but you're improving those iterations? Do you feel?

Dacia: Yes, I wouldn't say it was the same thing all the time.

Zaz: Yes, I wouldn't say it was the same time. It's like even though I'd done loads of menu systems, it's not like I'm not learning more or how to do it better.

Smyk: Yes, by redoing them it helps to polish.

Zaz: Yes. By this project, I learned about like the sliders, they normally have the little bobble on. But I learned that if you go into it or I knew that you could remove it, but it always looked like it never reached the end of the bar. But I found out how to make it reach the end of the bar after removing it, stuff like that, which I didn't before this Game Jam.

Researcher: How do you feel after you've finished flow?

Smyk: Satisfied.

ALL: Yes.

Zaz: You get that-

Smyk: Yes, you get a product at the end of it.

Zaz: Yes, you have the component done and if it's through Unity, like all visual.

Smyk: Yes, it's a low-effort process and it gives you something that you can put in your game.

Researcher: What happens when a problem jars you out of flow? How do you feel then?

Zaz: Well, it is not the worst thing because we have - or if I was stuck. I can mention it to somebody else and they can come with a solution, so you're soon back to flowing once you get through the problem-solving.

0:34:44

Researcher: Do you think that there are times where the group is experiencing a sort of flow at the same time?

ALL: Yes

Zaz: Yes, definitely. I think definitely right after we did the board and we discussed ideas, we wrote down what we had to do. Everyone just got into their job. We all flowed together.

Smyk: Yes.

Dacia: I think if I see everyone working on their stuff, I feel like I should be working on my stuff as well. So even if I don't want to do it and if I'm getting distracted, I will force myself to do it just because everyone-

Smyk: A hard thing for me is if I'm in flow, it's hard for me to notice other people. So I don't really know if other people are in flow as well.

Dacia: Yes, same for me. I just don't pay attention to anything around me. I'm just like tunnel vision sort of thing.

Researcher: I suppose the last question I've got, is there anything else that's gone on in the Foundry, anything that I might not know about that happened since the last time we spoke?

Dacia: We heard some people arguing earlier, right?

Researcher: Really?

Zaz: Oh, it was just a couple of people.

Dacia: Yes, a couple of members of a group over there. When I walked in they were just arguing.

Smyk: Undisclosed group that may comprise of another Brains Eden team.

Dacia: I think they probably had a long night and it sounded like they were just frustrated and tired.

Zaz: Yes. But, yes, that got me out of flow, hearing people arguing!

Smyk: Yes. It was very distracting.

Smyk: Yes, goddam it!

Researcher: So it must have been quite significant arguing then.

Zaz: I think that-

Smyk: Certain people are louder than others in- more vocal.

Zaz: I think the thing was is that there wasn't people here.

Dacia: At the time it was too early.

Zaz: Yes. It was us two. There's a random guy sleeping on the sofa.

Dacia: Yes. He woke up actually for the first time.

Zaz: Yes, he woke up. He was looking around. Yes.

0:36:36

Researcher: So you were working around the guy that was sleeping.

Dacia: Yes. He was-

Zaz: Yes. I was just like yes.

Smyk: Yes. Let them do their thing.

Zaz: Yes. You even put in headphones. I was like I'm going to put in headphones, but I ended up just-

Dacia: Yes. Because he was snoring a lot of the time.

ALL Laugh

Zaz: Well, I had a task that I had to do when I came in. I wanted to get all of the stuff animated before you guys turned up, so I just sat there doing that. I was so in the zone that I forgot to put on headphones and music.

Researcher: That sort of thing, so that says about goal setting is important for flow. You've got an objective to get you into it. You need to have a reason.

Zaz: Yes. I don't want to hold the team back, so I'm trying to keep on top of my stuff.

Researcher: Why is that?

Zaz: And even like write code to make sure like Dacia wanted me to do some code for him. So I made it as simple as possible. I put it on the UI, and it was like the one thing on the UI. It was like you just go on there and this type of thing.

Smyk: Yes. I feel like if you're flowing without an objective, you kind of just make very insignificant changes that don't really benefit the game.

0:37:46

Researcher: Are there things in this space that you've seen other groups doing and you're like, "Hmm, if we did this again, we'd do that"?

Zaz: Yes. I think actually like the fact that I've not used my headphones as much is a good thing. Normally when I'm in the lab, I put them in to focus on work, to cast out the noise of everyone else in the lab.

Smyk: Yes. Sometimes I wear headphones as like a 'do not disturb' sign.

Zaz: Yes. Or there are some times when a lecturer is going on and you're just in there and you've got to be quiet and just focus on your work.

Researcher: That's interesting. You're basically saying you're in a noisier, more boisterous environment over 48 hours. You hadn't used headphones to achieve flow.

Zaz: Yes. I think it's because all of the noise in this area is like important noise, say, because if I hear my two team members over here talking about a problem, I might- if I overhear it and be like, "Oh, actually I've already done this and you can find it here," or just listening up for if anyone needs a hand with work or whatnot.

Researcher: Have any teams come to you for help or have you gone to any other teams for help?

Zaz: Like people from other teams have come over here and we were doing a drawing game yesterday on the board, so like we've interacted with other teams, not really asked anyone for help. Normally people come over and like-

Dacia: I've had people help me with the lab type thing, with the whole Wi-Fi thing.

Zaz: Yes. But on the project itself, I'd say not really.

Dacia: The project itself, no, I wouldn't think so.

