6. The Use of Gameplay Design Patterns “It’s like a project in itself, really”

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Research Questions - March 2024

1. What pedagogical tools and processes are available to support novices to overcome barriers to participation in game coding processes?
2. How does CHAT theory help us understand how game design patterns x can be used in an evolving community of novice game makers?
3. How can learners build agency in an evolving community of game makers?

Newer notes

Re-read what is missing in terms of the CHAT concepts. Agency is to come in next chapter. –>

Introduction

Software design patterns are a grouping of a description of target project behaviour, with a suggested community solution of code structure often accompanied with worked examples (see

Chapter 2). While existing research explores the use of game design patterns in educational settings, for instance to aid the transfer of science simulation concepts to other contexts (Basawapatna, Koh and Repenning, 2010; Repenning *et al.*, 2015) or as a foundation for co-design work (Eriksson *et al.*, 2019), there is limited work addressing their role in overcoming challenges faced by emerging communities of game creators using text coding. In the previous chapter, I outlined the evolution of tool use, emphasising emerging tensions in activity. The importance of gameplay design patterns (GDPs) emerged from participant input in P1 and were then integrated by myself into various forms of scaffolding within and graded step of practice including: quick-start activities, instructional tutorials, and code snippet examples. This chapter shifts focus to the perspectives of participants, using recorded data to interpret their varied uses and adaptations of GDP use. In doing so, it addresses the research question: How does CHAT theory help us understand how game design patterns can be used in an evolving community of novice game makers? I describe the use of GDPs as diverse mediational strategies to overcome some of the tensions explored in the previous chapter, not only addressing the use of facilitator-provided resources but also as part of emerging community practices and interpersonal repertoires.

GDP usage in game making	**Description (using CHAT concepts)**	**Examples in data – click links to move to evidence in vignette**
Personal appropriation:		
GDPs used in appropriation of personal knowledge.	Facilitators can use existing and planned GDPs to surface computational, design and systems concepts embedded in games. Beyond curicular knowledge, participants demonstrate concrete and varied design knowledge. Careful template design can aid experimentation with game dynamics via rapid prototyping techniques. The implementation of GDPs can stimulate participants to adopt or to share technical processes.	Personal appropration of learning map concepts: V2.c , Appendix.learningmap Fluidity of design operations: V1.3, V1.6, Use of code patching and code snippets in V1 Debugging in Vignettes 2, 1, Present in x out of y coded sessions.
Guided Participation / Interpersonal focus		
GDPs as a framework for supporting resources and navigation	The restricted set of GDPs can serve as a framework for code examples and step-by-step tutorials. Presentation of documentation of GDP implementation as a menu or collection can facilitate flexibility of learner pathway and diversity of end design and without restricting access to resources beyond programme based support	Use provided of step-by-step docucmentation V.2 , V3.a Use of code snippet examples: V1 Utility of a graphical menu and map of GDPs: App.theming Present in x out of y coded sessions.

GDPs used to scaffold ideation and prioritisation processes	GDP concepts can guide ideation processes in diverse ways including: use of GDP terms as shortcuts in ideation and prioritisation, the use of visual code structures	Use of GDPs concepts by participants during ideation: V2,3 ,V7.a GDPs altered via visual prototyping: Appendix.prototyping, V7.10 Discussion of GDP dynamics facilitated by template game structure: Present in x out of y coded sessions.
GDPs used to aid the process of division of labour	Participants can split work and resolve working blockages by allocating different GDPs or parts thereof. The use of GDP concepts as a lingua franca and the sometimes modular structure of GDPs help the division of labour as participants to divide work by working on different patterns or taking on project elements within patterns, sometimes building specialisms in the process.	Dividing work between pairs by pattern based on difficulty or aptitude: V3.a, V2.b Alternating between coding tasks and other non-coding tasks in Vignette 2. Parents shifting from facilitating role to a more directive role: Vignette 7 Present in x out of y coded sessions.
Cultural activity focus		
GDPs can encourage learners to design for others	Referring to the impact of implementing or changing GDPs can help scaffold the process of imagining the end user experiences.	GDPs used to stimulate awareness of designing for others: V2.c Present in 8 out of 12 coded sessions.
GDPs facilitate the use of wider funds of knowledge (FoK)	Three dimensions of GDPs (mechanics, dynamics and aesthetics) can be used by participants to share and explore FoK and other interest within the emerging learning community.	Via incorporation of home interests and FoK in game narratives: V6.a and assets: V6.b Coding and documentation practices: V7.a Bertie's sharing of knowledge of game mechanics in Vignette 1b Present in x out of y coded sessions.
GDPs are propagated into the community through playtesting	New GDPs emerge often from the merging of home knowledge, technical processes and existing patterns. The implementation of popular or novel GDPs by participant pairs or individuals is often spread through peer activity.	A popular GDP implementation becomes a subject of community activity: V1b Present in x out of y coded sessions.

Table 6.1: Varied GDP use and summary of supporting evidence

The above table summarises the principal different uses of GDPs in the data analysed. The right column lists example behaviours and notes vignettes or appendices where the behaviour can be found in situ with more detailed analysis. In this table and the structure of this chapter, I employ

Rogoff's three planes of analysis (Rogoff, 1995), as introduced in Chapter Four. This chapter's sections examine how gameplay design patterns are utilised broadly by parents, children and facilitators, each through the lens of a respective analytical plane. Recognising that these observations do not neatly align with the three planes, I discuss the use of GDPs across cultural activities, interpersonal activity and personal knowledge in three distinct sections. An analogy can be drawn between these three planes of analysis and the examination of activity systems at varying scopes. Specifically, the cultural plane aligns with the community scope of activity described in Figure 5.x in the previous chapter, while the interpersonal and personal planes correspond to smaller scopes depicted in Figure 5.x. A discussion section explores the implications of these findings in relation to existing research and theoretical concepts.

The role of GDPs in the personal appropriation of concepts and processes

As outlined in Chapter 2, the focus on curricular knowledge and related skills developed by participants is the dominant thread in research on digital coding and game making (Papert, 1980; Kafai and Burke, 2015). The research aims of this study focus on the less explored areas of the social and cultural aspects of the coding process of novices. As such, the design of this study does not fully address the exploration of the personal appropriation plane of activity. Additionally, in this informal learning context, participants did not request exploration of concepts aligned with the computing curriculum, instead being driven more by a practical desire to make a game using the tools provided. Despite this, the evolving design process resulted in activities which did allow the exploration of computational thinking and other curricular concepts. Given the potential to adapt this learning design to a more formal environment to address the needs outlined in the introductory chapter, from P2 onwards I began to augment the learning design to suit curriculum-oriented teaching and assessment of computational thinking concepts and skills, a process which resulted in a learning map of curricular concepts included here as Table 6.x.

Coding Concepts	**Systems Patterns**	**Design Practices**
Sequences	Systems Elements	Goal Setting
Variables	Systems Dynamics	Being Incremental and Iterative
Logic	Reinforcing Feedback Loops	Developing Vocabulary
Loops	Balancing Feedback Loops	Web Navigation
Arrays		Problem Solving
Creating Functions		Version Control
Change Listener		Debugging
Input Event		Reusing and Remixing

Table 6.x. Learning Dimensions of the 3M Game Making Model

Appendix.learningmap explores in more detail the evolution of this map, which acknowledges

significant tensions in the integration of concepts into an informal context, and draws on the process and rationale of Bevan and Petrich's (2013; 2015) work to bring a similar learning map to a seemingly chaotic tinkering and making process in museum contexts. There is a tension in the evolution of this learning map, one familiar to teachers using project- and play-based approaches, between the naturalistic approach made possible by the non-formal learning environment and the desire to align with curricular concepts. It is of value to compare this observational approach to the design-driven process typified by research on Microworlds, which foregrounds the role of learning designers in shaping the affordances of (playful) learning environments to steer learners toward exploring curricular concepts. In much of the Microworlds research, these are often scientific or mathematical concepts: take, for example, geometry in Turtle computing with the LOGO language (Ernest, 1988). While there are similarities between this design and the constructionist ethos behind LOGO, the leading motivation of this study is the creation of and acculturation to a game-making community. Kynigos (2004) explores the tension between more targeted/restrictive and more adaptable technology toolsets using a white-box, black-box distinction (explored in the literature review), noting the difficulty of communicating the value of non-commodified, adaptable toolsets despite their exploratory potential. The design of this research's learning template can be seen as a half-baked Microworld (Kynigos, 2007), with the varied affordances of the design interpreted as invitations to contribute to an improvable boundary object (Kynigos, 2007, p. 336). This focus thus motivates and facilitates a discussion on a shared experience in a way that aligns with the sociocultural focus of this study.

The interrelationship of GDPs and the development of technical processes

Given the limited focus of this thesis, only one dimension of personal appropriation is included here: the technical implementation of coding structures. The implementation of GDPs can encourage participants to adopt or share technical processes in various ways. These processes were sometimes introduced in a basic form through scaffolded activities, supporting documentation, or informal interactions between peers. The following observations illustrate how introduced processes were adapted and modified by the community.

To integrate new gameplay design patterns or adapt existing ones in their games, participants needed to develop unfamiliar technical processes associated with computer coding, as well as foundational digital skills related to using a desktop personal computer. See Appendix: Digital Literacy for further details. One example of a skill developed by many participants was proficiency in keyboard and mouse use. Combined with the ability to navigate internet browser tabs, this facilitated movement between computer code, game prototypes, and supporting web-based documentation. Such personal appropriation and increasing fluidity are well illustrated in Toby's repeated, solo, incremental changes to level design, as seen in Vignette 1.a. Most participants demonstrated increased fluency, particularly in areas such as creating, uploading, and integrating graphical assets, adjusting game challenges by modifying GDP elements, and engaging in coding processes such as debugging and code patching, which is explored in later sections. In line with CHAT theory, this can be interpreted as the gradual operationalisation of

actions that initially required more explicit guidance, as discussed by Leontiev (Leontiev, 2009).

While the use of new techniques was driven by the implementation of GDPs, the following observations reveal a complex, interdependent relationship between GDP concepts and emergent technical processes. In line with Rogoff's understanding of personal appropriation as a bi-directional process, where the appropriation of personal knowledge is shaped by and contributes to a broader sociocultural context, participants actively contributed their interpretations of knowledge back into the communities they belonged to. In this case, the community in question was the game-making community. In this process, GDPs functioned as both conceptual tools and structured project stages, facilitating interpersonal knowledge exchange, as explored in the following example. In Vignette 5 (sections V5.a and V5.c), Madiha seeks assistance from her daughter Nasrin to format and export graphical files for use in the game code project. The implementation of her chosen GDPs drives the development of these technical processes, as she must either learn them herself or draw on peer knowledge to complete the task. For instance, changing pen colours in the graphical tool is a process that Nasrin has already internalised and performs effortlessly, whereas Madiha is still deliberately working to build her competency. Nasrin has fully operationalised the process, incorporating it into her repertoire of practices. Similarly, in section V5.d, Madiha receives help from a peer, Ed, in using the cropping tool to remove redundant space at the edges of sprite characters after he playtests her game.

Turning to the practice of code patching, a guided technical process designed to scaffold the coding process (see Glossary and Chapter 2), video evidence and observational journal notes highlight the potential of coupling code implementation with target behaviour, structured within a framework of GDPs. This patching process became an important element of documentation. Although code was provided, mistakes occurred in practice and additional customisations were introduced. An example of code patching in practice can be seen in Toby's careful copying and pasting of different lines of code from supporting materials into his game project (see V1a).

Toby's success in using the code patching technique was supported by the UMC based structure of the game template in line with the UMC principles explored in the previous chapter and the high level of contextualisation provided by GDPs as a guiding framework in the learning design. This is illustrated in V1 when Toby alters the imported code producing a type of programming error I refer to as a glitch. This specific error occurs when the game continues to function but exhibits an unintended effect (see V1a). The glitch triggered an initial investigation prompted Toby to seek my assistance and required an iterative process of revision and cross-referencing with the original code snippet. From this and similar observations I propose that the tight coupling between code implementation and target behaviour in this case structured within GDPs scaffolds the debugging process and can be a valuable tool for facilitators.

Additionally the key affordances of the learning design including the starting template code snippets and the resulting code patching process appear to encourage the creation of glitch errors. The data in this section is further supported by observations on the growing diversity of helping strategies in response to different types of errors discussed in Appendix Debugging. I also explain the patching process in greater depth to participants in an extract from Vignette 9 (V9a). In the commentary (V9b) I propose that noticing celebrating and exploring the sources of unintended behaviours may function as an inclusive strategy to mitigate the potentially frustrating process of debugging. Considering the bi-directional process aspects of personal appropriation can also be inferred from the interpersonal interactions explored in the following section.

GDPs used in the process of guided participation

This section examines data on the use of GDPs from the perspective of interpersonal interaction. Here, the process of being guided into planned activities or peer collaboration is exploratory, contributing to interpersonal processes that facilitate the completion of tasks. As outlined in the previous section, personal understandings of knowledge can be observed within these interpersonal interactions, particularly in exchanges between parents and children. Based on observations of video data, I describe how GDPs are employed in diverse mediational strategies. I focus on three key categories of interaction that incorporate GDPs: the use of a provided menu of GDPs and supporting documentation, the role of GDPs in project ideation and prioritisation, and their function within the division of labour.

Use of a menu of GDPs to assist project navigation and resource organisation

Chapter 5 introduced my provision of a curated collection (menu) of gameplay design patterns to address the tension between participants' choice and the need for documentation to support the technical implementation of code structures. Appendix.themeing outlines the evolution of how the sub-categories of patterns developed and the rationale guiding them. In Vignete 9, I address the whole group, describing the webpage presenting the menu of GDPs as a hub to help choose project goals and locate tutorials and code examples. "It's almost like this is our control panel. You decide what you want to do next and we jump off from there." In this section, I summarise data on the use of the menu of GDPs, focusing on interpersonal interactions.

Toby, in Vignette 1 (see V1.8–V1.17), engages in independent work, copying code from a snippet example of the game design pattern he selected from a graphical menu of patterns. His ability to choose and implement new features using supporting documentation enables him to take on the role of a mentor, inspiring and assisting others in adding the same GDPs to their games (see V1.b). Toby's independence and effectiveness in this process align with existing concepts, including the use of shorter, just-in-time tutorials to reduce barriers associated with more extensive instruction-based approaches, particularly those related to literacy (Resnick and Rusk, 2020; Dietz *et al.*, 2021).

Vignette 2 (V2.a) observes parent Susanna (p)'s use of a tutorial to address the goal of

implementing her child's chosen GDPs. Susanna, who is limited in her programming skills, leverages the concept of GDPs, particularly to access written step-by-step instructions to make progress. She prefers to avoid seeking facilitator help (see V2.b). The participants' choice over which GDPs they tackle can create a personal connection to these goals, a process that may help reduce feelings of alienation from coding or game-making culture (see Tehillah's positive reaction in V2.a and V11).

While the evidence supports the potential of a menu of GDPs to address the tensions between choice-based approaches and the danger of a lack of relevant scaffolding, there are some important clarifications to make at this point. Firstly, not all participants engage with this menu: a later section shows how GDPs picked up by one learner, via provided documentation (e.g., Toby), are propagated in other ways. For example, in Vignette 3 (V3.a), Ed cedes this aspect to his father in a way explored in the section below on division of labour. Secondly, there are potential issues concerning the validity of observations on the use of the GDP menu (and concepts) as navigational and organisational tools by participants, due to their nature as being introduced for that purpose. The danger here is of circular reasoning in methodology. At this early stage, this study acknowledges the potential of circular reasoning but observes the potential of GDP adoption and, in particular, the evolution of practices by participants. In addition, this process of using GDPs in this way was also discovered via an exploratory DBR approach, and thus its introduction is also significant and cannot be divorced from the aspect of participant reaction. Additionally, the potential of GDPs as a germ cell concept (as explored in Chapters 3 and 5) is explored in greater depth in the following chapter.

GDPs used to scaffold ideation and prioritisation processes

Addressing the tension between participant choice and scaffolding via menu of GDPs, my journal notes on the shift from P1 to P2, I noted that the provision of this menu of GDPs significantly decreased in time spent in the ideation phase by providing scaffolding and restricting choice. Beyond this immediate impact, this section outlines how the use of GDP concepts and supporting tools were used in ideation and project organisation, specifically: as a lingua franca, as a visual prototyping tool, and within participant gestural interaction.