0:39:23

Researcher: Beyond your group, does it still feel like a collaborative atmosphere?

Zaz: Yes. There are times when I go over to other groups just to talk to them or see what they're doing. I think it's a nice, refreshing thing. I think there are some people who'd go to other groups and then they'd see something like, "Oh, that's a really good idea."

Smyk: Steal that for our game.

Zaz: Yes, like there are times when you go to another game, you're like, "Wow, that mechanic or that thing that they've implemented is really useful." It's normally like UI stuff, when you see it and you're like, "Oh, why don't we have maybe like controls in our game?" because we don't have settings or anything like that, but that would be really useful.

ALL START LAUGHING AS HORSE SOUNDS FROM OTHER GROUP START CUTTING OVER

Caro: Yes, it's just like a very friendly atmosphere. You know that everybody is doing the same thing. Everybody is under the same deadline and you just go over and speak to any of the groups at will and they'll happily speak to you. There's been not one person that's been like, "Oh, yes, don't speak to me. I'm working," sort of.

Car: I'd say the Game Jam for me, like as a whole, like connected with everybody doing work, doing the same sort of work.

Zaz: I think it's really good.

Zaz: We did the pizza play test when I was on this monitor again. So this space to me ready had like a relaxing thing working here.

Smyk: Atmosphere, yes. [GUNSHOT, HORSE NEIGHING]

Zaz: Yes. I didn't have any stressful experience in here or whatnot. People came here, sat down, played my game and then I had to- and I would talk about it and then they would like, "Oh, really cool game." I think it's the same again happened. Like we're in this area and people see the board with like our name and they're like, "Oh, that's a really cool idea." I think it just sort of takes me- GUNSHOT - so I connect this room with just projects. (FOUNDRY)

Dacia: Teams or-

Smyk: It's very focused, so I would say that's what I have in this interview towards in this space.

0:41:19

Researcher: Okay. Does that go as far as a different mind-set then? Do you think when you let into this space, do you take on a different mind-set?

All: Yeah

Zaz: Yes, I take on like a team mind-set, like everything we've done in here is team-based.

All: Yes.

Researcher: And how does that compare to when you've done team projects in other spaces?

Zaz: Well, I feel like the problem with team spaces- well, there are team spots that you can go to. But it's normally we sit in the lab in a section of the lab when anyone can like- or it's not really split up. Like these are split up into section and you sort of block out that other one, even though you can hear the horse down now, but, yes.

All: Laughter

Smyk: Yes. I'd say it's our fifth team member, the horse.

Zaz: Yes. It's really given us good information. But, yes, I feel like if you go to other places in uni, they're not really sectioned with four computers in. It's normally you go into a room.

Smyk: And it's a line of computers.

Zaz: Yes, or you go into the study rooms and it's one big computer and then you're all sat round the table. They're like meeting rooms. They're not really-

Zaz: They're not really…

Smyk: They're not really work-

Zaz: Dedicated work areas.

Dacia: Yes.

Dacia: They're alright for-

Dacia: It's probably more appropriate for team working, yes.

Smyk: Because you're either purely talking or you're purely working, so there's no real balance.

Dacia: Yes, yes, no middle ground.

Smyk: Yes.

0:42:55

Zaz: Like I don't know how it is like in offices or in actual game-

Dacia: In game studios.

Zaz: Yes, because like from my end or like working or just prototyping games for a company, what would happen is we would go, all take our laptop in a room. We'd sit there and we'd just do our stuff on the laptop and then the talk ideas, not really work-

Symk: That's quite similar to the atmosphere of this room.

Zaz: Yes, yes. Yes, it's very much like working with a client or my experience with working with a client. But in business it's whether they have like squared off units with the computers in. Unless they have the different section and they've got all the people working together in one section, so they can all talk and ___[0:43:49] on.

Smyk: Well, it's very team and sub-team based.

Zaz: Yes. Like our year projects or like the end bit of CDG in-house and we had like each individual group in a section. That'd be pretty cool. We could all come out and call the meeting, have a shared whiteboard there, which would be like the overall project in project management, so like the team leading. Then you could have each section of like-

Smyk: Sub-teams.

Zaz: Yes, sub-teams, so you could have-

Smyk: Which would help.

Zaz: Yes. How many? There are like seven groups, so, yes, it's easily split up into the people and they could all just jam.

0:44:40

Researcher: Really open-ended question, just final thoughts.

Smyk: Best jam ever probably.

Caro: That was fun.

Smyk: The most relaxing jam and actually got a really good thing out of it.

Zaz: I just can't believe we actually won it. I thought we were fifth.

Smyk: Yes. Like none of our things were scrum, so that might have helped, and we didn't actually have any bugs, I don't think.

Zaz: Yes, we didn't. No, there was like the Pokeball sometimes went above the second player.

Researcher: I noticed that.

Zaz: Yes, yes, yes. Yes, that was the one thing that I noticed.

Smyk: Yes, the Z-ordering on the programme. Yes, we should put Z-ordering in the script on it.

Caro: I did.

Researcher: Why do you think you did win?

Zaz: Well, I think it was more the fact that we didn't…

Smyk: Stress.

Zaz: We took it very relaxed. We picked a simple concept at the start that we knew we could do.

Smyk: We pushed on it a slight bit out of our comfort zone, which we managed to deliver on.

Caro: We took like the mechanics that we wanted. Like we didn't go too far in what we wanted. We didn't go like and just refined the…

Smyk: I feel like there should have been stickers though.

Zaz: I feel like they actually just voted for us because they were like-

Smyk: Because they saw a glove and they were like, "Oh, punching."

Zaz: Yes. I think the topic was a good one we picked.

Smyk: Oh, yes, we forgot to mention that you can share a keyboard.

Caro: Oh, yes.

Smyk: Didn't matter.

Caro: I don't think people really care about the controls.

Smyk: I don't know. I think like- because there was another- I kind of liked it.

Caro: Yes. Adds another aspect, like when you're playing it brings you closer. Argue more.

Smyk: Yes. Fight each other, in Zaz's household.

0:46:19

Researcher: And final thoughts about your team.

Smyk: Good.

Caro: Good job boys.

Zaz: Yes, I think we mentioned it before. Our team just did what we were given. No one complained. There was like- we would make points and agree as a team that it was good.

myk: Well, we respected each other because we'd been working with each other and we know how each other works.

Caro: Yes, and nobody stepped on each other's toes. Nobody went and changed someone else's script or what they did behind their back because they didn't like it. If someone didn't like something, they'd say and then they'd get them to change it. I think that helps a lot, especially when it comes to merging two versions of the game.

Smyk: Yes.

Caro: I think that's down to being in the Foundry as well, like the fact that we were sat…

Smyk: In a relaxing environment.

Zaz: Yes, we were sat us three in a line so whenever I was doing something close to Caro's work, I would instantly mention it. Me and Ben were working together a lot but I was animating the stuff that he gave me.

Smyk: And when I saw him working on something, then I'd focus on trying to complete the assets for that so he wouldn't have his flow interrupted.

Zaz: Yes. So we worked good, like as a unit.

Smyk: Yes, of course.

0:47:39

Researcher: So I asked for final thoughts about the Foundry. You've kind of answered that, but I wonder if you have anything else to add to that.

Zaz: It turns out that the spot we got in the Foundry was probably-

Smyk: Perfect.

Zaz: Perfect for us, and like the relaxed way.

Smyk: Relaxed, because I don't think that- I think the reason why it was so relaxed was because that area wasn't entirely intended to be a place where you stayed for a while and coded with everyone. It's more of a conference area, so that kind of turned our entire project into a very relaxed.

Researcher: I don't know, would it surprise you if I said that the other groups that we'd asked also felt that they'd got the best space?

Zaz: Yes.

Smyk: That wouldn't surprise us because they're not used to working in the Foundry.

Caro: I feel like every group made their area work for them and they arranged it or used it how they wanted to use it.

Researcher: Thank you, and hopefully you'll do at least the 2020 jam in the space and you'll be back for a bit more.

Caro: Oh, definitely.

Zaz: We hold the title now.

Smyk: I'm planning on doing my master's.

Zaz: Come back. Yes, we'll come back with a helmet.

0:48:52

Researcher: How was the Foundry different to previous places you've done jams in?

Caro: Yes, that was your first jam.

Dacia: We had more tools to work with for starters.

Smyk: Yes. We had the whiteboard.

Dacia: We had screens. We had a bunch of monitors. We had comfier seats.

Smyk: Yes. That was important.

Dacia: Yes.

Zaz: I think it was very secure, like the area.

Dacia: It felt a lot more exclusive.

Zaz: Like Smyk left his computer there over the weekend and didn't even take it home, and you didn't even worry about it. Like if you left your main computer in the lab, you'd probably be worrying quite a bit. It's like-

Smyk: Well, we did leave one thing in the lab accidentally. We left the VIVE in the lab once.

Dacia: Oh, right, yes. Yes. To be fair, I've left all kinds of things in this lab. I left my laptop just now.

Smyk: I left my childhood innocence.

Dacia: I leave all sorts of things there all the time.

0:49:59

Zaz: Yes, but you'll just leave something in there all the time. I think one of the best things about the Game Jam was it felt like such a homely space because we just left our workplace and we knew we would come back the next day and it would still be there.

Smyk: Just carry on from-

Dacia: Yes, it definitely felt more exclusive than working in like 2Q24 or any other lab.

Smyk: Instead of like people sleeping in 2Q24, like that was our first jam.

Dacia: Exactly. Because on top of that we had our own section, so it was like extra exclusive.

Smyk: Yes. Yes, it was all cornered off, so it's nice.

Zaz: I don't know. If it was like a public space that everyone could access, I don't know. I think mainly it comes down to because we got given the section for the weekend.

Smyk: Yes. Well, you'd be worried that you'd come back in the morning and someone is like chilling in your area.

Zaz: Yes, or somebody has wrote over your stuff on the board.

Smyk: Yes. It's my whiteboard. Get out.

Zaz: Well, yes. For that time period. Yes.

Smyk: Yes. Everyone was happy with their space, so they didn't feel the need to-

Dacia: The place also has much a better vibe than 2Q24.

Zaz: Yes, yes.

Smyk: It's far more inefficient with its space in the eyes of like computers to-

Dacia: Yes, in terms of how many people you can fit in there that can actually work at the same time, but it feels much better.

Zaz: Yes, that's the-

Dacia: That adds to the feel as well.

Zaz: I think that's the reason why. It doesn't feel like a lab. It feels like a homely space, not a workspace.

Dacia, Smyk: Yes, I agree.

0:51:35

Zaz: But at the same time you're still very productive in it with it being a homely vibe. I think it's like a good middle ground between a home and a lab. That's what it really is.