Video data surfaced frequently use of GDPs terms as a lingua franca to organise and prioritise game making activity. An exchange from Vignette 3 between participants Ed and Mark shows the use of GDP concepts to help resolve a tension between a more chaotic style of working jumping from one goal to another and a parental motivation to prioritise work. The pair's initial listing of features is a brainstorming technique using the approximate names of game design patterns (*get the person animated*, *get an enemy in*, *changing the platforms*, *make a theme tune*). The vignette analysis sees the parent *overwhelmed* with the child's lack of focus on one pattern "*that's what I mean, you can't just skip around like that*."

In Vignette 7 (see V7.a), home-based knowledge of GDP mechanics is utilised on an interpersonal plane, with Dan(p) helping Toby(c) via guided facilitation to provoke and shape new design ideas. Dan(p) draw on the game playing experiences to promote innovation in the design of the existing template: "*the previous style of game was a platform (makes shape with*

hands) game wasn't it? You went along and there was gravity pushing down. There are other types of games aren't there?" The pair use their knowledge of game play patterns and genre conventions to break out of the genre constraints of starting template. Here they are charting new territory beyond the curated choices of GDPs and as such may not have vocabulary to express concepts. Both Dan and Toby make extensive use of gestures in their interaction reinforces their spoken references to GDP concepts.

In the same vignette (see V7.12-16), Toby uses the code based tilemap tool to design a maze game instead of a platformer game drawing on existing knowledge of tools and home knowledge of the target game genre to rapidly make revisions without extensive planning. This use of GDPs to allow the spacial exploration of design in a visual and intuitive way suits being mapped onto paper, or onto graphical software which allows for a similarly rapid prototyping. By way of contrast, other pairs take advantage of paper prototyping (see Appendix.prototyping). For example, Susanna(p) notices the child's difficulty in using cursor and delete/backspace keys to edit a matrix allowing level design. The parent provides a book with grid paper to allow the child to replicate the matrix. The parent is then able to transcribe the design to the code example while engaging the child by checking she has interpreted the design correctly. The use of GDPs to support visual prototyping is also undertaken by Mark and Ed explored in more detail in Appendix.tech.prototyping

To end this section, it is of value to link this use of GDP terminology and visual prototyping techniques to existing research on the development of shared language to support joint work and guided participation. While much research on teaching coding addresses the benefits of collaborative approaches (see Chapter 2), fewer studies outline strategies to facilitate such joint attention (Brennan, 2009). The work of Stahl and others (Stahl, Koschmann and Suthers, 2006) within the fields of technology use and collaborative learning is relevant here to highlight the importance of language development and the intersubjective interpretation of visual prototypes and gestures as tools in building mutual understanding in the kind of *joint problem space* we see in this study. Returning to Kynigos's interpretation of the half-baked game as a boundary object facilitating communication (Kynigos, 2007), we can locate the diverse forms of GDPs as such *boundary objects* at a scope of greater granularity.

GDPs aiding the process of division of labour (1400)

Addressing division of labour on an interpersonal plane, participants worked mostly as pairs or individuals, alternating between community playtesting and pair/individual design work. Turning to the use of GDPs specifically in DoL as an organisational strategy, structuring work processes through implementing modular sub-projects in the form of GDPs can aid division of labour. GDPs feature in processes division of labour in a variety of ways: working knowledge of different types of GDPs can help participants to divide work by working on different patterns or taking on project elements within patterns.

In Vignette 3 (V3.a), Mark(p) repeatedly steers his son Ed to pick one GDP for them to carefully work through the associated documentation together, a process he later refers to in interview data as *plodding* . Early in that session Mark takes a significant amount of time puzzling over

documentation on how to add animation to a character. This results in Ed being blocked from progressing and to address this tension child proposes dividing their labour and workig on two separate computer (see V3.9 "*Why don't you go there for a computer and you can do that?*"). Ed appears to make a tactical decision allowing the father to specialise in GDPs that involve deciphering technical instructions, whilst he engages with a pattern that involves creating audio and graphical assets in a less technical, more exploratory process.

While in this case, a decision was made to work side-by-side on the same game using different computers, data uncovered other ways in which the participant divided the process of game making, in ways which uncovered traces of home collaboration practices. For example, In Vignette 2, Susanna(p) and Tehillah(c) relied on the parent to do the majority of code implementation but shared one computer. The parent took a lead on many activities but took care that they alternated between use of keyboard and mouse to give the child hands on experience when possible, particularly in level design activities and playtesting (see V2.7). In interview data (see V2.b), the parent notes "*I resist the urge to fix things immediately when she struggles.*" In another exchange (see), Tehillah (c) uses the name of a GDP within a request for her parent to take on a specific task within their making process, "Go on then. Key-Door person." When the parent expresses confusion Tehillah gestures with her hands to indicate that her mother is the person she is referring to. The child appears to consider the level of complexity needed to add a new pattern into the code to be beyond her ability and thus directly delegate the task to her mother. At times Susanna(p) asked Tehillah(c) to seek help from facilitator (V2.1). On another occasion when the child appeared bored of waiting for parent to solve a code problem, she approached the facilitator to ask for help on behalf of the adult without prompting. At other times Tehillah(c) engages more peripheral activities such as watching older children playtest each others games, or observing community activity from under the table.

Madiha's(p) family Nasrin(c) and Zidane(c) are all working on separate games on different computers. While Madiha sits next to Zidane who needs closer support, Nasrin often sits close by but next to a friend. In Vignette 5, as part of her process of building an emerging identity as a graphical asset designer (see V5.b), Madiha calls across the room to draw on Nasrin's help to correct a design mistake. Nasrin affects reluctance in her support of her mother (see V5.a), but at other times shows that she enjoys her status of technical supporter (see V5.d). Nasrin appears reluctant to explain the technical processes she uses to help her mother:
"*Madiha (to Nasrin): What are you doing? You have to tell me what you are doing so I can do it myself.*" This may be driven by a desire to preserve this specialist status and utility to her mother.

Toby adopts different working arrangements dependent on which family members he attends with. While in P2 when supported by grandparents Toby had worked mostly alone (see V1), in P3, he works as a pair with his father (Dan) in closely guided practice (see V7.b). In several interchanges, the father starts as a facilitator, taking a lead from the direction of the child. As the child reaches the limits of their ability, he begins to be more directive, by asking leading questions and testing existing knowledge. Finally, in order to complete the programming or research tasks beyond the child's knowledge, the father is more direct in instruction, directing the research and proposing a coding solution for their new game design pattern. Dan's experience as a software engineer and volunteer at Coder Dojo (see glossary) is relevant as a fund of knowledge he draws on (see V7.a and later section).

While the context of the participants as families involved in home education makes any general claims difficult, these observations support findings in other research in this domain. For example, research shows that children have the potential to help parents as technology brokers (Correa *et al.*, 2015). In joint technology work, parents can fulfil several reciprocal roles including collaborator, resource provider, learner, non-technical consultant, and emotional support (Barron *et al.*, 2009). Thus, in response to the creative support that parents and siblings provide, facilitators should design learning environments to facilitate these possibilities. The work of Roque provides guidance for helpers in the process to support parents to value and feel confident in these roles (Roque, Lin and Liuzzi, 2016) in a way which mirrors the use of helpers in this phase of my study (see Chapter 4). While these examples involve GDPs, others are explored in relation to the development of agency in the following chapter. The examples above illustrate part of some of the varied strategies to divide labour adopted by participants at times involving complex tensions in activity. For example, Madiha and Nasrin reversed the traditional helping relationship, and the child would reluctantly implement the parent's requested technical elements of GDPs but would pointedly not explain the changes made, seemingly taking pride in knowing something that her mother didn't.

Similarly, while Tehillah's activity away from the screen while non-productive within the scope of technical progress, can be characterised as legitimate peripheral activity of observation of community activity (Lave, 1991 ; Rogoff, 2014). Indeed the possibility for children to *not* engage in community activities is seen by Rogoff (2003; 2016) as an important characteristics in participation based models of learning.

The variety of repertoires of helping practice depends in part on the different funds of knowledge the parent has access to. Toby and Dan's pair process is more guided and focused than many other participants and includes accessing professional documentation and exploration of computational thinking concepts. While the helping pattern of researching and accessing technical documentation is available to all pairs, due to the level of skill and experience involved, other technical processes are developed by most participants and are explored in the next section.

Use of GDPs in the cultural plane / community level of activity

Following Rogoff's (Rogoff, 1995) three planes approach to analysis, the following section explores the use of GDPs at the community plane of activity. While Rogoff's earlier analysis of activity on a cultural plane emphasised the metaphor of apprenticeship, focusing on an already existing community, her later work with Gutiérrez (Gutiérrez and Rogoff, 2003) places greater emphasis on cultural activity as dynamic. This perspective examines existing and emerging norms and repertoires, adapted from participants' engagement in other communities and contexts.

The role of GDPs to facilitate learners to design for others

The use of GDPs, particularly during playtesting, can support the process of imagining end-user experiences. This section examines how the concept of, and experience with, implementing GDPs encouraged participants to envision the experience of end users of their games. Chapter two explored the proposition from professional and participatory design processes that design should be informed by end-user experience (Redström, 2006), as well as the challenges involved in undertaking such an "*operationalization of empathy*" (Surma-aho and Hölttä-Otto, 2022, p. 1). From a CHAT interpretation, this process involves shifts in perspective by participants as they engage with objectives across different scopes of activity. For instance, in the vignette above, Tehillah (child) pursues a quirky design goal during her paired design work, which Susanna (parent) resists. Imagining a shift in perspective to the intended audience at a community level of interaction, the parent aims to ensure a sense of challenge for the imagined player.

Susanna shares "*Must be quite hard to get through that door.*" when Tehillah places the exit door high above a platform. She then continues, "*It's no fun having a game without any hazards to avoid.*" Tehillah (child) seems determined to remove all hazards. "*It is for me!*" she counters. She may be aware of the implications for game balance but takes pleasure in this destruction of the key challenge of the game as an act of disruptive play. However, a later interaction with a peer shows that Tehillah (child) is indeed imagining the experience of the immediate audience of fellow game makers and supporting students. "*I like making it frustrating. That other people find it frustrating!*" Tehillah (child) notes the persistence of a student helper who pushes past her frustration to complete the game. Her remark, "*If people tried hard they would get to my level,*" shows her awareness that not all players will persist in the same way to reach her final level, which has only rewards and no hazards. This being a "*secret, special*" experience, which plays against the norms of platform game design, is thus intended to provoke player surprise.

There are other examples of how concepts of game challenge and other aspects of gameplay experience evolved through informal feedback during playtesting and served to influence peers to modify their games to increase the enjoyment of peer players. The discussion of game challenge, specifically comments about how 'hard' participant games were, was a particularly common interaction during playtesting. Vignette.challenge outlines a key interaction which demonstrates norming behaviour towards Madiha(p) who has concentrated on the graphics of her game to the detriment of the level of challenges. In particular, the controls of the game are frustrating. The vignette shows varied attempts to influence Madiha to change the game variables to make the gameplay less frustrating. They praise the look of the game but offer feedback on the experience of the game mechanic of jumping. While the players do not tell Madiha directly to change the game, these comments appear to direct the direction of the design to comply with an emerging community norm of how a player jumps should feel, stemming from the participants' feedback on the feeling of lack of control over the player's character in the game. These behaviours are some of the informal norming behaviours that are less directive, seen in the work of Rogoff and colleagues, as explored in the literature review (Rogoff, 2003).

The examples explored above serve to highlight two dimensions of the use of GDP concepts to facilitate the process of designing for others. The first is the influence of making in a cultural setting where regular playtesting by peers occurs on the making process. The second is through

either direct advice by pair partners and peers in playtesting to imagining others' user experience, or indirectly by gameplay feedback or suggesting alterations to GDP implementations. This research is in line with other studies which explore the potential of tangible, public digital products as both a motivating and focusing factor in computer-supported collaborative learning (Fields, Vasudevan and Kafai, 2015; Xambó *et al.*, 2017). The results here help address a deficit of results in this area (Silva, Mendes and Gomes, 2020).

GDPs can facilitate the use of wider funds of knowledge and interest

GDPs can allow participants to share and explore funds of knowledge and interest in the emerging learning community. One premise driving my exploration of the use of gameplay features in pedagogy is that the tacit knowledge of gaming conventions among most family members is extensive, even if they are not avid gamers, due to the extensive influence of video game culture in mainstream culture, including contexts of family life (Itō *et al.*, 2010; Livingstone *et al.*, 2018), particularly retro gaming (Heineman, 2014). As such, the process of facilitating ways to surface and work with such tacit knowledge aligns with Moll's concept of funds of knowledge, and, potentially, funds of identity (Esteban-Guitart and Moll, 2014; Fasso and Knight, 2020). Within a CHAT framework, these funds of identity and knowledge can be seen as tools that facilitate the transfer of potentially useful concepts and practices across the boundaries between activity systems, in this case, between home activity and that happening in this game-making community. The associated inclusive benefits of working with participants' home interests are explored by Barron (Barron, 2006a, 2010) and similar work by Gutiérrez on third spaces (Gutiérrez, 2008). Existing research outlines the motivations for social making incorporating gaming cultural elements (Gee, 2003; Itō *et al.*, 2010) and the ability to make personalised game assets and narratives, which sustain engagement in digital making projects (Sefton-Green, 2013).

In the last chapter, I outlined processes facilitating participants in creating and incorporating graphical, audio assets, and narrative elements into their games, and, referencing Appendix.tech.gameframework, briefly outlined how these elements were themed as Game Polish items within a typology of GDPs, which aligned with the MDA (mechanics, dynamics, and aesthetics) game element framework explored in Chapter 2. The different types of GDPs available to participants to choose from in the menu of GDP documentation and code snippets allowed for a choice in participant making paths, enabling alignment with home interests. This point is well illustrated via the domain of polish/aesthetics in Vignette 5, where Madiha and Nasrin show identification with the graphical-making process and the process of bringing that aspect of creativity into their games. Beyond their internal family interaction, they share this artistic flair and attention to detail with the emerging learning community. Another pair Clive and Pearl, the grandparents of Toby, included a narrative message at the start of their game surfacing the interest and expertise of the family as beekeepers (see V6). This sparked interesting conversations with other participants.

In addition to issues of aesthetics, home knowledge of game mechanics and dynamics (the M and D of the MDA framework) also contributed to emerging cultural repertoires. As explored in the previous section, Vignette 4 gives several examples of participant feedback on the dynamics of

Madiha's game in the level of the challenge experienced by players. Peers shared their experience of what makes a good game to bear in the feedback they shared. Turning to the area game mechanics, In see V1.b Bertie(c) comments on Toby(c)'s game, which has a dominant game experience of timed jumping: "*It's like parkour in Minecraft but timed. It's like playing the game Wipeout. Have you ever played Wipeout?*". Parkour in Minecraft and Wipeout are both game experiences whose main gameplay mechanic is about judging jumps and landing accurately. Bertie makes links to his existing experience of games, making comparisons between Toby's game, commercial games, and his own. In doing so, Bertie is able to show his knowledge and analysis of gameplay patterns. Additionally, the guidance of Dan(p) for Toby(c) explored above in Vignette 7, saw the parent explicitly drawing out the child's home knowledge of games to enable an exploration of a different set of game mechanics. Thus, the tacit knowledge of GDPs of children and adults as game players serves them in knowledge-brokers roles in the process of feeding back and ideation (Wenger, 1998).

Thus observations from video data in this study support existing research which highlight the motivating potential of incorporating home interests in games, coding and media projects (Papert, 1980; Resnick, 2012). They also support findings of other research on the use of funds of knowledge and interest in digital projects as motivating factors and as a way to overcome barriers to alien cultures (Moje *et al.*, 2001; Gutiérrez *et al.*, 2019). This research also aligns with PBL research that indicates that allowing participants to incorporate home interests can be highly motivating both in initial stages (Swirski, Baram-Tsabari and Yarden, 2018; Penuel *et al.*, 2022), and to sustain activity and overcome problems in order to share the personalised object created (Barron, 2006b). I also propose that this use of the MDA framework as a way of providing varied learning pathways has potential to aid facilitators to align with existing inclusive pedagogy, a point I explore in more detail in the discussion section.