Smyk: Because it's a space which is-

Dacia: It's meant for work.

Smyk: Which has a purpose of work, but it feels secure and fresh.

Zaz: It's like having your own office at a workplace.

Dacia: Pretty much. Pretty much.

Zaz: It's like if you had your own session in a workplace, no one is going to mess around with your desk. Like you could leave your desk how you want and come in the next day and carry on working. But with like lab computers, you come back and you're on a different lab computer every day. But with this area, you go back and just like, "This is where I've been working," and then because it's a work area, you don't just go and randomly watch YouTube videos like you would at home.

Smyk: Well, I don't know. Zaz put on some.

Zaz: Yes, yes. Well, but at home I'm constantly on the second monitor watching something, working. With that area I was there- I was focusing on work more than- we had videos in the background but my main focus was work because we all had work. I knew that I had a job to do in that space.

Smyk: Yes. That's why I usually like jams.

Researcher: I think it's interesting. You did use aspects of the space to make it more homely. I mean, you used the fire in particular.

Smyk: Yes. Well, we weren't stressed for the entire time, so I think ours helped a lot.

Dacia: Yes. That's probably the most reason.

Zaz: Yes. That's probably why we were so relaxed.

0:53:22

Researcher: What were the highs and lows of the event for you?

Dacia: I'm not sure if there were any lows.

Zaz: Oh, we had a low near the beginning where we just…

Smyk: Yes. Zaz was backseating my art.

Zaz: Yes, which he eventually changed with his…

Smyk: Yes, but like everyone knows that a first draft is a first draft.

Zaz: Yes, well, I was just trying to point that out but I did in the wrong way.

Smyk: Saying that he could do it better.

Zaz: Yes, I could have. With his first one, I could have done better, not the last one that got in. That was really good.

Dacia: I guess like when the Wi-Fi wasn't working. That was a low.

Smyk: Yes, that was a pain, but like, yes, that's probably eduroam issue on that laptop not the Foundries.

Dacia: But then like after that-

Smyk: Some Ethernet ports would fix it, but maybe. Don't know how [GI] works.

Dacia: Yes. Ethernet ports would have been like an alternative, but, I mean, we fixed it in the end. After that, I don't think there were any.

Zaz: Yes, yes, there weren't any issues, and then the highs definitely the shock of us winning, I'd say.

Smyk: Yes. To be honest, for the first part I thought that we didn't even place in the top three, because I was like, "Yes, yes, yes, that's great. Really proud that people enjoy our game," but I was completely content with not getting a placement at all.

Zaz: When they said third place and then they said we got a draw-

Smyk: Shine a light. Wait, no, 'Princess of Light'.

Zaz: Yes, yes, and then it's like second place with these two. It was like, oh man, we didn't- I was one of the last ones to go up to the board.

0:54:54

Dacia: I don't know. I had a feeling that we'd win it because I didn't stay for the whole thing.

Zaz: Yes, you weren't even there.

Dacia: But the games I saw, I was like our game is more complete than these games.

Zaz: Well, you didn't get to see the board at all but I was one of the last ones to put my notes on.

Dacia: Well, I mean, Smyk knows. When I left I told him, "Get me a [large suit with your t-shirt 0:55:10]." (Laughter) Not surprising.

Smyk: It's not that surprising, but I also think it depends on the groups that have access to those spaces.

Dacia: That too. Yes, but because like I'd say for a game jam-

Smyk: Because I don't know any first years that went in the Foundry.

Dacia: No, no first years were in the Foundry.

Smyk: Which might also help for the atmosphere.

Dacia: Probably.

Caro: There were first years at the Works though. It's interesting. There were first years at the Works.

Dacia: Yes, there were at the Works.

Smyk: The Works is a bit too harsh though, like the lighting and the space is open but it kind of feels a bit too open because the ceiling is like incredibly high.

Zaz: I've not used it so I can't really say, but from looking at it, it looked like just another library workspace.

Smyk: It's a bit nicer though.

Dacia: It's got better-

Smyk: Because the tables are far larger.

Dacia: It is newer though.

Zaz: Yes, it's got like- but it reminds me of working in the library last year. That's what I-

Dacia: It's just another computer lab. There's nothing else to it. It looks prettier, but it's still just a computer lab.

Smyk: Yes, doesn't have the character.

Dacia: It's got a lot of natural light in though. I like that.

Smyk: Yes. I love artificial lighting as well.

Dacia: True. Anyway, the point is the Foundry is better.

0:56:27

Smyk: Also the hanging stuff like in the Foundry makes it feel a bit low as well, but I think that depends on the wall colours and stuff because that changes the lighting quite a bit. Because the Works, I think the themes are blue and white which are quite cold.

Dacia: I'm pretty sure anyone can access the Works, right?

Akk: Yes.

Zaz: Yes, so you also don't have that security.

Dacia: So if I went there, I wouldn't feel like I can actually configure lightings or all that.

Zaz: Yes. We could do that in the Foundry as long as most of the teams agreed and we could just turn down our section of lighting, which did happen. Like one team turned down all the lights and it was like everyone all found it better. But I feel like in the Works you couldn't really do that.

Smyk: Because other people were working there as well.

Zaz: Yes, other people, like yes. I think we mentioned before like also with the people who were in there, I felt like people who were working in there would like because we were all doing the Game Jam, or it was like we were all in a similar boat. And it's like when it got later people were getting more rested so we needed to turn down the bright lights. Let's say somebody had only just come in at 9:00 and like ready to go, if you dimmed the light that would really dampen them. I think, yes, we were just all similar time.