Evolution and propagation of GDPs concepts during playtesting

Within the emerging idioculture of the game-making sessions, and during playtesting in particular, the implementation of popular or novel GDPs by participant pairs or individuals is often spread through peer activity. Both documented (those part of provided resources) and novel GDPs (those introduced by participants) were transmitted between participants, enriching the games of participants. At times, participants were influenced by playing the games of others, and at times, they would request the direct help of peers to implement GDPs in their own games.

As the process of playtesting emerged, community norms began to develop, some of which were influenced by home experience of game playing. Vignette 4 (V4.a) outlines the community norming of Madiha(p)'s game to conform to expected standards of a platform game. In Vignette 1B, Toby's work adding 21 levels to his game is noticed by Bertie who then asks Toby, "*Can you show me how you add more levels onto yours?*" The full exchange shows an example of the propagation of GDPs emerging from the process of community playtesting through a direct request. It is possible that Bertie's request to Toby is prompted by Bertie noticing Toby helping Nasrin and Harper add levels to their games. Toby's emerging role as a specialist that the community can draw on for practical help, and similar examples (see also that of Nasrin in Vignette 5), were welcomed by me as a way to reduce dependence on myself as a facilitator, or

to provide an alternative to the instruction-based support documents.

In addition to the propagation of GDPs offered in the menu of supporting documentation, other gameplay patterns and related design concepts emerged organically from the community. The concept of a safe zone in the game of Pearl and Clive arrived as a direct result of adding many *moving enemies* in a way that it became essential for players to quickly identify and use ‘safe zones’ where enemies did not reach. As such, this concept, not used in any facilitator provided resources, became used frequently in the playtesting of that game.

In another example, Tehillah’s concept of a level that eschews challenge and offers only rewards emerged through playful experimentation (see Vignette 2). Susanna(p)’s alarm at the child’s deletion of all elements of hazard shows she has too keen a sense of game balance to ensure a sense of challenge for the imagined player. “It’s no fun having a game without any hazards to avoid.” The child seems determined to remove all hazards. My understanding is that she is also aware of implications for game balance but is taking pleasure in this seeming destruction of the key challenge of the game as an act of disruptive play. Other players also created impossible or overly easy game levels. They seem to take pleasure from ignoring concepts of what should be done to maintain game balance and from the sense of shock from their current audience her parent. Going against this convention is a type of playful destruction in this context. The process mirrors play theory concept of playing against the game or dark play (Sutton-smith, 2001).

These novel concepts may have emerged spontaneously or have a source in part from participants’ funds of gaming knowledge. In either case, once a concept like that of safe zone enters the linguistic and coding repertoire of this community of game makers, it facilitates propagation based on the interest of other participants.

The process of emergence of novel repertoires which drew on GDP concepts, and wider, existing practice aligned with the motivations of this study. Therefore to try to support their development I introduced some additional social missions described in Chapter 5 and described in more detail in Appendix.makertypes. Paralleling Bartle’s player types (Schneider, Moriya and Néto, 2016), the concept of maker types addressed observations of the varied sub-goals which emerged in playtesting. Recalling the barriers to participation explored in Chapter 2, my rationale for exploring maker types with participants was to promote awareness of pluralistic programming process (Papert and Turkle, 1990), and a message that when you are learning something novel and challenging, there is value in incorporating your existing working preferences and techniques in the process. Rather than proposing that these styles make up a rigid typology to be replicated in other settings, instead, in line with Gutierrez and Rogoff (2003, p. 20) , that the process of co-constructing understanding and communication about learning styles can “support the changing nature of participation and the forms of assistance provided in joint activity.”

Thus, similar to the way tools were modified to provide new affordances for participants, in P3 I began to encourage these processes by introducing a drama process incorporating *social side-missions* to augment the affordances of the playtesting environment. The process of exploring identity via side missions in this way surfaced the cheekiness of some young people and the pleasure they took in demonstrating their playful mischievousness. Many of the social missions encouraged activity outside of strictly productive design activities: for example, the lively

discussion about game playing in response to the mission to *find out the favourite games of 3 other people*. In observations of video data, I was struck by the high degree of flexibility and variation present in participant behaviour. In the following section I begin an analysis of other emerging characteristics.

Discussion

Addressing the use of GDPs in relation to theoretical understandings of processes of mediation and incorporation in repertoires of practice

This section begins an interpretation of the diverse roles of GDPs in the game-making activity using CHAT concepts, with this analysis continuing in the following chapter. Addressing GDPs as a mediational tool, Chapter 5 outlined design decisions, and this chapter explores the impact. For example, the uses of the quick-start activities, tutorials, and code snippets as supporting tools, if viewed in isolation, can be seen as a more straightforward, triangular form of subject, tool, and object mediation (see Chapter 4 diagram). This chapter, along with the evolution of the learning design, exposed tensions where existing mediational strategies or tools were insufficient, and thus innovative forms of mediation were needed. Elements of the innovation in the toolset of learning design, based on the emerging needs of the participants explored in this and the previous chapter, exemplify the development of new mediational strategies and tools. In line with Sannino (Sannino, 2022), this study frames such innovation within CHAT as transformational agency, a discussion of which forms a significant part of the following chapter.

By way of contrast, Gutiérrez's (Gutiérrez, 2008) focus on the movement of identity between settings' repertoires of practice draws on the importance of a wider cultural focus of the learning process, or the "cultural mediation of thinking" (Moll, 1998), cited in (DiGiacomo and Gutiérrez, 2017) p.44. Gutiérrez sees a role for facilitators to facilitate this via learning design. In this chapter, the last section examining activity on the cultural plane exposed elements of transfer between different activity systems, supporting Gutiérrez's (Gutiérrez, 2008) perspective regarding the importance of transcending borders and linguistic practices between sites of learning.

The examples in this chapter show the importance of GDPs as a lingua franca, as a mediational strategy to facilitate these kinds of flexible, responsive collaboration. The process of playtesting often served as a facilitative medium for a shared language and idioculture to emerge and, as such, became a significant part of the pedagogy of the learning design. The use of GDPs in design and in community interaction became integrated with other home and technical practices into an idioculture (Cole and Packer, 2016): a local, non-geographical, non-demographic community where culture emerges via valued behaviours (Lecusay, 2015). This chapter has demonstrated that these behaviours could be undertaken in many ways, including those requiring little commitment. For example, even if participants only noticed the use of GDPs and used approximate terminology to comment on them during playtesting, this form of activity can be seen as legitimate peripheral participation (Lave and Wenger, 1991; Guzdial and Tew, 2006), and thus a helpful practice contributing to the emerging ecosystem of the learning community.

Observations on emerging design practices

The cultural section above identified the development and the value of flexible design processes in a way which invites discussion on how best to conceptualise these flexible approaches. Firstly, it is notable to make the flow theory in my guiding motivations in terms of participant experience (Perttula *et al.*, 2017). As a facilitator, my design decisions were often guided by the desire to not detract from participant experience of flow, and thus their coding fluency and engagement in and identification with the overall game-making process. This section synthesises my observations on video data and my own journal reflections on this topic of designing for flow. Flow is a highly subjective experience, and as such, there is a danger that I privilege my own interests in this analysis, and a tendency that I reflect on in the concluding chapter. Beyond fluidity, I now identify and explore other characteristics of the emerging design practices and potential strategies to support them. These include: a flexible approach to design stages, varied forms of incorporation of external repertoires, and a tension between choice of participant pathway and creative restrictions in the learning design.

Observations of participant design behaviour did not align with common design thinking concepts or advocated in design cycle frameworks (Resnick, 2007; ẆiNarno *et al.*, 2020; Dam, 2024) as I initially thought might be the case. The stages were instead fragmented and sometimes happened in parallel. In many interactions, I observed improvisational approaches which incorporated ideation, planning, implementation, and testing in the space of a minute or so. As typified in vignette 1 and 5, some younger participants, in particular, developed impressively fluid practices, demonstrating extremely rapid shifts between code editing, game testing, authoring assets in online tools, and migrating files, often while talking with peers. Some older participants also showed rapid, responsive creativity. Grandad Clive quickly incorporated a boost to player health after a level after being given feedback during playtesting. If I had encouraged participants to follow prescribed design stages, this may have restricted this flexibility in practice (Kuby, 2016).

In Vignette 4 (see 4.c in particular), we see Ed(c) break out of the more restrictive approach of plodding that Mark(p) advocated for to engage in experimental, improvised design processes with no clear end goal. Mark (p) later joins in Ed(c)’s exploration of sound-making software. They start a process of tinkering and messing about with the capability of music-making tools in a way that spurs creativity. In this case, the joint improvised process sparks a new proposal to incorporate the two soundtracks they create in distinct levels.
Other pairs often adopted a similar spirit of collaborative improvisation. In V7 Dan(p) makes a suggestion - “Use paper to design?” - to which Toby(c) replies, “I’m just going with it.” These examples and many observations in this chapter show a variety of ways that home interests, division of labour, and varied repertoires from other activity systems are incorporated into new practices.

Given the disparate nature of the features of designed and emerging pedagogy, it is of value to address ways of conceptualise the overall learning process. While the chaotic directions possible in design evoke a rhizomatic approach to learning (Cormier, 2008; de Freitas, 2012; Biffi,

Bissola and Imperatori, 2017), I concur with Biffi et al (Biffi, Bissola and Imperatori, 2017, p. 972) who identify significant competencies required which are not well-aligned with the age group of this context. While supporting a flexible learner pathway is vital to this approach, the value of restrictions to creativity are also important here. The restricted genre, pixel art format and templated approach act not only as technical scaffolds but also aligns with research on the value of constraints in facilitating rapid creative improvisation in the areas of music and drama. The domains of programming, game jams and hackathons also use constraints in a similar way (Gabler *et al.*, 2005). Thus, I now explore the tools, process and the community in this study mutually encourage an flexible approach often referred to as *jamming*. As explored in Chapter 2 existing research suggests that Game Jams can be profitably used in education contexts (Aurava *et al.*, 2021), although there is no agreement on the characteristics game jam pedagogy, and scant guidance on how to address potentially problematic issues (list these),

The characteristics described above offer a contribution to the literature on Game Jam pedagogy and learning design of this study offers greater scaffolding to the process to facilitate the process of jamming as a way of encouraging co-development of practices and making styles as proposed by Gutiérrez and Rogoff (Gutiérrez and Rogoff, 2003). The characteristics of the design process outline above can be located in the process of jamming in a musical context. For example a song jam is an introduced, familiar framework restricted in that it based on a familiar popular song, within a template of a recognisable genre. However, improvisation and bringing your own style to the process is welcomed. Furthermore, this process is augmented by the group element of the musical jam process where makers pick up techniques from other makers in the group. The value of such metaphors on group coding practice, in particular to explore agency is continued in Chapter 7.

Conclusion

On a theoretical plane, this chapter has outlined the evolving use of GDPs as a meditational strategy to develop coding repertoires that are often shared. CHAT frames diverse use of shared resources and concepts, in this case GDPs, as meditational strategies which can involved into repertoires of practice (Lecusay, 2015; Gutiérrez *et al.*, 2019). On a cultural plane, using GDPs can aid the propagation of technical and social processes game making practices within an emerging community of learners. GDPs served both researchers and participants by *providing a common language* to clarify first learner expression and researcher’s analysis of gameplay experience.

The observations of this chapter show the advantages of GDP as an relatable design framework, occupying a the space between too concrete to be repeated and too theoretical to be grasped by novice game makers. An exploration of this aspect follows in the next chapter. In addition, the framing of learning as participation with community repertoires, is explored in the next chapter in relation to participant agency.

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Special Appendix - Participant Vignettes

The following vignettes have been extracted from video recordings of screen capture files and for some vignettes, where possible or profitable, augmented with descriptions of physical interactions taken from 360 camera data. The process is described in more detail in Chapter 3.

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Summary of data cited in Chapters linked to evidence

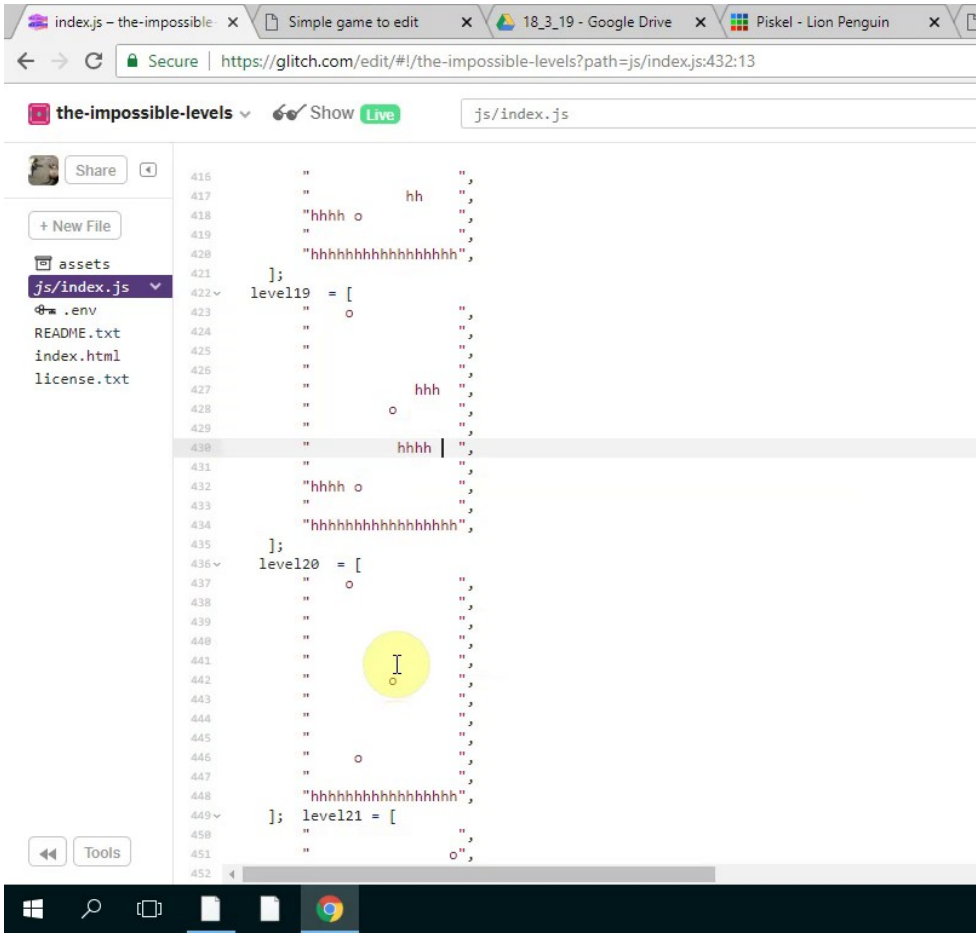
Chapter Six Table of GDP use

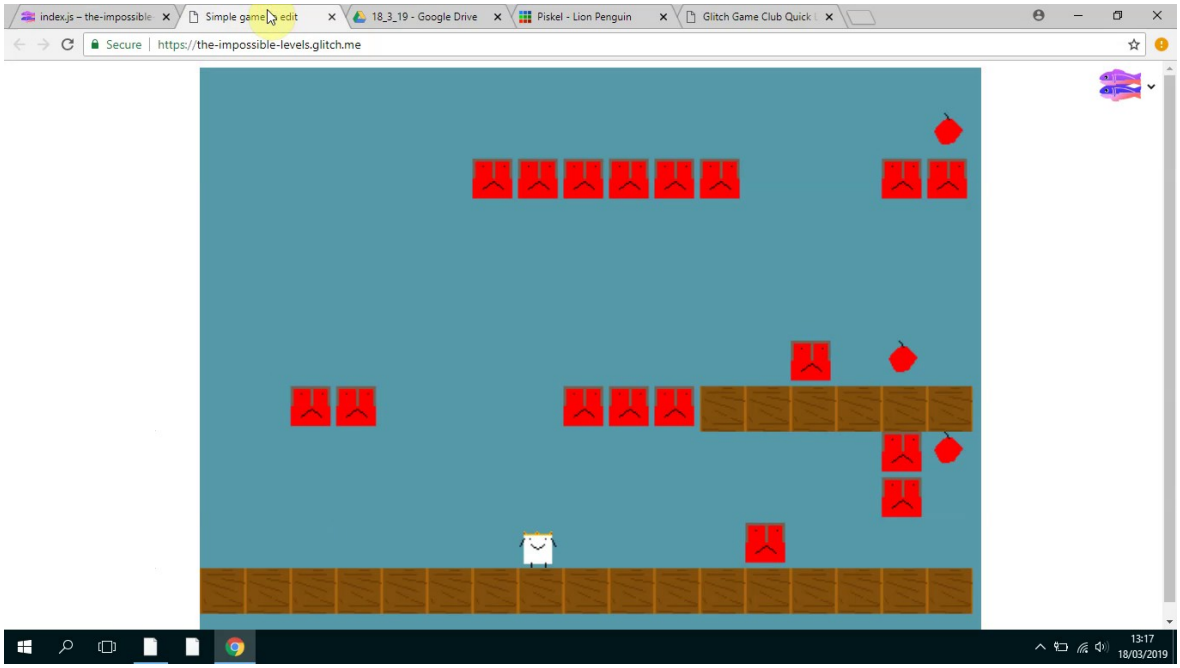
This table included in chapter 6 helps answer RQ2: How does CHAT theory help us understand how game design patterns x can be used in an evolving community of novice game makers?

GDP usage in game making	**Description (using CHAT concepts)**	**Examples in data – click links to move to evidence in vignette**
Personal appropriation:		
GDPs used in appropriation of personal knowledge.	Facilitators can use existing and planned GDPs to surface computational, design and systems concepts embedded in games. Beyond curicular knowledge, participants demonstrate concrete and varied design knowledge. Careful template design can aid experimentation with game dynamics via rapid prototyping techniques. The implementation of GDPs can stimulate participants to adopt or to share technical processes.	Personal appropration of learning map concepts: V2.c , Appendix.learningmap Fluidity of design operations: V1.3, V1.6, Use of code patching and code snippets in V1 Debugging in Vignettes 2, 1, Present in x out of y coded sessions.
Guided Participation / Interpersonal focus		
GDPs as a framework for supporting resources and navigation	The restricted set of GDPs can serve as a framework for code examples and step-by-step tutorials. Presentation of documentation of GDP implementation as a menu or collection can facilitate flexibility of learner pathway and diversity of end design and without restricting access to resources beyond programme based support	Use provided of step-by-step docucmentation V.2 , V3.a Use of code snippet examples: V1 Utility of a graphical menu and map of GDPs: App.theming Present in x out of y coded sessions.
GDPs used to scaffold ideation and prioritisation processes	GDP concepts can guide ideation processes in diverse ways including: use of GDP terms as shortcuts in ideation and prioritisation, the use of visual code structures	Use of GDPs concepts by participants during ideation: V2,3 ,V7.a GDPs altered via visual prototyping: Appendix.prototyping, V7.10 Discussion of GDP dynamics facilitated by template game structure: Present in x out of y coded sessions.
GDPs used to aid the process of division of labour	Participants can split work and resolve working blockages by allocating different GDPs or parts thereof. The use of GDP concepts as a lingua franca and the sometimes modular structure of GDPs help the division of labour as participants to divide work by working on different patterns or taking on project elements within patterns, sometimes building specialisms in the process.	Dividing work between pairs by pattern based on difficulty or aptitude: V3.a, V2.b Alternating between coding tasks and other non-coding tasks in Vignette 2. Parents shifting from facilitating role to a more directive role: Vignette 7 Present in x out of y coded sessions.
Cultural activity focus		
GDPs can encourage learners to design for others	Referring to the impact of implementing or changing GDPs can help scaffold the process of imagining the	GDPs used to stimulate awareness of designing for others: V2.c

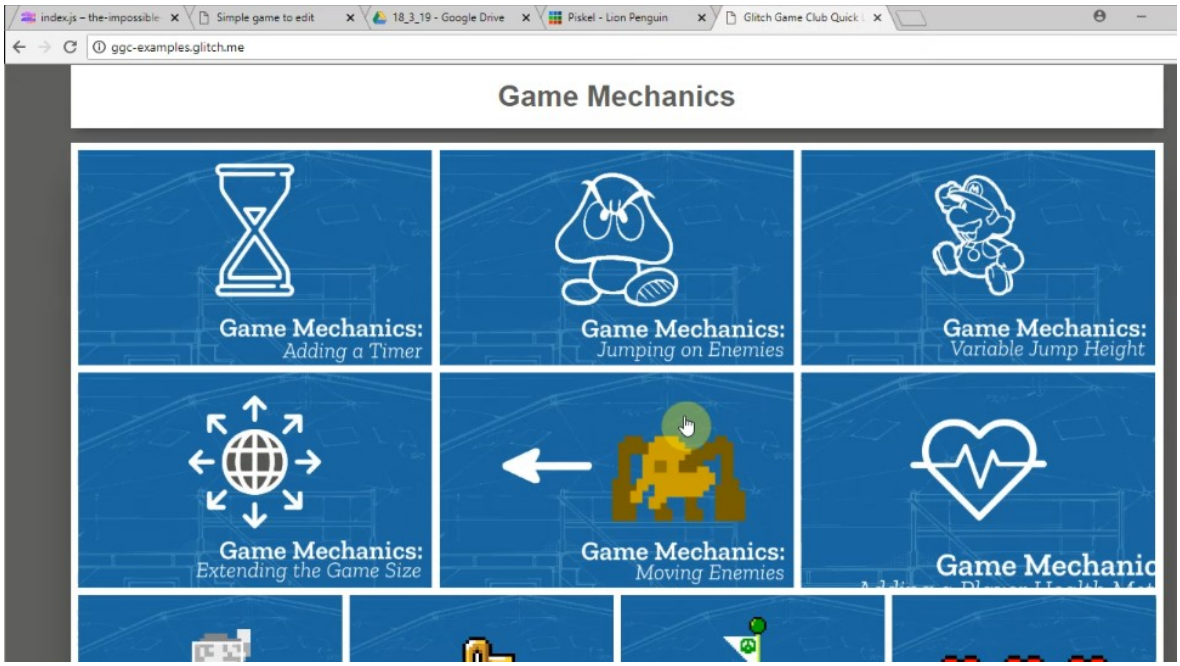
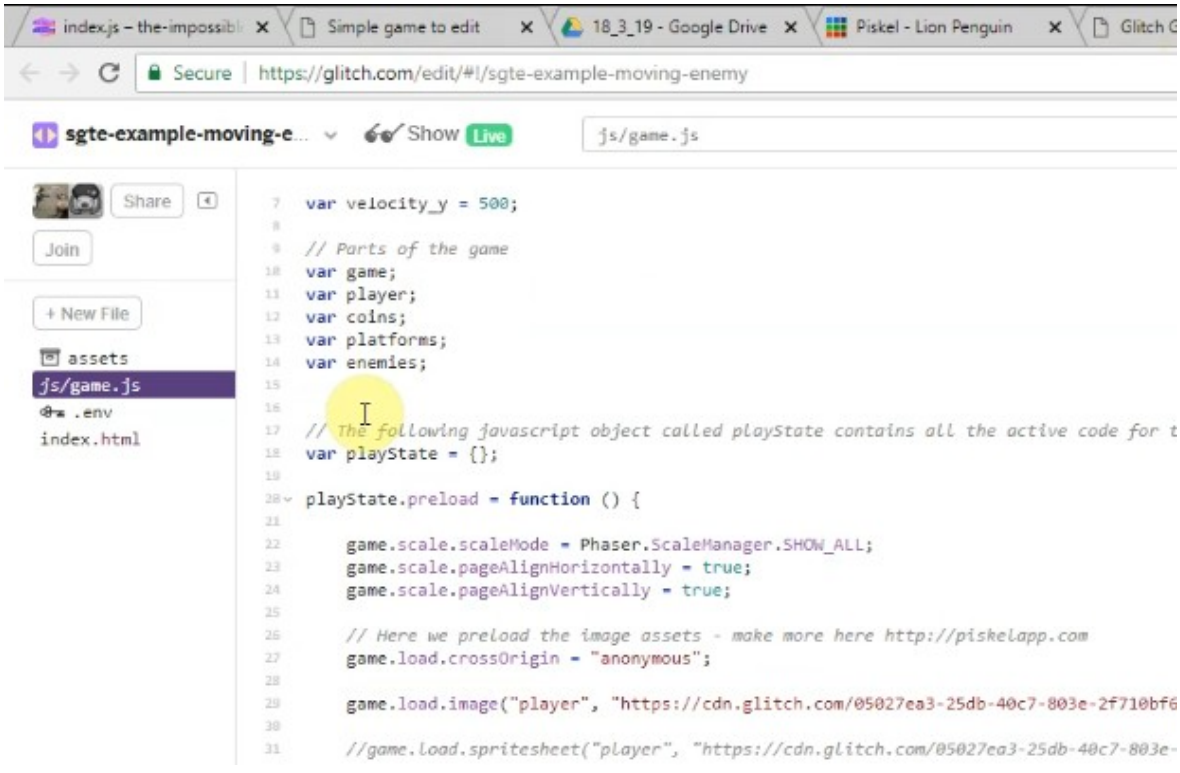
	end user experiences.	Present in 8 out of 12 coded sessions.
GDPs facilitate the use of wider funds of knowledge (FoK)	Three dimensions of GDPs (mechanics, dynamics and aesthetics) can be used by participants to share and explore FoK and other interest within the emerging learning community.	Via incorporation of home interests and FoK in game narratives: V6.a and assets: V6.b Coding and documentation practices: V7.a Bertie's sharing of knowledge of game mechanics in Vignette 1b Present in x out of y coded sessions.
GDPs are propagated into the community through playtesting	New GDPs emerge often from the merging of home knowledge, technical processes and existing patterns. The implementation of popular or novel GDPs by participant pairs or individuals is often spread through peer activity.	A popular GDP implementation becomes a subject of community activity: V1b Present in x out of y coded sessions.

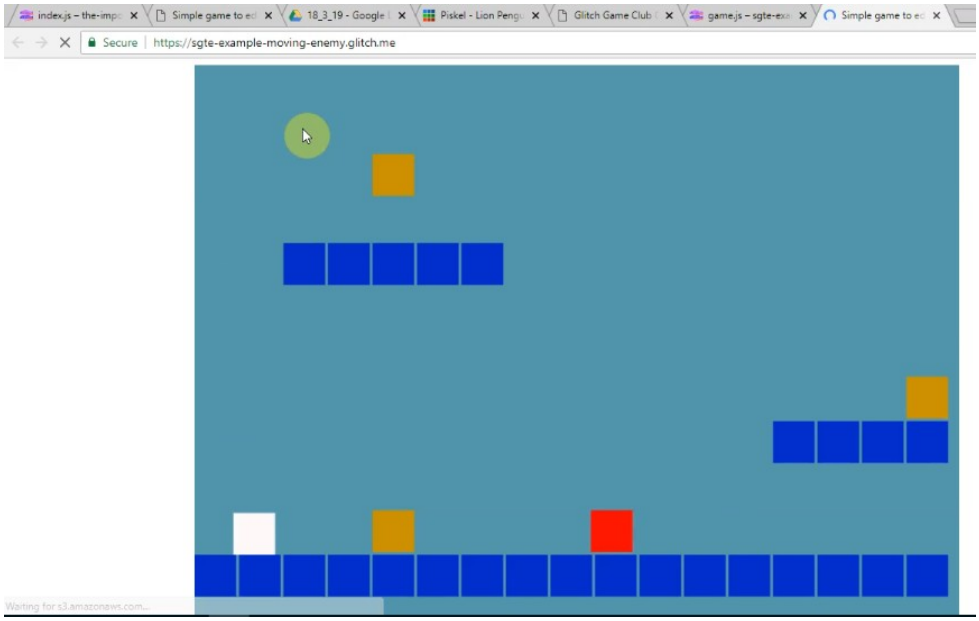
Vignette 1: An extract of Toby and Veronica's coding activity

Key	Dialogue	Activity
V1.1		Toby (T) returns to his computer. Open on the screen is a web browser with several tabs opened. The active tab shows the code view of Te's project in the code playground glitch.com. Toby has extended the starting template of the game from its initial three levels to over twenty.
V1.2		
V1.3	Mick makes an announcement to all participants: I don't really have much to say now apart from we've got this one final making session next and then, if you can make it, the Monday after we can play our games and we can share them with students. We can make the students frustrated when they can't beat our games. It's usually quite fun. So, if we can do that - same time next week let me know. So, we'll keep trying to help you and yes good luck everyone!	As Mick is speaking Toby clicks on another browser tab to see a live preview of his game in a web page. He plays through the many different levels of his game showing fluidity and skill.

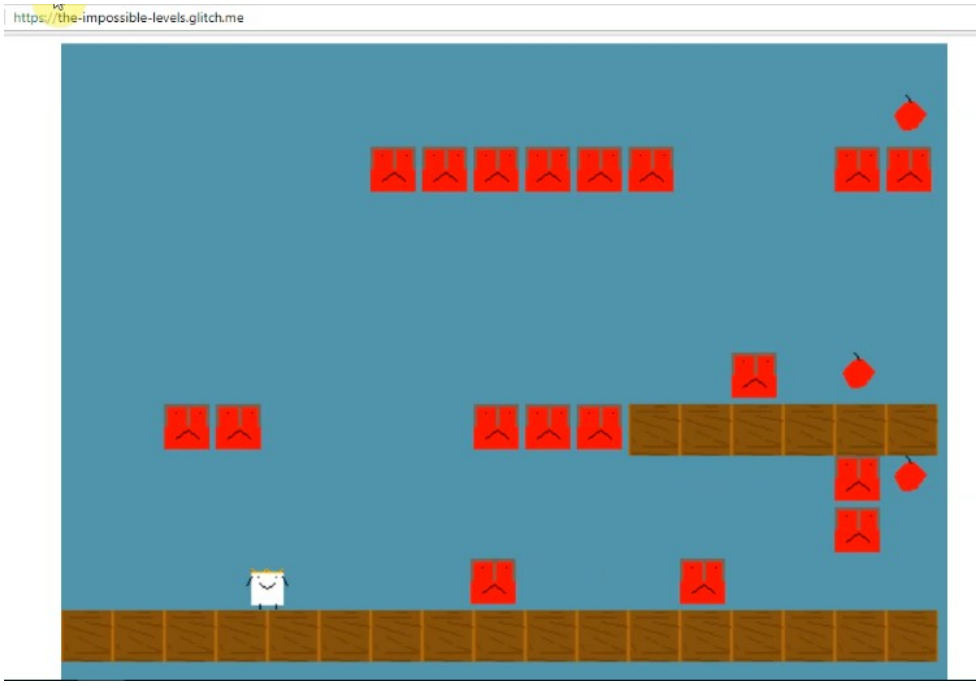
V1.4		
V1.5	Veronica: What was that website called? Toby: Glitch. Veronica: With the key on? Toby: The what? Veronica: We're trying to work out how to make the game work. How to get that key and make it unlock that door.	Toby is still playtesting his game and tries to chip in to help Veronica who is seated next to him. Mick also hears Veronica's request and attends to demonstrate how to access two different forms of help in the form of code examples and step by step tutorials.
V1.6		
V1.7	Mick: So we've got two ones. Here's the tutorial and there's the examples of code so you can compare what you are doing and see where the new code should be placed.	Mick shows different sources of documentation on the screen. The tutorials mentioned at https://en.flossmanuals.net/phaser-game-making-in-glitch/_full/ And a menu linking to code snippet examples at

		https://ggc-examples.glitch.me Meanwhile Toby is playtesting his game.

V1.8		Toby finishes playtesting and navigates to the page containing a menu of game design patterns at https://ggc-examples.glitch.me He clicks on the image of Game Mechanics - Moving Enemies
V1.9		
V1.10		This opens up a code project using the same code base as Toby's existing project. He takes time to examine the start of code carefully.
V1.11		

V1.12		Toby then clicks on the tab of his own game code and examines how it is different. He deletes a redundant line in his code. He returns to the example code and scrolls down and examines the code needed to patch into his game. He hovers over it. He selects half of it and then hesitates. He then rapidly clicks on the Show Live button.
V1.13		
V1.14		When Toby clicks on Show Live this opens up a live preview of the example code in a new browser. Toby plays this example game and avoids the moving red block as he navigates around the screen away from and back into the danger zone of the patrolling enemy (red square).
V1.15		
V1.16		When Toby dies in the game he navigates away from this screen and returns to copy the full code needed from the example. He then navigates to the same section of his own code project template. He seems to check this, as indicated by mouse movements checking what

		was above and below the space he has created. He then pastes the code into this space and then navigates to the live preview of his game to check the result. The game now shows a new enemy moving back and forth. Toby check his game by playtesting it and struggles to get past this new enemy, failing multiple times.