Dacia: Yes.

0:57:59

Researcher: Okay. There's a particular use of the space I want to ask you about. There was one occasion on the Sunday morning where you would have come back to your group and discovered someone was sleeping on the sofa. Do you want to talk to-?

Dacia: He wasn't from our group though, just so you know.

All: Yes, yes.

Researcher: How did you deal with that?

Zaz: Oh, well, I just came in and sat down and worked. I saw him there and I was like, "I'll let him rest.

Smyk: Yes. We've got nice sofas.

Zaz: Yes. I just sat down on my computer.

Smyk: I can understand.

Zaz: At that point what I did is put in my headphones and just got to working.

Dacia: I don't think he was snoring anyway.

Smyk: Was it one of the guys that we know?

Zaz: No. It was the ginger guy in Star's group who came in from a-

Smyk: Oh, yes, yes.

Zaz: It was him.

Smyk: That's fine. Like he came over and talked to us a few times.

Dacia: He helped me out with the Wi-Fi thing actually.

Male: Yes. He's cool.

0:58:48

Researcher: Okay. Well, that was a nice segue you've done there. I wonder if there's anything you can tell me about the role that flow played in the game that you made?

Smyk: Pretty well since we didn't really hit many problems apart from the one near the end with yours.

Dacia: Yes, when the branch got deleted, but, no, I think it was quite smooth. We didn't actually have any major setbacks.

Zaz: That was-

Smyk: None of our components were that dependent on each other.

Zaz: Yes. We basically sat at the whiteboard for an hour before we started. We basically brained out the idea. We all got on the same page with that idea.

Dacia: We put enough effort in the design bit and in the planning, so I think that helped a lot.

Smyk: That's what matters, and we've got quite a bit of experience with breaking them down into components that don't depend on each other too much.

Zaz: And also from just generally working in groups, like from previous, we know how to make stuff that works with people. Because when you design a system, you already know that someone else is going to eventually come and use it. So you make it in mind for that person rather than something that's only going to work for you.

1:00:00

Researcher: Oh, that's interesting, so you're curating the way you produce something knowing other people will work on it. So in terms of flow then, would you say that you were flowing individually? How did flow occur for you guys as a team?

Zaz: I think flow happened individually, but then it happened as a group.

Dacia: Yes. We were definitely synced.

Zaz: Yes. I think definitely like somebody would get in flow first and then people would realise and then also get in flow. If you see the person next to you doing loads or like coding and working, you're going to be like, "Oh, no, I need to keep up, not let the team down."

Smyk: Yes. It's one of the reasons why I put on headphones. Even if I'm not listening to music, I like the silence and it tells other people I'm in flow or I'm busy working, so doesn't break me up.

Researcher: So you're kind of signalling that either you want to be in flow or…

Smyk: Yes, it's like a 'do not disturb sign'.

Smyk: Because nobody talks to someone if they've got headphones unless they tap them on their shoulder.

Dacia: You say that. You say that, but working in 2Q24 it's not at all the case.

1:01:13

Researcher: I guess I'm wondering how the layout of your team affected flow.

Zaz: We were all actually sat in the same direction looking at the wall.

Dacia: Yes. We were all in a row.

Zaz: We were in a line sat looking at the wall.

Dacia: I guess like-

Researcher: You weren't straight onto the wall though.

Zaz: No, no, no, but I was-

Smyk: We were because our table was against the wall.

Zaz: And then the sofa like half-

Smyk: You guys were like half towards the whiteboard.

Dacia: Yes, so we were on separate sofas.

Zaz: At the same time, my chair wasn't fully at the desk. It was sort of like that so I could go and look at, be like, "Caro", are you doing this?" or look at the board. Because in that time-lapse you had, when it was coming round there were probably loads of times that you saw us look at the board just moving out our chair and being like, "Oh, I need to do that."

Smyk: Yes. That's done, get a new desk. Easier to switch between them.

Zaz: Yes. So I always made sure that I could see the board, or when I had to I went over to the board and looked at it, even if it was to give my legs a break and just have a little time to get off the code and give myself some space.

Smyk: Yes. Well, we went to the shops quite a few times.

Zaz: Yes, to get fresh air.

1:02:28

Researcher: Would you say you learned any new skills? Because you've implied that you did things the way you knew they would work, but did any of you learn anything new through the event?

Smyk: I'd say knowing the importance of certain aspects of group work.

Zaz: I learned something new with Unity. I learned that you can play animations without doing connections. You can just write in the-

Smyk: Animator.play

Zaz: Yes, animator.play and then the name of that one and then that was the first thing I found in the whole Game Jam and like when I was doing animation, I was like that could have been so useful in my previous game, like in the previous-

Researcher: How far through the jam was it you realised that?

Zaz: Well, luckily it was like when I just had this-

Smyk: Yes, when you were making all the animators for all of them.

Zaz: Yes, yes, Smyk was doing the assets the night before, I came in at 9:00 and these guys didn't come in until like 10:20.

Smyk: Yes, around there.

Zaz: So I was there for like an extra hour before them, and I was just sat there at my thing, no one around, and then it was like, "Wouldn't it be cool if you could just play?" And then I was like

surely they have some- and I looked through their API and found it. I just started putting that in all the animation and I'd got all of the animation that he drew last night done before Caro got in so he could just instantly use it.

1:03:57

Researcher: And you communicated that, so you made him aware that you'd found this thing.

Zaz: Yes, yes, yes. Yes, I did. I was like, "Look at this cool thing I found." That was awesome.

Smyk: And then I'm like, "Cool." ___[1:04:08].

Zaz: Yes. That was also another really well planned or like we planned out that he was doing the assets and he's like, "Oh, I'll stay in later and get more done." And then I was like, "Yes, I'm going to go home earlier and come in earlier so I can do the animation before Caro arrives for him." But I was just doing some- yes.

Smyk: I work better at night-time when it's like quieter and everyone is chilled.

Zaz: Yes. And I just came in early so I could get it done before they needed it, so time management we did really well. It's all-

Smyk: I'd say being realistic with the things that we chose to do was also an important one, because that allowed us to add all the juice and the polishing.

Researcher: You say you'd done that better than in previous projects?

Smyk: Yes.

Dacia: We learned quite a bit about the importance of juice as well.

Smyk: Yes, because for all of the previous ones, we didn't have as much experience but we were too ambitious with our concept. Well, not really concept, just the implementation and all the features we got there.

1:05:06

Researcher: I think it was interesting you chose, on paper at least, a very simple concept, but obviously you were as conducive through the jam as the other team.

Smyk: Yes. The more character you can add to something, the more it feels like an actual game with a nice setting and stuff. That's why stuff like 'Princess of Light' got quite good feedback, even though it was quite a simple game with combat and everything.

Zaz: I also felt that that game in particular, I felt like- do you know when they played it through and he was going in the perfect place. If they had got somebody else to come up there and play it, I reckon they would have found like half of the map still missing but it looked like a really big map, how he was running around and jumping it. But in reality, that game- it looked really good, but then I think they were only showing the good sides to it. But our game, we didn't have to go any roundabout ways. There's no bug.

Smyk: Let's just throw two people in an area and they're going to hit people.

Zaz: Yes. We could have just got people to come up and then all they had to do is just arrow keys and spam the punch button and then use the special button.

1:06:17

Smyk: Yes. We even got rid of aiming because it's too difficult for two people on one keyboard.

Zaz: Yes.

Smyk: What are they going to do, use a mouse?

Zaz: It would work on an Xbox controller actually. It'd be quite cool.

Dacia: The Xbox would be quite good for it.

Zaz: You could have the punching thing with the second analogue too.

Smyk: Yes, but like doing three things at the same time is a bit of a pain.

Zaz: No, no, that's very Xbox, isn't it?

Smyk: Because you need to move, hold and aim.

Dacia: On the Xbox controller it would definitely work.

Zaz: Yes, that definitely works. Think in most games you have to control how you aim with this one, how you move with this one. Then you jump.

Smyk: I think the simplicity of just not aiming is quite good for the rest of the game because you can just mash your first at the other person and it's quite satisfying.

Zaz: Yes. It was definitely- yes, and seeing we built it for keyboard as well, we wanted to give that, "Oh, this is my keyboard, but we're in our own section of the keyboard." Yes. That was a planned nature.

Smyk: Planned nostalgia.

Zaz: Yes, planned sharing a keyboard.

Smyk: Planned inconvenience system!

Zaz: I remember playing 'Tanks'. Did you ever play? It was like on MyMaths and in school they would make you play maths games.

Smyk: "MyMaths" is horrible.

Zaz: Yes. Everyone would have just picked 'Tanks', and then it would be like the shared keyboard 'Tanks'. You get your ___[1:07:38] and you're both sat there on that keyboard playing. So yes, nostalgic.

1:07:46

Researcher: Well, that segues to my next question actually. Because obviously your game was about nostalgia and what I'm going to ask you about now is the notion of a theme. So I guess when you think of the Global Game Jam 2019 now you've had time for the dust to settle, what do you feel and think when you look back at the event now?

Smyk: Quite proud.

Dacia: Yes.

Zaz: Yes, I'm proud of it.

Smyk: It's the first time that I've done a game jam. Well, the five of us have done a game jam and-

Dacia: Can be proud of what we made.

Smyk: It's not been stressful and it's complete.

Dacia: Yes, yes, definitely.

Zaz: I think it was very nostalgic. Well, I hope. Not like the whole- but just thinking back to childhood and then thinking of all the game ideas. I think the topic they gave, like what home means to you, was really good.

Smyk: Far better than the previous ones, to say the least.

Zaz: Yes. I don't know. I think that could have also been a tribute to why it felt so homely. Just sitting down on the sofa, but that is very homely, like we sat down on the sofa whilst we were doing boards or doing the plan on the board and it was like, "Oh, we're sitting on the sofa doing work," which is a weird thing. Normally when you're sat on a sofa, you're there relaxing, watching the TV, eating food maybe. But in this situation we were there sat on the sofa, doing work, which felt more relaxed just with how the seating was, like comfy seats and stuff. So, yes, it just felt more homely due to the seating arrangement.

Researcher: Yes. So when you look back at the Global Game Jam, you feel pride and a sense of that everything was strong.

Dacia: It was definitely a really fun experience overall, so it's like I wish I could do it again.

Smyk: Yes. It feels like the first time I've won something that I'm like, damn, I can be really proud of that.

Researcher: What did you feel connected with during the event?

Smyk: I'd say our individual area.