V1.17		
V1.18	Helper1: How is your game going? Have you got anything else you want to add to it? Toby: I'm just adding this moving enemy. It's so much harder. (laughs) Helper1: You've got a lot of enemies going on here. What is it? Is it a sheep? Toby: I've no idea my cousin designed it? Helper: Has it got a crown on? Toby: I think it does. My cousin designed it? I'm not that sure. (both laugh)	Toby is approached by a student helper. As they begin to talk. Toby's grandmother Pearl turns her attention away from her and Clive's screen and looks over and looks at what is happening on the Toby's screen and at the helper.

V1.19		
V1.20	Helper1: Is there anything else you want to add in this session? Toby: Well I'm just trying to get this to work. I'm going to try to get it in the right position. Pearl: (talking over Toby) Oh I see you've got one of those things to move. Toby: I'm just going to check what it's like on the second level if I can get to it. Helper1: What level is this? Level One? Is yours the one where level one is harder than level three? Toby: Yep! (both laugh) Helper1: I like that.	Toby continues play testing as Helper1 and Pearl lean in and watch him play and comment .

V1a Personal appropriation of concepts and practices & code patching

NOTE - Also add Interview data?

There are two main GDPs addressed in this vignette. One alters the level deigns, an inbuilt pattern to the template explored in Chapter 5. The other is a new GDP feature of moving enemies, not included in the template which Toby must implement using external help, in this case via an online code snippet example from the menu of provided GDPs.

While the speed and fluency of the undertaking of processes in this extract show that previous actions have been transformed into operations, some novel processes are still performed carefully and hesitantly as actions.

An example of a fluid operation is Toby's quick navigation between different areas of the game code, the game preview window and other sources of documentation.

In contrast, it can be observed that at times Toby is careful in the process of reading, copying and pasting the relevant code form a code snippet example. He checks and rechecks the code to be copied and the place it should be copied to.

MOVE HERE – some on example of appendix.debugging / code patching.

Code patching is a processes which suits being organised around GDPs aligns with the UMC process.

Example of code patching resulting in a glitching bug which needs debugging

After the process of code patching Toby alters the code to adjust the scope of the movement of the new moving enemy.

Toby: Well I'm just trying to get this to work. I'm going to try to get it in the right position.

To do this he changes some of the parameters of the code that has has pasted in but in doing so gets an unexpected result. Rather than changing the scope in the x-axis (side to side) the moving enemy now moves up and down. This provokes laughing from Tody and he then immediately draws the attention of his granny to this unexpected change. However after play-testing the change he decides to keep it in his game.

However, the glitch bug which provoked further investigation and hand on tinkering when Toby decides. "It's really hard, I'll make it go a bit higher."

There a key aspects that Toby want to change based on the imported glitch, one is that the moving enemy appears in the same place in all levels whereas he wants that it should only be in some levels and to be able to change the movement in each levels.

After tinkering with the code Toby seeming judges this beyond his ability and asks for help from myself as a facilitator. I guide him through changes to the code to allow him to do this. He then continues to make increasing sophisticated tests an revisions. In the process he compares the original code snippet with his own work to finally achieve his desired behaviour.

Motivation of Audience (move/drop?)
The real or perceived audience of the completed games is relevant when considering the motivating objectives of participants at this level of activity. The explicit target audience were students and staff in the Manchester Met Brooks building at a final showcase event where the created games were shared in arcade cabinets. An additional audience are friends and family who can be send the games to play online. However, a more immediate and tangible audience for the evolving games were peer game makers and facilitators during the making sessions.

V1b Propagation of GDPs.

Popular GDP implementation became the subject of community activity. For example other video data shows wide appreciation of Toby's game having so many levels.
In addition, the comment above, "Is yours the one where level one is harder than level three?", shows the propagation of gameplay features via community activity.

In the next example the process is more direct.

V1.21	Bertie: Why's that enemy in every level Toby: He's not. Bertie: Can you show me how you add more levels on to yours? Toby: Yeah sure. Pause Toby: I'm just going to have one go of beating this (refering to his own game which he is playtesing). It's 21 levels in it. So Yeeeeah. Pause	
V1.22	Bertie: It's like parkours in Minecraft but timed. It's like playing the game Wipeout. Have you ever played Wipeout? Toby: Er not really. Bertie: Or seen it? Bertie: That's like my second level.	
V1.23	Toby: Ah so hard	Toby fails at a high level on his game and starts to move off
V1.24	Toby: (To someone else calling for attention) No I'm helping Bertie.	Toby then follows Bertie to his workstation to help him implement more levels.

Parkour in Minecraft and Wipe out are both game experiences whose main gameplay mechanic is about judging jumps to landing accurately. Bertie makes links to his existing experience of games making comparisons between Toby's game, commercial games and his own. In doing so Bertie is able to show his knowledge and analysis of gameplay patterns to this community. While his motivation is not clear, one interpretation is that Bertie could be making this contribution not only to openly share experience but also as a offering in return for his request for help which he has just made.

When Toby moves to Bertie's game he playtests it and then looks at the code. He notes that Bertie has added a variable for a fourth level but then goes on to demonstrate to to add an array representing the next level, and a conditional statement to select level 4 when level 3 is completed. At Toby uses the keyboard completes this work, Bertie reads aloud the code which is being typed in by Toby.

A different pattern of propagation was that participants notice and comment on a game element or pattern during during playtesting, and then to use supporting resources or facilitator help to implement it. A less frequent pattern involved participants' diligent and deliberate use of supporting resources to identify and implement features without peer influence.

Vignette 2 – Susanna and Tehillah

Date .11 3 19

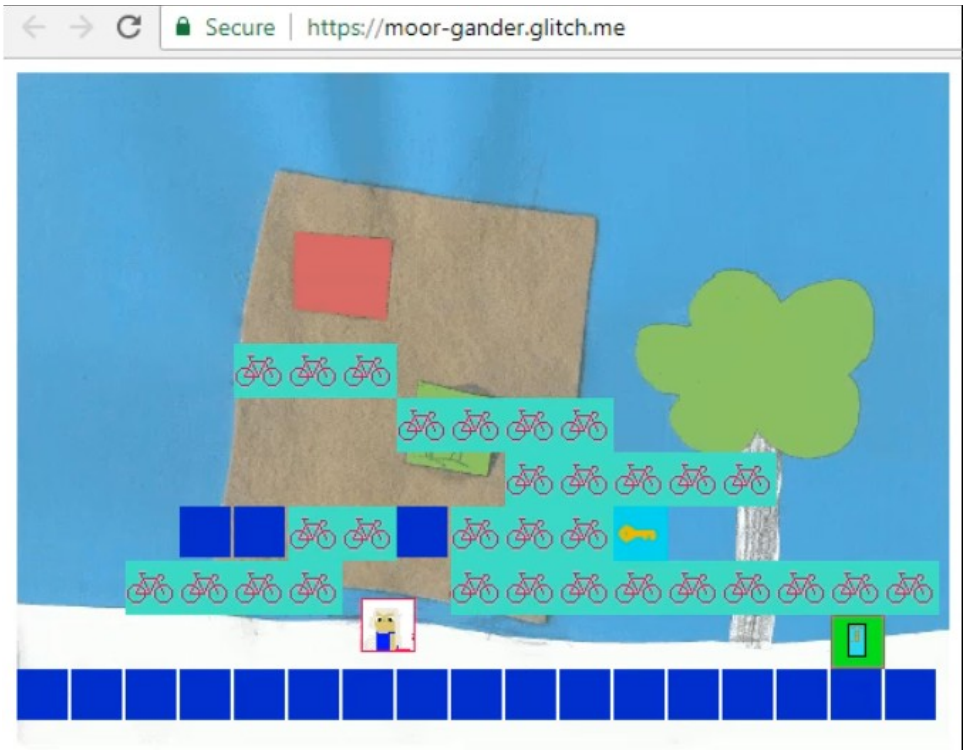
Context

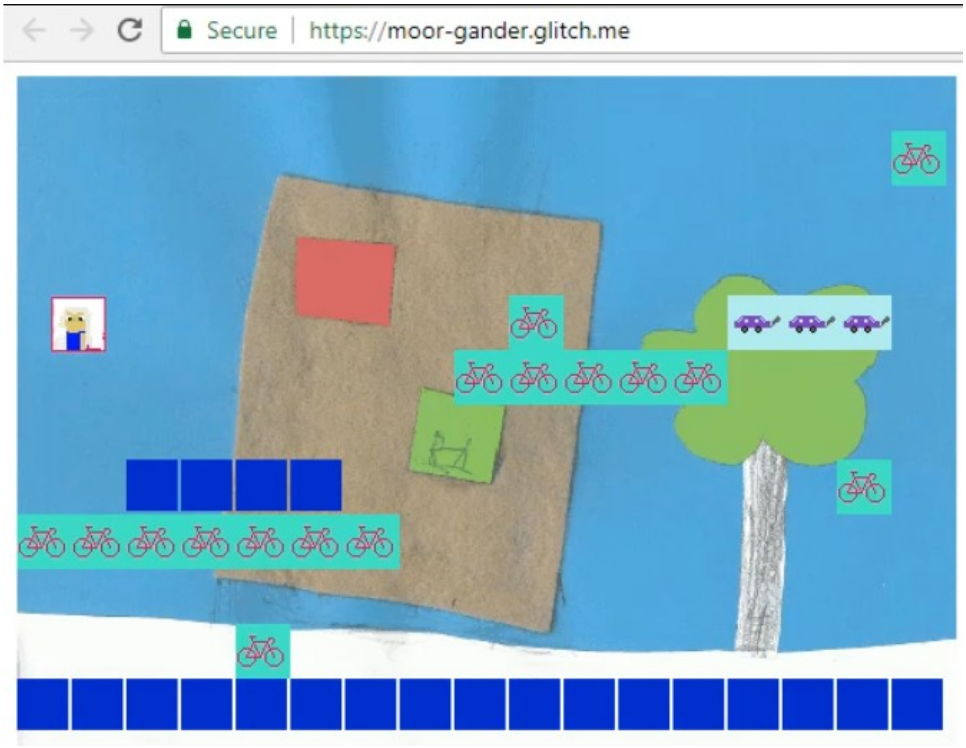
The current goal of participants is to implement the Key and Door pattern. The parent is following an online document guiding the process of implementation see appendix.

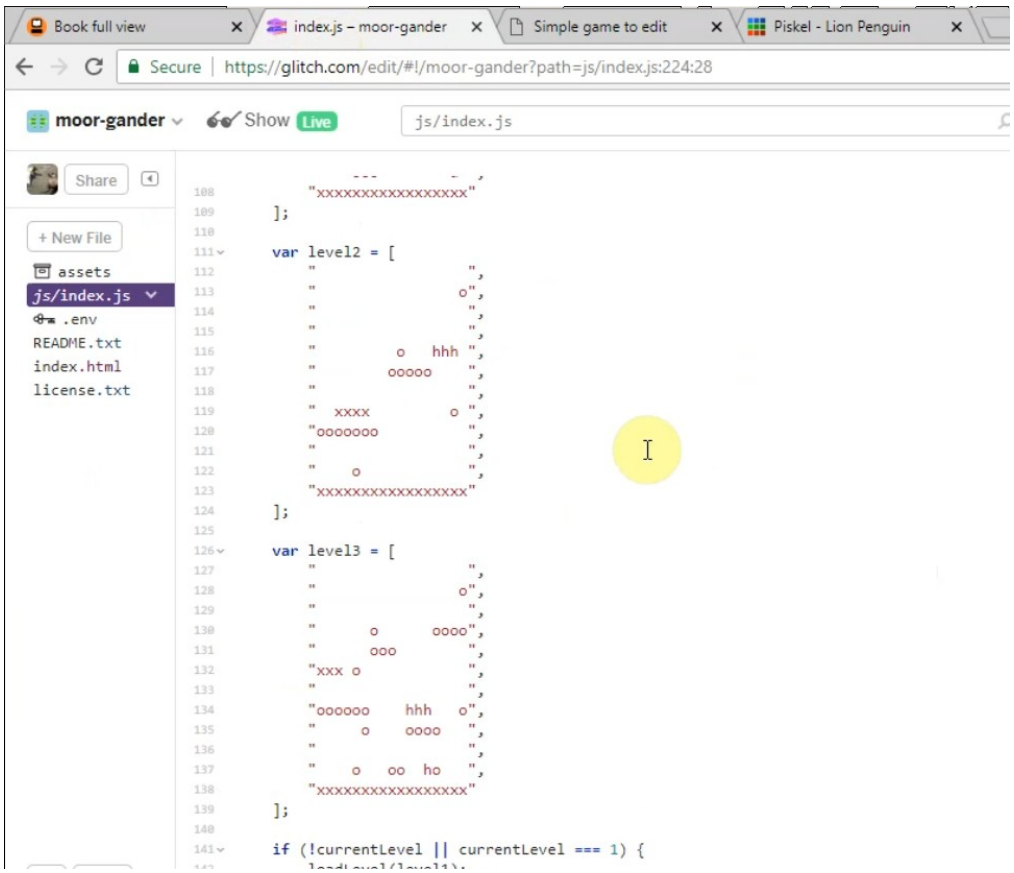
For the previous 5 mins the parent Susanna and child Tehillah had a shared objective of fixing a glitch in the software which prevents their wider motivation of adding the game play design pattern of adding levels to the game. Susanna has been trying many different things and changing things in the code while Tehillah has been expressing boredom. In response Susanna has expressed frustration. This vignette begins with Susanna suggesting that Tehillah asks facilitator for help to resolve the coding glitch.