Zaz: Yes. We sort of had that space and it was our space.

Dacia: It felt like our office.

Zaz: Yes, like coming to work into the office. Sit down on a sofa. Come in one morning and there's just a guy slept in your office.

Dacia: Yes. Definitely.

1:10:21

Researcher: Did you feel something particular when you arrived or were arriving compared to-?

Smyk: Well, usually when you have a space that you generally just mess around in, you're probably going to immediately go to just messing around and relaxing when you go to that area. But with this place, we didn't really know outside of doing a jam, so we just did the jam.

Dacia: Yes. I don't know what working for a gaming company is, but I wish it was that, like how that felt. That would be perfect, because I felt like I actually want to go there and do it, like I felt like I wanted to go and spend all day there and just do the Game Jam. Whereas in other times, it's been kind of like, "Oh, I've got to go in and do this."

Smyk: Make your own, yes, yes.

Dacia: It's something I have to do and not something that necessarily want to do.

Zaz: It's sort of like going into or I went into a restaurant and it had a similar look to the Foundry. You look at the ceiling and the ceiling is like not there and it's just a load of pipes and like old wood and rust. You just sit down at the table and it's like you take in the room, and that was one of the

things, like if I did get distracted or stop working I would look around and the room and be like, “I didn’t notice that before,” and yes, I think how the room is designed is very like-

Dacia: I think most other teaching areas don’t have that much going on.

1:11:53

Zaz: Yes, yes. When we first came into the game lab, and I still notice it now, so when they turn on the RBG lights, I’m like, “Wow. We have cool glow-y lights,” and I look around and I get distracted by them sometimes but it’s more like I’m thinking about something else while looking at them.

Smyk: Well, you hardly ever get the opportunity to take them in because-

Zaz: Yes. I was sat on the end computer.

Smyk: The only time you really see them is like after 6:00ish.

Zaz: Yes, and it was just there, lighting up on the side. I was like, “Oh, yes, this is cool. This is something cool about our lab.”

Smyk: To be honest, you shouldn’t be working until 6:00.

Zaz: Yes. It’s the same with the new posters Warszawa put in. It gives you something to look at whilst you’re- it’s like a way to give you inspiration without really- you don’t look at them and then suddenly think, “I’m going to make Lara Croft game number two.” You look at it and you’re like, “Oh yes,” and then you think of something for your game. It’s sort of like you look at it and you remember the game series and you think about the job.

Smyk: For me it just adds character to the room.

1:13:09

Researcher: If there were things that you could change immediately with the Foundry space, what would they be?

Smyk: I’d say you might not want to take away from the relaxed nature. If you put in posters and stuff, it could make it too relaxed.

Dacia: I don’t think it needs posters actually.

Zaz: Yes. I feel like just a standard poster wouldn’t suit the place. I think the- do you know the image of how the walls should look at the beginning and it had all of the-?

Caro: Yes, a mural.

Zaz: Yes, the mural.

Dacia: I’d say that would suit the atmosphere.

Zaz: Yes. I think that would be much better.

Researcher: That’s happening. That’s going in.

Zaz: Oh, that would be much better than a poster because having loads of images of random things and then just looking at that, you might see the buttons of a controller in that space and then it can cause you- or somebody could look at that and it could be a plus and then that could be like how they solve the problem. It might be, how do I get this model to move around with world space? And you’re like, “Oh, I need to plus them. I need to plus that on,” sort of thing.

1:14:18

Researcher: What you're saying, Benjie, is quite unnerving because mural in the Foundry is me trying to visualise that subconscious web of associations with a view to trying to condition people to being aspirational in what they're thinking about and their problem solving. In another way, the mural genuinely is meant to be a mass of all of all the different things that UWE has done around Bristol in an aspirational way to maybe inspire people. So it's obviously not going to give you the answers to a difficult problem, but it's interesting you notice that it isn't in the space at the moment.

Zaz: Yes, that's why a mural would add something because I think it would definitely just suit how the room looks. If that was- if somebody just put posters up, it would just feel out of place, but that wouldn't.

Researcher: So if there was an aspect of the Foundry you could put in a traditional leaning environment or the lab, you know, 2Q24 you've talked about, what would it be?

Smyk: I'd say more exclusive areas for just groups of people or teams.

Zaz: Yes. I think even having the metal fences between- so like it is wooden.

Researcher: Yes, the partitions.

Zaz: Yes, but they're like walls. They're not walls, but you can see.

Dacia: You're going to see through them still.

Zaz: But they're like zoned off in a way that you can somehow zone off the team on the other side even though they're right next to you. Yes, you can't just suddenly look across. You can look through it but you can't just suddenly go across and look at their work. It's just like that limitation that you have to walk around to go see their stuff, and then it's sort of like, oh, but then I'm put off from that because I'm not working.

1:16:04

Smyk: Your area kind of blends into the neutral area which is like the big corridor.

Dacia: I think doors would be too much.

Zaz: Then you sort of feel like you're-

Dacia: Yes, that's like actual-

Smyk: Enclosed.

Dacia: Yes, enclosed.

Smyk: Well, the Foundry is very open with the ceiling. It feels like things are enclosed but they go further than they are, like with the ceiling being low but it also going a bit further, your area being enclosed but also it goes a bit further.

Zaz: Yes. You can actually look across the entire Foundry and see the other side and still be in your section.

Smyk: Yes. It's like instead of a hard, rigid box, it's like flowing.