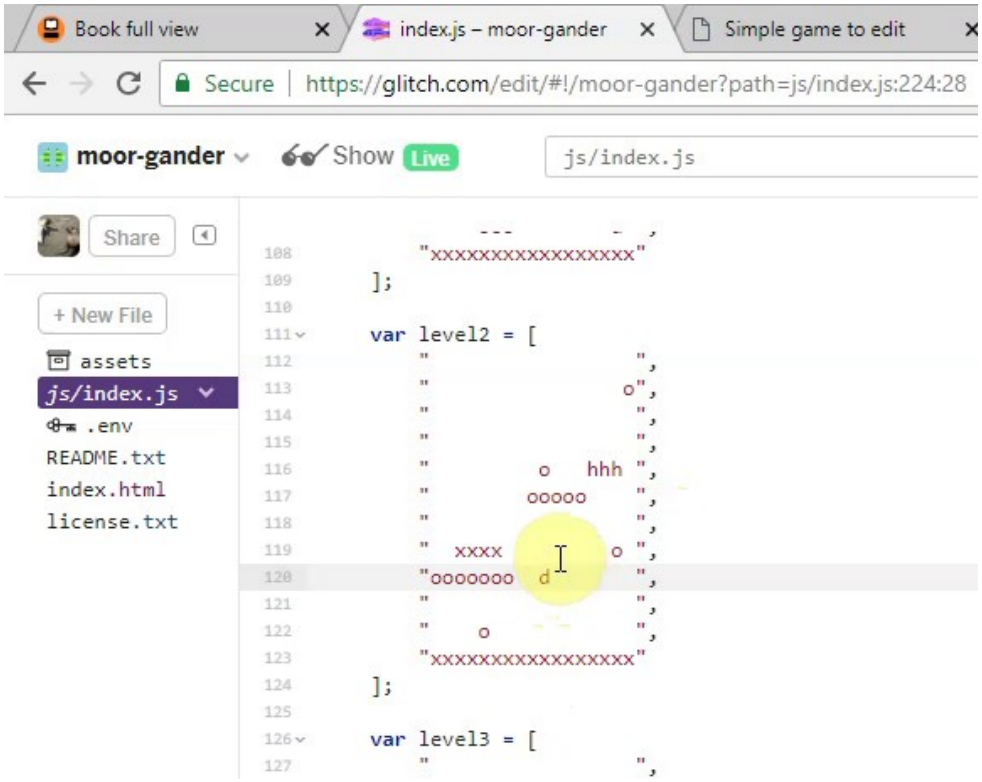
Transcript and Activity Log

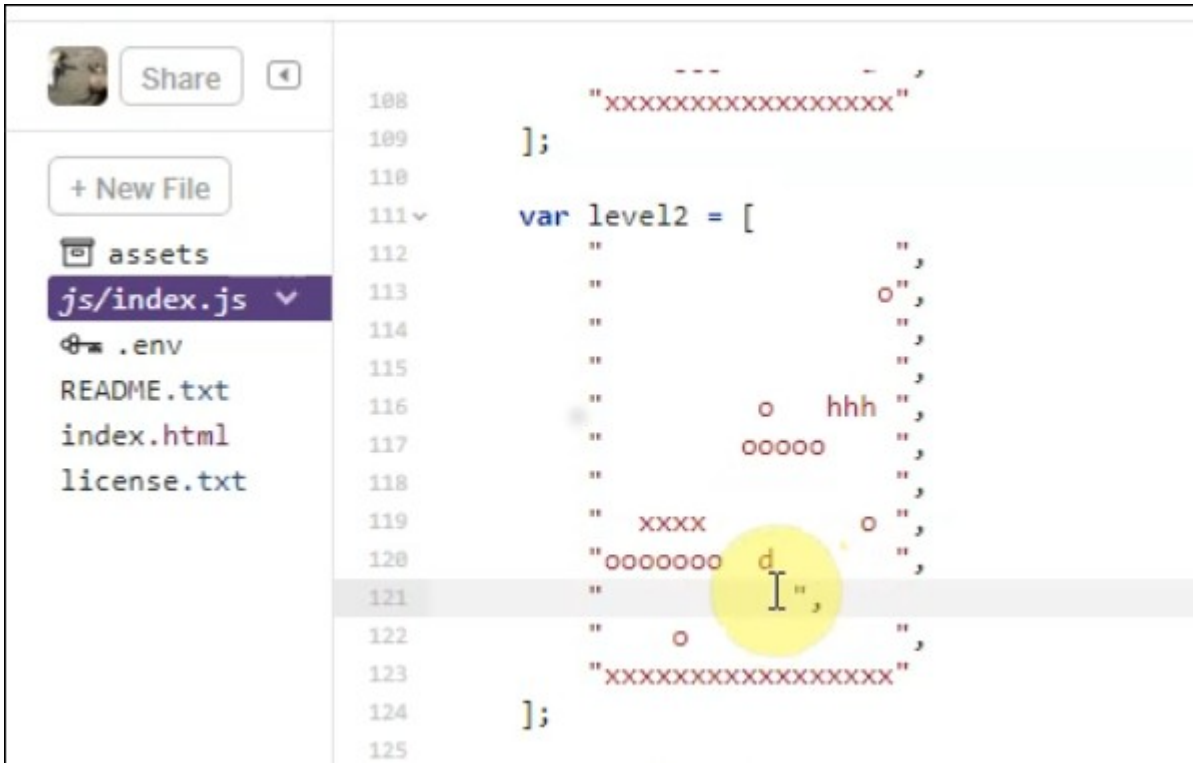
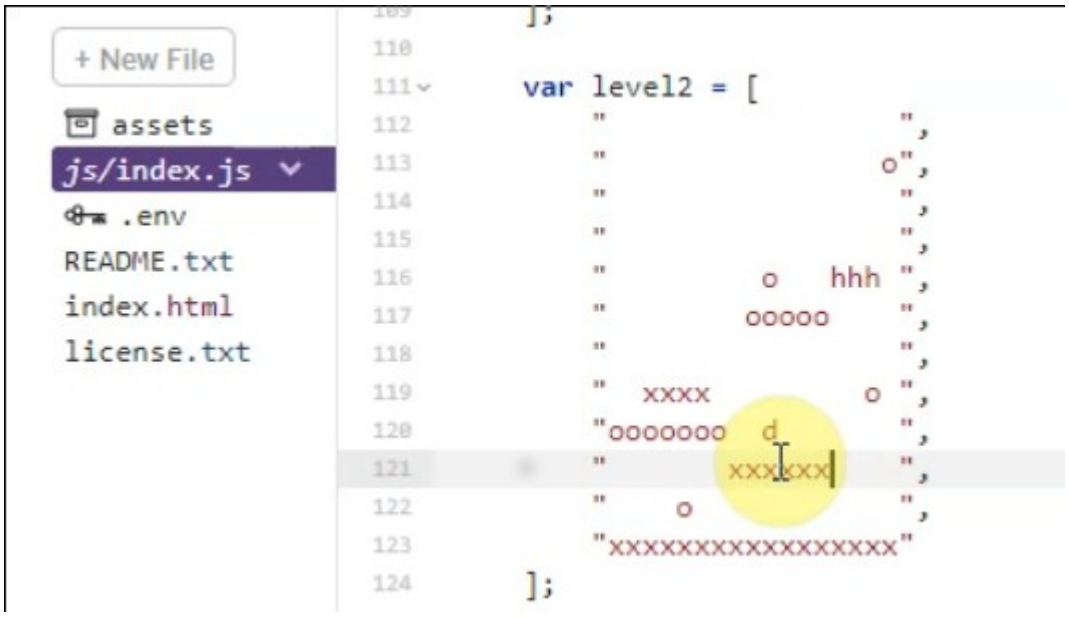
Key	Dialogue	Activity

V2.1	Susanna: You can ask him for help again if you want. Tehillah: Why Susanna: Cos I can't do it. Tehillah: OK.	Susanna is using laptop. Tehillah is nearby
V2.2	Exchange follows with Mick and Susanna. Problems solving using debugging methods and exchange of information about sequencing of variables. Ends after several minutes with game exhibiting desired behaviour of moving to the next level after collecting a key. The exchange contains good troubleshooting of sequencing And uses the debugger as a tool. A fuller transcript is available. One error is due to different versions having different state names. So documentation is out of date.	
V2.3	Mick: Great	(On Screen) Platform game bug is resolved shown by game progressing to the next level.
V2.4	Susanna: Thank you. Did you see Tehillah?	(Off Screen) Mick cedes computer to Susanna.
V2.5	Tehillah: Did it do it?	
V2.6	Susanna: Yes	
V2.7	Susanna: I'll reload it. Here you go	Susanna presses refresh key to reload the game
V2.8	Tehillah: Laughs	Tehillah moves laptop to point towards her and takes over using the keyboard
V2.9		

V2.10	Tehillah: (Makes excited cat noise)	Tehillah is using arrow keys to control game and checks desired behaviour of player progressing to level 2 is working. T progresses to level 2 where there is not a door or key.
V2.11		
V2.12	Tehillah: We need a door in this one. I want to make more levels now. So you can put lots of doors and lots of keys (in a rhythmic voice) Key Door Key Door Key Door (in a sing song voice) Key Door Level. Key Door Level, Key Door Level	Susanna moves computer back to take over the use of the keyboard. She changes browser tab and navigates to the section of the code which deals with the design of levels and placement of different game components.

V2.13		
V2.14	S. Well. Where are you going to put your door in level two? Do you want to change the layout at all?	Susanna gestures to screen
V2.15	Tehillah: What's door?	Susanna doesn't move laptop but gets closer to take over keyboard
V2.16	Susanna: d	
V2.17	Tehillah: Ok	
V2.18	Tehillah: d . Door right there.	Inserts a "d" in an array high above a platform

V2.19		
V2.20	Susanna And where's the key going? Must be quite hard through get to that door Key is K	
V2.21	Tehillah : (Calmly) Ok just let me do something	Tehillah starts to delete multiple characters on a line
V2.22	Susanna (Alarmed) What are you doing?	
V2.23	Tehillah: Back. You'll see! Tehillah: Ah yes	

V2.24		
V2.25	Susanna What are you.. Ah you're making a platform. I see.	Tehillah starts to add x's to replace the spaces she has deleted
V2.26		
V2.27	Tehillah: See!	
V2.28	Susanna So where is the key going?	
V2.2	Tehillah: Key, so it's K?	

9		
V2.30	Susanna: Yes	
V2.31	Tehillah: Where's K gone	
V2.32	Susanna: There	Susanna indicates where the K key is on the keyboard by pointing
V2.33	Tehillah: Back. K …. for Key	
V2.34	Susanna Are you putting one in your third level as well?	
V2.35	Tehillah: Yes and then I'm going to make more levels	Tehillah Smiles at Susanna and then looks away for a short while
V2.36	Tehillah: You do this bit	
V2.37	Tehillah: And then delete those H's. And in there.	
V2.38	Susanna No. No.	
V2.39	Tehillah: Then, let me do it.	(off screen) Tehillah takes over the keyboard
V2.40	Susanna It's no fun having a game with any hazards to avoid.	
V2.41	Tehillah: Is for me! How do you go that way back? So sorry for deleting… They just…	(on screen) Tehillah deletes hazards in Level 3 of game

V2.42	Back Back Back O O O. (laughs) (replaces another) Back O (giggles)	(on screen) Tehillah adds three coins to Level 3 by inserting o in the matrix
V2.43	Susanna: Goodness me what was the point of designing our car with fumes if we're not going to use it?	
V2.44	Tehillah: I don't know (sighs) Tehillah: You put the key and door in this one. Tehillah: Go on then. Key - Door - Person.	
V2.45	Susanna: Person?	
V2.46	Tehillah: Key Door Person.	(off screen) Tehillah indicates that her mother is the person she is referring to She add a platform and a key and door to the design of the third level
V2.47	Tehillah: (laughs)	Susanna starts play through of their game again. She progresses past the first level, completes second level. The game then goes back to the first level unexpectedly.
V2.48	Susanna: Is this the first level again	
V2.49	Tehillah: I think so	
V2.50	Susanna: OK so our the door for the second level goes back to first level and we want it to go to the third level presumably	
V2.51	Tehillah: Yes (laughs) Yes. Why could that be? That's silly	
V2.52	Tehillah: I'm just going to go see something	Susanna dives into the code to try to troubleshoot the problem. Tehillah watches for a short while becomes disengaged. She then leaves mother to explore the wider environment of the room and objects within it.

V2.a General commentary

The child Tehillah also wants to add additional levels to their game. In recent sessions several young participants had added new levels to their games, including Toby who added over twenty. This activity

had sparked much discourse between participants which may have influence Tehillah's interest.

The is a positive reaction when saying the name of GDPs . Tehillah’s use of a sing song voice to repeat them and her reaction in V.11 show this.

V2.b Division of labour

For this pair, these more involved coding activities were beyond the ability of the child.
The pattern involves adding two new functions (), which while simple enough, represent new code structures and thus this adds a new level of conceptual and practical complexity.
Susanna has taken on the role of solving harder code problems and in doing so has built important proficiency in coding practice. These include which include; finding and comprehending supporting documentation, fluidly navigating between undertaking more advanced coding to implement new GDPs, playtesting and preparing the coding environment for more basic coding of her child.

Dialogue and gestures of the participants indicate that they have established a working pattern where the child directs the direction of design and tests the game play and the adult uses their more advanced digital literacy to drive the code changes and use of software tools at trickier points of the process. When there are points of game making which are within the capability of the child she is able to take over the computer to implement those changes and test the results.

In an illuminating exchange (see), Tehillah (c) uses the name of a GDP within a request for her parent to take on a specific task within their making process,

> Tehillah: Go on then. Key - Door - Person.
> Susanna: Person?
> Tehillah: Key Door Person.
> Tehillah gestures with her hands to indicate that her mother is the person she is referring to.

The utterance by the child "Key Door Person" work on the game design pattern called Keys and Doors to the adult. The child appears to consider the level of complexity needed to add a new pattern into the code to be beyond her ability and thus directly delegate the task to her mother. While, the parent took driving seat to overcome code blockages they were careful to then involve the child to input their design choices when solved.

Feedback from the parent indicated that this division of labour was partly due to reading ability.

> *"Tehillah got on better during the coding once the student who was hovering initially left us alone. Because every time Tehillah hesitated, she jumped in to do it for her. Whereas I know her better so can judge how to facilitate more minimally, and I resist the urge to fix things immediately when she struggles. Plus she can't read yet, so she was recognising the relevant bits of code by matching the individual letters, which takes longer."*

The parent outlines her strategies used to address lack of reading ability as a barrier to participation. The design choice of a grid of letters representing different elements of the platform game appears appropriate in the case of a novice learning to code and read at the same time.

The child is one of the younger participants when blockages occur she explores the room or to dwell on the periphery of other participants interactions.

V2.c - On designing for others & participant awareness of game making patterns and systems concepts

Even though a general pattern regarding division of labour is relatively established, this process is not without conflict. For example, this direction of design is not uncontested in this interaction. The mother is closely monitoring the changes of level design. When the child makes changes that are not clearly purposeful, the mother challenges this *'(Alarmed) What are you doing?'*. The child takes delight in surprising her mother with an unexpected design element.

Additionally, after asking her mother to take back control of the keyboard the child also directs her mother to delete many 'h's' (hazards) from the game. When the mother realises the plan is to delete all hazards she protests, *"It's no fun having a game with no hazards"*. The child responds. *"It is for me."*

In terms of understanding of the game as a dynamic system, this is seen clearly in the parent's alarm at the child's deletion of all elements of hazard. The parent is keen to keep a sense of game balance to ensure a sense of challenge for the imagined player. "It's no fun having a game without any hazards to avoid." The child seems determined to remove all hazards. My understanding is that she is also aware of implications for game balance but is taking pleasure in this seeming destruction of the key challenge of the game as an act of disruptive play, a process explored in this thesis as a form of an emerging game maker typology.

This playing against the normal levels mechanic can be seen as an alignment with another mechanic within video games, that of bonus stages which can be seen as a reward for completing harder stages which allow for rapid points earning in a risk free environment [1]

Key	Dialogue	Activity / Notes / Gestures
V2.1	H1: Have you enjoyed making the game? Tehillah: Yes H1- Has it been a lot of fun Tehillah: Yes and I like making it frustrating. that other people find it frustrating!	
	Tehillah: You've nearly got to mine. Mine's very hard to get to. H1. Is it? Tehillah: You'll like it when you get to it. H 1: How many levels do you have? Tehillah: Four. Mine's the last one. And it's very fun. Do you want to guess about it? H1: Erghm. Is there lots of bikes? Tehillah: Yes, guess how many there are? H1: Is it the whole screen? Tehillah: YES! Laughs	
	H1: I will get it to your level Tehillah: You seem to not give up. that's good Tehillah turns away to get a hug from her mother. H1: I got to your level Tehillah: Good! (laughs) Tehillah: It's a secret, special one. (...) If people tried hard they would get to my level.	Tehillah notes that the student helper does not give up and persists beyond initial frustration to get to the final screen which plays against the platformer genre's conventions to contain a screen fillled with the reward.

The exchange shows that Tehillah;'s (c) is reflecting on the direct and indirect the feedback that other players are giving her.

For both participants there is an explicit awareness of game making patterns and concept of the game

1 https://ultimatepopculture.fandom.com/wiki/Bonus_stage

as a dynamic system. Both seem to drive their work on the design and coding mechanics of the game.

Game making patterns are outlined by both the child and parent. They talk of adding more levels, of the mechanic of keys and doors and then progressing to another level. The child takes delight in outlining this pattern of game progression. The transformation from the period of time when her parent was problem solving code is dramatic. I propose that a contributing factor to this motivation is the ability to replicate a familiar pattern of game play via her own work in construction. It is the ability to translate this home knowledge into her own artefact which gives a sense of mastery over an otherwise foreign environment.

V2.d Funds of knowledge and home interests

I propose that a contributing factor to this motivation is the ability to replicate a familiar pattern of game play via her own work in construction. It is the ability to translate this home knowledge into her own artefact which gives a sense of mastery over an otherwise foreign environment.

The child uses her concepts of game design patterns in the end of course evaluation. She responded to the question _What would you like to see next time? What would you add?_ with the comment. "Tehillah: I'd add a health bar and lots more levels and keep on changing the characters and background."

Vignette 3 Mark and Ed's use of GDPs within their organisation

Date **2019-03-11**

Here after choosing a GDP to work on in the form of adding animation to the moving player character, Mark is engaged puzzling over documentation for some time. This results in Ed being blocked from progressing. In the following exchange, the child proposes dividing their labour informally.

Key	Dialogue	Activity / Gesture / Notes

V3.1		Before dialogue starts the parent child pair are getting settled in front of one laptop. Ed(c), is play-testing their existing game with laptop in front of them Mark (p) is on left of Ed with supporting documents in front of him,
V3.2	Ed: What shall we do now? Mark: I'll get my notes out, and then… Mark: I think we should get sheep in and stuff. Ed: The Tea Cup Mark: and the Tea Cup yeah. Ed: We need to get lives as well. Ed: Shall I make a little ...	{**12.15**} Ed is playing his game as discussion happens The sheep and tea cup are graphical assets which have been designed but not added to the game yet. Mark gets bag to locate notes
V3.3	Mark: There's lots to do but we can't do it … I think we need to take it one step at a time or we'll get completely overwhelmed Ed: Should I make little heads for lives? We could have a little line? Mark: Heh? Pause	{12.30} Mark gets notes out of bag Ed gestures to screen to indicate location for proposed feature Mark is distracted with task of getting notes out of bag
V3.4	Ed: Should we? Mark: What's that sorry? Ed: Shall I make little heads, for down there? Mark: Heads? Ed: Like little things that are showing your lives. Mark: Oh you want to make the life icons? Ed: Yeah. Mark: Yeah you can do.	{12.42} Mark directs his own attention to screen. Ed points again to screen to indicate location for proposed feature. Mark leans into towards Ed and his screen.

V3.5		{13.00} Ed then starts navigates to piskel website to edit pixel character Runs into difficulty in finding the right URL location {13:25} Ma takes over to find correct URL Points to right option from partial google search.
V3.6		Description of interlude In the interlude between these sections..
V3.7	Mark: Er, so. It just involves doing a lot of coding you see. Ed. Hmmm. Mark: (reading aloud from written documentation). In the create function	{13.18} Mark is engaged puzzling over documentation for some time. The relevant documentation is available here. https://3m.flossmanuals.net/#polish-add-animation-to-your-character
V3.8	Mark: Quite complicated. But we can do it. But it would mean a lot of mucking around Ed: Ah Er Mark: Which is difficult to do while we're here. But it's doable. Mark: It's like a project in itself really. Ed: Project in itself? Mark: Yeah! (laughing). I just want to know like. We can get him in. So if I ask about the sizing. Ed: Hmmn	{13.20}
V3.9	Mark: I think you can edit the size here. Ed: Why don't you go there for a computer and you can do that? Mark: Why. What. While you're doing what?	The child suggests splitting and using one laptop each. He names one of the other pattern. The child continues to work on parallel patterns or component actions of patterns.

	Ed: Um making a sound track or something. I could do something like that. Mark: Ok. Yeah. I'll see if there's any more computers in the cupboard..	
V3.10		Description of interlude In the interlude between these sections the child F has been working on graphical asset create of
V3.11	Mark: I've brought the music, and also we could just concentrate on one thing and just change that. You know, keep working through. Ed: Yeah. I think I want to get an enemy in - oh no - my person animated. Mark: So you want to get your person animated that's the main thing. Shall we concentrate on that and changing the platforms into something different?	{13.35} Ed is editing head and finishes this off finding a tool to remove redundant blank pixels
V3.12	Ed: Yeah. Mark: Yeah? Ed: I also want to make a theme tune. Mark: Yeah. It's, that's what I mean, you can't just skip around like that. Ed: Hmmm. Mark: Just cos it gets really overwhelming. Mark: Yeah..? So…? Long pause.	
V3.13	Mark: Well I'll have a look at the code and see if I can make sense of that.	

V3.a Division of labour & GDP documentation aiding project navigation

This interchange shows a tension between a more chaotic style of working jumping from one goal to another and potential resolution with parental dialogue prioritising work to be done. There is also the use of the game playing as an activity to do while discussing what to do.

This child also begins researching other toolsets, in this session, research to identify an online tool to create an short audio soundtrack.

While the father was keen to prioritise and then complete one pattern, the child takes a more piecemeal approach. Later in the session the father then gets drawn into creating audio assets after observing his son searching for suitable tools. The father becomes distracted from his stated task as he is responsive to help the child when they get stuck on an alternative pathway they have chosen to avoid waiting on the parent. While this may be stressful for the parent, lots of progress in the overall game project can be observed in any particular session and the child seems to be developing useful skills managing the parent.

both with the familiar graphical asset tool Piskel and exploring new territory by researching an seeking a new tool for creating audio assets, specifically a background theme tune .

Add analysis of the situation as overcoming a tension using 3GAT terms. (NOT NEEDED HERE - ONLY IN CHAPTER?)

GDPs documentation aiding navigation: Mark's careful use of documentation is not without challenge, and his comments show a degree of being daunted. But his evaluation of the difficulty of the process and the time involved facilitate the division of labour outlined in this section.

Mark seems more comfortable with printed notes.

V3.b GDPs used in ideation and prioritisation

The following exchange between participants Ed and Mark shows GDPs being used to try to organise future activity.

At this stage of their process, some of these patterns have been discussed and sketched out some started but only partially completed. For example, the child has designed different frames of animation but this has not been exported to the right format or implemented in code form. This interchange shows a tension between a more chaotic style of working jumping from one goal to another and a parental motivation to prioritise one work to be done. This tension is outlined when a parent Mark gives an update on progress. "So, we've made quite a lot of progress this week. I

think the issue we’re having is that Fi’s super excited so we’re kind of jumping from one thing to another and that’s kinda overwhelming me a bit." An earlier interaction illustrates this dynamic clearly.

The pair's initial listing of features is a brainstorming technique aid a creative process, in this case use of the approximate names of of game design patterns (*get the person animated*, *get an enemy in*, *changing the platforms*, *make a theme tune*). The parent says he is *overwhelmed* pointing to the child's lack of focus on one pattern - "that’s what I mean, you can’t just skip around like that". The parent appears to be keen to quickly pick one pattern, then then work through the documentation on that pattern, a process he later refers to in interview data a plodding.

V3.c Breaking out of plodding

The more experimental approach that Ed then engages with in terms of playing around with online music making software draws his father into the process.

DEVELOP THIS SECTION TO SUPPORT THE END OF CHAPTER 6.

In Vignette 4 (see 4.c in particular), we see Ed break out of the more restrictive approach of plodding that his father advocate for to engage in experimental, improvised design processes with no clear end goal. His father joins in his exploration of sound making software. They start a process of tinkering and messing about with the capability of music making tools in a way which spurs creativity. The joint improvised process created two different soundtracks. This sparks a new proposal to incorporate different soundtracks for different levels.

Vignette 4 - Feedback on the dynamics of Madiha’s player movement

As context for this vignette, in the sessions until now, the parent Madiha had been focused mostly on completing asset design for her game. In the starting template design the jump mechanic is determined by the use of variables controlling gravity, jump velocity and movement velocity. The only changes she had made to the deliberately frustrating initial player movement (discussed in design chapter) was to change player jump velocity. Player jump (y) velocity was set very high but left right (x) velocity was slow. This created a very frustrating game feel.

She had been made aware by her daughter Ne about the relevant game variables. In response, Madiha asked for advice but Ne gave none walking away. Madiha noted "She's left me to my own devices." The following is a compilation of feedback comments or reactions over a 15 minute time period.

INCLUDE THIS?

Key	Dialogue	Activity / Notes / Gestures

V4.1	Bertie: That looks nice	Bertie is referring to the graphical look of the game Madiha invites Bertie to play as she can't progress due to the difficult game controls.
V4.2	Bertie: It jumps super high but so slow Pause Madiha: He has to go slow be cause he's an astronaut, you see. Bertie: It's hard.	
V4.3	Madiha: (to peer parent with serious tone.) It's hard. Wow.	Bertie leaves.
V4.4	Interlude	
V4.5	Ed: How much jump speed to you have? Ed: Your jump speed is massive.	Ed comes to play the game.
V4.6	Interlude	Other children come and play Madiha's game but only for less than a minute before leaving. While their feedback is non verbal the very short length of time that some of them spend is noticeable. After the last one leaves Madiha comments "It's so frustrating."
V4.7	Madiha: (Talking to self) No! It's so hard that.	Madiha is referring to a particular jump in her game being hard which blocks her progressing.
V4.8	Mick: How are you getting on Madiha? It's looking good.	
V4.9	Mick: Have you made it too hard? Madiha: I don't know. Can you jump from here to	I (Mick) mote frustrated air of Madiha.

	here with this.. this.. him? (point to main character) Mick: So it looks like you bump your head and fall down.	
V4.10	Mick: One bit of friendly feedback that I would give you is that it's taking a long time to move left and right. And that is something that you can change if you want to. Madiha: Oh right yeah.direct Mick: Yeah. Madiha: Yeah, actually that's a good idea. Mick: If you think about average games. Your average jump time would be about one second in the air. So that can be a bit of guide sometimes.	As a facilitator, I share feedback about the frustratingly slow movement time. I then give indirect feedback on the high velocity jump value.

V4.a: Commentary on norming tendance of the community

We can see that Madiha justifies the game feel of a very high fast jump with a narrative response about the character being spaceman. However, the limited amount of time anyone plays her game and her own frustration in playing it is telling. The game feel is frustrating in the wrong way here. Madiha seems to initially misconstrue the feedback she is getting here equating her ability to make the game hard as a positive thing. However, towards the end she notes the frustrating nature of the game.

The same message is delivered in a variety of ways, above we can see feedback from Mick trying to bridge a technical and conversational approach, direct feedback of the personal challenge level and an interpretation of the cause from Bertie and then a more specifically technical explanation involving the naming of the variable *jump speed*.

The concept of difficulty for most of the participant's games was dependent on the interaction between the feel of the game controls and elements of game challenge associated with placement of hazards and moving enemies. The term *game feel* has varied interpretation but is generally framed as the responsiveness and feeling of control over the main character during the core movement of the game. In this case, it effects the ability of players to move between platforms and avoid enemies. In this design the jump mechanic is determined by the use of variables controlling gravity, jump velocity and movement velocity.

The importance of these variables to is was behind the design decision to place these variable

right at the top of the code and to rename them with player centric names rather than mathematical terms like velocity and acceleration.

The regular playtesting of games allowed participants to give each other feedback regularly and game feel was one of the aspects that young people in particular to gave frequent feedback on.

MOVE THIS TO WHERE EXPLORED IN CHAPTER
These norming behaviours some of the informal norming behaviours that are less directive seen in the work of Rogoff and colleagues as explored in literature review [@rogoff_cultural_2003].

Vignette 5 - Madiha and Nasrin working with graphics and stories as funds of knowledge and identity and emerging specialism

V5.a - Division of labour, technical language and emerging specialities in interaction between Madiha and Nasrin

Key	Dialogue	Activity / Gesture / Notes

		Madiha continues to do solo design using the Piskel graphical too. She encounters a design problem. When erasing a part of the design she gets rid of background colour. Madiha asks for help from partner but receives misleading advice which does not help her progress.
	Madiha: Oh no it's not done that has it?	
	Madiha: "Nasrin!"	Madiha calls the name of her child across room with theatrical gesture and loud whisper voice Madiha then makes face, wiggles head and shrugs at parent peer. The other parent laughs. Nasrin arrives to help.
	Madiha: I'm trying to delete them but they turn light grey. Nasrin: So you want to get rid of them?	
	Madiha: What are you doing? You have to tell me what you are doing so I can do it myself. Madiha: laughs Nasrin: laughs.	
	Madiha: I'll just have to keep shouting at you if you don't tell me.	Nasrin uses the mouse to select the grey background colour with the colour picker tool, then the pen tool to fill in gaps in the design. She then swaps the active colour back from grey to black by clicking the option to swap foreground and background colours.
	Madiha: How did you do that so quickly? I've got to like, carefully... Parent peer laughs	Madiha makes hand gestures to show a sense of hesitant keyboard use. Nasrin bounces up in place and smiles broadly.

	Madiha: Thanks Madiha: So am I like back with the black now?	
	Nasrin: Yeah but if you want to delete it just press X (which switches between foreground and background colours) and then do it. Madiha: Oh X. Alright Bubs. Thanks.	

This example shows a practical division of labour based on the building of emerging skills and technical processes. The learning design which prioritises choice of different GDPs facilitates this. The process here illuminate the process of building an identity as an individual or a family is. The next section develops this theme.

Here the child has a powerful position and seems to enjoy this. In contrast the parent explains her frustration but does this light heartedly.

Supporting use of technical language and processes

Key	Dialogue	Activity / Gesture / Notes
	Madiha: Nasrin! Nasrin! Nasrin! Madiha: Do you know how to get it in the game? Nasrin: Oh my god!	
	Madiha: Well . First of all save it to the gallery. How do you save it? Ah there you are. Save it. Is it saved? Right now export it.	
	Nasrin : Do you even know what export means? Madiha: I know what export means! Nasrin - Ok then smartie pants.	

V5.b - Interaction between Madiha and Sonia showing development of identity in design process

Key	Dialogue	Activity / Gesture / Notes

	Sonia: That's Good! Madiha: Oh do you like it? Sonia: Yeah Madiha: Thank you. I'm very proud of it. Concentrated extremely hard. The thing is, you can get quite consumed doing things like this can't you? Sonia: Yeah	
	Madiha: That's the problem at home I get a bit kind of lost. I can't get the knack of some things. It takes me so long to get it. I'm like so excited. - Both laugh. Sonia: So are you	
	going to do bits at home? When the kids are.. Madiha: I tried and I lost it all. And you know when you just completely... And even Ne didn't know so I just ... what a shame.. hours .... (Laughs) Madiha: Lost time. Never mind. We live and we learn.	
	Madiha: We're finished. Right what's next? Now I'm an expert pixel? Now I have to figure out how to get it in there don't I? Without losing it I'll be very upset.	
	Sonia:– Have you saved it? Madiha:– No I've not saved it. Sonia:– Save there. (points to relevant button on screen)	

Other participants expressed pride over their graphical creations. In this excerpt parent Madiha has spent time creating a pixel art representation of an alien. The full exchange (see appendix 4.x) sees Madiha cultivating a sense of ownership over the graphical element that she has created. There is also the development of a growing sense of competency in this area of asset design. She notes she is an "expert pixel".

The growing mastery of this area also seems to help drive motivation to complete the next challenge. The sense of ownership spurs the technical process of saving projects. Her pride in her

work and concern surrounding losing it provokes a fellow parent to show her how to save her work.

V5.c - Developing shared language

Key	Dialogue	Activity / Gesture / Notes

	Madiha: Right so I don't want this rocket here. I want the rocket to be the yellow thingie. Nasrin – Gold coins.	
	Madiha - Right so, What are you doing? Do you know what you are doing? I want the aliens to be the hazard, the rockets to be the gold coins and the spaceman to be the character.	
	Madiha: Poop Ping? (alarmed) What are you doing? What's poop ping. Where's my spaceman?	
	Nasrin : Wait! What do you want the aliens as? Madiha: The hazards. Madiha: Yaaay!	
	Madiha: And now the rocket thing as the like you know the good thing - the reward. Nasrin : Who wants a rocket for their reward? Madiha: Because if a spaceman gets to a rocket he can get home. But if he doesn't then the aliens get him.	
	Nasrin : It's a very violent game. Madiha: What? Nasrin : It's a very violent game.	

Madiha, the mother wants to export an image from the graphical editing tool and to import this into the game. The mother's focus has been on creating graphics and has expressed pride in this her growing expertise in this area. She asks her daughter for help "I want the aliens to be the hazard, the rockets to be the gold coins and the spaceman to be the character." The mother shows a developing proficiency of expressing GDP related concepts and language as this interaction develops. Nasrin appears to enjoy using the language and norms of game culture to tease her

mother. "Who wants a rocket for their reward?" Here the daughter recognises the GDP of reward after used by her mother but questions the aesthetic choice and its appeal to game players.

The child takes on the role of guiding her mother to export graphics from Piskel gallery to the hard drive as a downloaded image file before them importing it to he code project and updating the relevant lines of code. The mother demonstrates her increased level of understanding and participation on overall process after being playfully challenged by daughter about her use of technical language. "Do you even know what export means?". Emerging laguage is used blending both technical terms like _export_ with more folk terms _getting it in the game_ rather than importing.