Zaz: Yes. Sort of like putting a mark on the floor and saying, "This is your space to do work in."

Smyk: Yes, not like that.

Zaz: I was just thinking some back, if there's a way to change unique teaching spaces, I think it's making the space individual because if I think of the lab, everything is the same. All the rows are the same. All the computers are the same, and if I imagine just the tables were curved differently, just having that different curved tables and each one being individual, you would probably find people go to a preferred spot.

Smyk: Well, yes. It would give each different working area their own experience and therefore giving the area character.

1:17:48

Zaz: Yes, and that's sort of how the Foundry is as well. So we had a really chilled area and we worked in our space like that. And then you looked over to the second team and they had it differently as well.

Smyk: Yes. Theirs was a lot more enclosed.

Zaz: Yes, theirs was a lot more and they had like a table, and then the third team all sat around one single table. The second team had a long table there and a table in the middle. They didn't all sit around one, and then the third team all sat around a table and then further down they had like rows. I think that's what make- it was very unique, each working space, and I think that gives you like more possession over your space.

Smyk: Yes. It feels like this one is unique. Well, a lot of other people also felt their little area was the best.

Zaz: Yes. Everyone thought that because you put two days into that space and it felt like home for those two days, and everyone got that same feeling. They were like, yes, this place actually felt like a good workplace, but then it didn't feel too formal, like you could go in their work and talk and chat and then it didn't feel like stressful. So that's why everyone must have thought their section was the best.

1:19:18 I think if we went in again and had a different workspace, we would probably say that one is better because you sort of make it your home over the two days and you get a connection to that.

So now whenever I go into the Foundry or every time I've gone into the Foundry I went and sat on that big monitor, so when I went back to that section it brought back nostalgia of that. And then when we finally got the final build of our game on there, I was like, "Oh, yes, brings back memories of when we were playing 'Super Smash' on that and all the people would just come round and, "Oh, can I have a play?" It's really fun.

Researcher: Alright. So, well, thank you for all that.

END AUDIO

Participant Information Sheet

Foundry Game Jam Observation

During the Global Game Jam 2019, Andy will continue his research project as part of his doctoral study into how new kinds of environment affect learning and engagement

The Foundry is an exciting new informal, multidisciplinary learning space for studio projects and events. I am interested in following *your* experience of this space over the course of GGJ2019.

The aim of my research is to inform how classrooms of the future might be designed, to see how the space is used during the event, and the extent to which 'affinity spaces' contribute to successful jams. I am looking for 4 teams to observe from a distance, and then catch up with 4 times in 48 hours.

Anonymity: Everything you do or say during the event will be treated in strictest confidence, your anonymity will be maintained at all times and pseudonyms will be used in any written work.

Tweets and other media by individuals during the jam are also relevant. Even though considered 'public domain', pseudonyms will be used here also, along with visual redaction ('photoshopping') of any screengrabs to ensure no personally identifiable details are published.

Data Security: All personal data and digital artefacts will be stored on an encrypted, secure UWE file system and in hard copy for the duration of the project. Upon conclusion of this project, all data will be destroyed.

Right to withdraw: You have a right to withdraw from this study at any time, for any or no reason given, without prejudice.

If you choose to withdraw from this research at any time, observation of the rest of your team will continue, unless you state that you do not want this to occur, at which point team participation in this research will end immediately. After withdrawal you are still free to fully participate in the game jam.

If you leave your team and join another, or leave the event altogether your observation will end, but any activity up until this point will remain in scope of this research, unless you withdraw your consent.

Game jam observation in the Foundry

Other than your consent and attendance, nothing else is required of you up to and during the event, except to be present with your team in the Foundry (downstairs 1F007) for the event apart from when offsite, sleeping, eating, or taking a break etc.

Please attend and participate entirely as you normally would. The only constraint on participants is that they do their game development activity anywhere within the Foundry as flexibly as they like, and that you are free to use and reconfigure the space to suit you and your team throughout.

You can, as usual, utilise any organisation or development process you feel suitable and at the end of the event a copy of the demo and a build of the final game build will be collected from each team.

Follow up activity

I would like to catch up with each team for a short chat in the weeks after the jam during or after CGD. Many thanks for your time and your help with this research, which I hope will re-shape learning spaces across HE in time to come.

If you have any questions pertaining to the research at any stage, please email or call: XXXXXXXXXXX

Participant Consent Form

Learning in next generation environments: Game Jams in Heterotopic Affinity Space

CONSENT REQUIRED:

For the observation of participants in the 'Foundry' during Global Game Jam 2019 in respect of games and other data generated throughout the course of the event.

(see information sheet for more details)

- I, the undersigned voluntarily agree to take part in this research project, conducted by Andrew King, University of the West of England (andy.king@uwe.ac.uk).
- I give permission for the work I undertake during the Global Game Jam to be used for research purposes, the rights remaining with me, the undersigned.
- I understand that I will remain anonymous in this work if it is published, a pseudonym will be used to protect my identity, and that approval for use of direct quotes will be sought in advance of further publication.
- I understand that I am free to withdraw from the study at any time without needing to justify my decision and without prejudice.
- I confirm that I have read and understood the above terms and freely consent to participating in this work. I have been given adequate time to consider my participation and agree to comply with the restrictions and instructions of the study.

Name of participant: .....

Signed: .....

Date: .....

Email: .....

Phone: .....

Name of person taking consent: ANDREW KING

Signed: .....

Date: .....