Nasrin appears reluctant to help at first and when she does she is mostly non-verbal and makes changes quickly in a way that her mother cannot initially follow or replicate. The process of explaining this to her parent would be more time consuming. There may also be a power dynamic happening as well with the child enjoying showing proficiency without sharing the process perhaps as a performative
demonstration agency or growing status within this community.

This technical process for some participants it would be a more conscious process, for others it has become second nature.

In terms of division of labour, the interaction here is complex.
Both the parent and child here takes great pride in the graphical work of game making. The parent shows this after being complemented by a fellow parent on graphical design saying "Thank you I'm very proud".

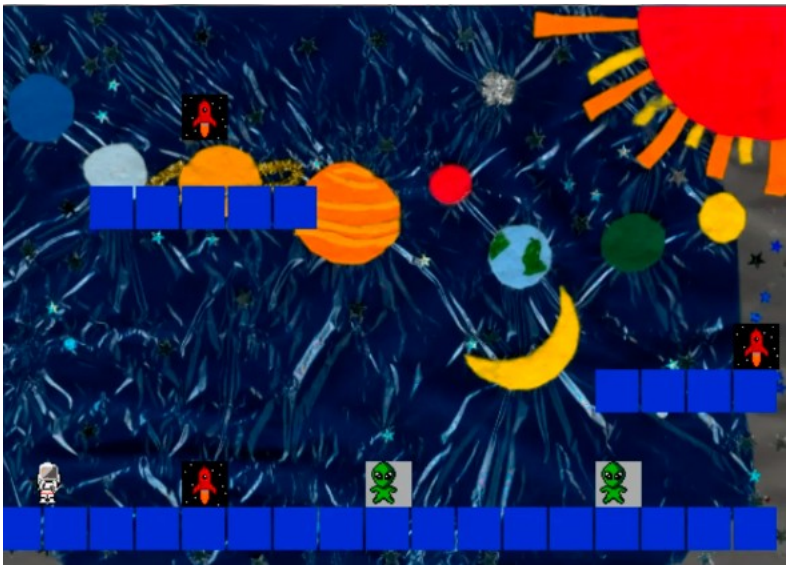
This allows them a level of participation which is helpful without being stuck on more tricky technical or code related problems.

The child also specialises in this aspect spending much time on this aspect. This interaction show her demonstrating to her mother on request proficiency in tool use, another example shows this in asset migration.

V5.d The use of technical language within the application of GDPs

This example for the most part covers a the technical process of removing redundant space from around art in graphical editors. However the process becomes much clearer to Madiha when linked directly to here experience of a game design pattern of altering the sprites hit box.

Key	Dialogue	Activity / Gesture / Notes

	Madiha: It’s hard.	Ed has been testing Madiha’s game and giving feedback. A screen shot of her game is shown below.
		
		Ed points to one sprite element of the game.
	Ed: for people with background like yours, Weve done. You can use the cramping tool. And you cramp it and it’s just that thing.	Ed first makes a quick rectangular shape with fingers. Then on “cramp it” Ed makes a percussive gesture with one hand on the other
	Madiha: Oooh. Can I have a look? Can I see?	Ed leads Madiha to his workstation and involves his father in the process.
	Short interlude	
	Mark: Oh yeah we just cropped it.	Mark makes snapping motion with one hand between fingers and thumb. Then moves two hands

		together, palms facing each other to indicate a reduction in size.
	Mark: So it’s got no border around it. So you don’t set things off when you get really close to them.	Draws a large square with hands. (see below)
		
	Madiha: Aaaah. I see yes. Cos the corners actually could have.	Madiha makes a small square gesture with fingers
	Yeah so in Piskel. You can crop it to the sprite so it doesn’t have a.. cause it take that area too. You approach an enemy if you’re close to it, it’ll trigger it.	Mark gestures – draws a large square with hands – then gestures to the edges.
	Madiha: ‘cause, sometimes you think how am I just sitting on this ledge here? Mark: And you’re floating? Madiha: Yeah. Yeah that’s what’s happening. So.. Mark: So you can put your sprite back in again and you can crop it down.	

When Ed leads Madiha to his workstation and involves his father Mark in the process. Mark uses an example of a GDP in his explanation of why to undertake that process, to not "set things off

when you are close to them".

Thus rather than GDPs helping the graphical cropping process, it provokes Ed to notice and suggest it to Madiha, and Mark to evoke it as a reason to undertake cropping.

Vignette 6 – GDPs facilitating working with home interests and funds of knowledge

Diverse sources of extracts could be used here?

V6.a Use of game narratives

Video evidence indicated that conflicts involved between learner expectations and their technical abilities are helped by the use of the starting template. The Constraints of provided game elements and implied narrative structure of the template accelerated the initial creative process. EXAMPLE OF NADINE IN P3?

One pair Clive and Pearl, the grandparents of Toby, included a narrative message at the start of their game. This process surfaced the expertise of the family as beekeepers, sparking interesting conversations with other participants.

var starttext = "This is a game which pits a honey bee against a swarm of Asian hornets, which are alien invaders attacking bee hives in the UK and which beekeepers are trying to stop spreading here. Try to guide the bee to collect all the flowers without being caught by the hornets.

Use the arrow keys to move the bee. Press return to START.";

V6.b Use of game graphics and funds of identies in interview data

In another example, Mark and Ed designed a game around the character of a train driver that needed to collect coal. In subsequent post course interview Mark describes the impact of the child feeling like they could bring their own identity and interest into the project.

Mick: (17-46) Can you tell me anytime that you felt like you bring your own identities or interests into what you were doing.
Ma - Oh, definitely. Yeah.
Mick: Let's ask Ed that as well.
Mark: Yeah.
Mick: Can you do feel like in making the games, you're able to bring your own interests or things that you related to into it?
Ed: Yeah. The Fireman.
Mark: Yeah, well, tell us about that game. Tell about your interests and stuff?
Ed: A little fireman, he's going around collecting coal for this train. They lost it. But then there's

sheeps on the line.map
....
Mark: What is your aspiration for your life?
Ed: I wanna be a fireman (on a steam train).
...
Ed: I really like trains, since like I was very, very young.

Mick: Do you think I mean, was that was that like something that helps you a little bit keep your interests go in for the game?
Mark: I think it excited you to have to build a fireman sprite? Is that right?
Ed: Yeah.
Mark: and to have it train themed, didn't that like, keep your interest in the designing part of it up? Is that true?
Ed: Yeah.
Mark: Because the whole theme of it. Just I know just your eyes lit up when you realised you could expand your interests into gaming.

Vignette 7 Dan and Toby – Home experiences of Gameplay design patterns.

2019-05-08

This exchange takes place in the first session of P3. Toby has just outlined a proposal for a game which uses the current templates parameters in terms of the three key game elements of player, hazard and rewards to outline a prototypical narrative.

Key	Dialogue	Activity / Notes / Gestures

V7.1	Dan: Have you thought about pushing it a bit further and have a different style of game? Toby: What do you mean?	
V7.2	Dan: Well the previous style of game was a platform game wasn't it? You went along and there was gravity pushing down. There are other types of games aren't there?	Dan makes shape with hands to indicate a platform. Dan then points downwards to indicate gravity pushing down on that platform. And then the jumps of an imagined player between
V7.3	Toby: Pause. I don't know what to do thought. Dan: Well quite but what other games are there? Toby: I don't know er. Dan: Well I tell you what .. muffled. Toby: Erm -	Toby navigates to webpage menu of GDPs.
	Dan: So. You played them before didn't you Toby: What do you mean? Dan: The flying game that's a different kind of game Toby: Oh like kind of like moving along kind of thing	Toby moves hand left to right.
V7.4	Dan: Yeah and those where. There are games where you are in a world and you have to move around the world like pac-man.	Dan points down and moves finger around like an imaginary character moving at right angles. Toby nods
V7.5		d a

	could block it somewhere.	

V7.6	Dan: So instead of.. instead of the world… the world being sideways. We could have the world being looked down on.	Dam reindicates the change of perspective with hand gestures.
		
		
V7.7	Toby: Hmm. How should I do this then? Dan: That's a good question. Shall we ask Mick to see if that would mess things up or not? Toby: Mick Mick: Hi ya.	

V7.8	Toby: Erm. Thinking about what game to do . I was thinking can we make like a pacman game kind of thing Dan: If we had an on the top game rather than a platform game	Toby makes a gesture of movement with fingers, indicating the movement of a pacman character. Dan repeats the top down and side gestures with his hands shown anove.
V7.9	Mick: I think it could work. You could kind of adapt that game by kind of removing gravity. Dan: and see what happens? Mick: and see what happens. Dan: It's not a bad starting idea is it?	
V7.10	Toby: I suppose make a new one	Toby begins the process of remixing game from the template.
V7.11	Interlude	
V7.12	Toby: Oo. Shall we try to make it (unintelligible). Cos in pac man you can go off the edge. Dan: and you wrap round the other way?	
V7.13	Dan: Yeah, yeah. We can do that. Save that for version 1.1	Toby continues making changes to the code design.
V7.14	Dan: What's the theme? What are you drawing? Toby: What? I'm trying to make like a pac-man type thing.	
V7.15	Dan: Alright. What if you sketched it on paper first? Or have you got it in your head? Toby: I'm just kinda going for it it. (laughs)	
V7.1	Dan: Ok go for it, see what you get up to. Toby: I'll leave a hole there.	

6		

V7.a Deviating beyond the menu & using GDPs and home knowledge to access external documentation

The exchange shows how the use of GDPs can help participants navigate the professional practice of forking a codebase and the exploration of developer resources. Technically, he has the courage to divert from the existing game paradigm from platform to maze.

Changes in the code which Toby is altering to impact on the new design pattern of a top down game, are immediately apparent in the preview window. As such, Toby does not feel the need to prototype on paper. The use of GDPs to support visual prototyping is explored in more detail in Appendix.tech.prototyping

Practically it brings up issues as many of the dominant game design patterns are different. Thus the first one they identify that of enemy following is not present in the current menu of choices. Toby adopts this suggestion once he understands Dan's suggestion. He then approaches Mick to test the practicality of the suggestion.

Dan expresses his desire to for the pair to try something new by implementing a pattern not in the menu of GDPs provided. Their new choice is a change of perspective which involves a new game pattern of a new movement game mechanic. The specific proposal is to remove a jumping game mechanic and using a 2D top down movement mechanic used in maze and adventure games (e.g. Pac-man and Zelda games).

Toby takes on the role of checking these change of direction with me. He uses a concrete example of a game to indicate the shift of genre and games space structure implied, saying "I was thinking can we make like a pacman game kind of thing". Dan is more explicit naming the shift of perspective and genre. Mick takes this to a concrete code level by making reference to a key change of code that would be involved.

The decision to divert from the existing menu of GDPs and genre can be triangulated with interview data from Dan on the motivation behind his involvement in volunteering at Coder Dojos.

> Honestly, it's just it's just my hobby and I love it is the main reason. In fact, it's probably the only reason. If I can, if I can persuade / cajole / trick my kids into being involved at the same time, then that's even better. Personally, I think that's about it. I've always been interested in computers. I love, I love, I love programming. I'm no good at pencils and pens drawing or anything like that. But writing software is the closest I get to a creative outlet. So I just love doing that.

Given this additional perspective, I interpret Dan's influence to divert as a way of embracing a creative challenge and bringing his child along for the ride. However, Dan is also aware of potential challenges of straying too far from the template. He does not want to "mess things up".

This tension has a parallel to a professional practice of "forking" code-bases in open-source code communities. The practice of forking can involve taking a code base in a new direction and the benefits of adaption may be out-weighed by disadvantages including the friction involved in splitting an existing community and duplication of effort. The parent checking with a Mick a guiding community member about the advantages and disadvantages of a major fork in the code structure mirrors this professional tension.

This example shows that while the use of GDP can help support choices within a frame, there is also the ability to break out of that restriction and keep some of the benefits of the shared code base.

My own positive response to their suggestion was driven partly from knowledge of Da's cultural background a both a professional coding and a volunteer supporting children's coding programmes. While simultaneously checking with other groups that they use the starting template as a base, to avoid overload as previously discussed in design decisions, I encourage this pair to see what happens as a potential learning opportunity. I am conscious that the change of movement may open up different possibilities for new game patterns that this pair may be able to solve. This outweighs the possibility that the pair will get bogged down in complex code problems or structures which may be beyond the capacity of the young person. After all even if they encounter father must solve, the apprentice does not need to understand everything in order to benefit from observing the master at work.

V7.b Addressing Division of Labour

Dan’s interview data.

> I try never to touch the keyboard of who's there. If they are stuck on something I always tell them what to do. Even if it's then taken me five minutes to explain what a semicolon is. And point. It's that key. Because it was just, I could do it so effortlessly. I think I'm sure I put people off very quickly by "Dave did something really quickly. I don't know what it was.".

This approach appears to be influenced by Dan's experience as a software engineer and volunteer at Coder Dojo (Glossary). Interview extracts (included as appendices) show a direction to support the novices direction as a facilitator where possible.

This extract from interview data indicates a priority to support the learner to develop independently but to still be very present in the support process.

Toby and Dan's pair process of accessing professional documentation also illustrated an aspect of their family learning culture. The pair's process is more guided and focused than many other participants. In several interchanges the father starts as a facilitator taking a lead from the

direction of the child. As the child reaches the limits of their ability he begins to be more directive, by asking leading questions and testing existing knowledge. Finally, in order to complete the programming or research tasks beyond of the child's knowledge, the father is more direct in instruction, directing the research and proposing a coding solution for their new game design pattern.

Vignette 8 - .alien - Transcription of the introducing a drama process in P3 – MOVE TO APPENDIX?

The participants have entered the room and chosen a laptop to work on. Some of the children play web-based games or reviewing the games that they have made previously. The session progresses with a warm-up game which includes many false starts, changes of rules, development of tactics, appeals to be serious, full throated laughter and many restarts and which ends in good hearted failure. The transcript below picks up at this point.

Mick: Ok. So I've got a surprise. I don't know if you know but as part of our Home Ed club we did a page of different games. So it's on glitch.com and it's called Glitch Game Club and it's on there, there's one for Home Ed Winter 2019 and here are all the games that we made. We made a lot of games. 15 games. This has not gone unnoticed because I got a message through this account. This is kind of a story now. We are entering a story. You have to use your imagination. We got a message and it was an audio message. If you guys take your fingers off your keyboards and have a listen to this audio message which is quite unusual as I don't think it was from anyone on … this ... Earth.

Greetings Earthlings, we have an important message for the Glitch Game Makers.

We are the Weean. You would call us an alien lifeforce. We like to think of ourselves as friendly space cousins.

We can see your Internet from space. We are contacting you because we know you are making games on the Internet.

We are on our way to the Planet Earth, and we have an important mission for you. We are an Intergalactic Rescue team. We know you have problems on your planet. We can help.

But we need to find out one thing first. Are you worth it? After we are gone will you also be able to help yourselves? Or are you already doomed to make the same mistakes again?

You must pass this challenge. Make some games showing problems you have on earth. In the games also include ideas for how to solve them.

We have some guidelines:

- Make a game about a big or small problem for your planet to solve. If you can let us play it each week as you go along.
- Give us an update each week by recording a group update.
- Show you can work on your own but also work as part of a team.
- We will also send you text messages with some mini-missions sometimes. Be sure to tell us

how you do.

Please now get started and come up with a new game about solving a problem on Earth.

Mick: I couldn't understand all of it but I tried to write it down as best as I can. So from what I've work out they've looked at our games and they've come up with a challenge for us. They are coming to Earth so they need to find out if we are worth saving. And the way that they are going to decide is by playing the games that we come up with. And they are going to set us little challenges. So. yeah, that's the story. (with heavy irony) I'm pretty sure it's true. (Mick and others laugh).

Mick: So all they're asking us to do is to come up with a game. We've got four sessions. They want a new game because they've already played our old games. It's got to be something about the problems of the world. I've got a lot of problems. It could be big problem or a small problem. It could be about your problems. But also ideas on how to solve them.
And yeah. That we can work by ourselves but also work as part of a team. So we've got to give them a report by the end of each session as well. That's our mission.

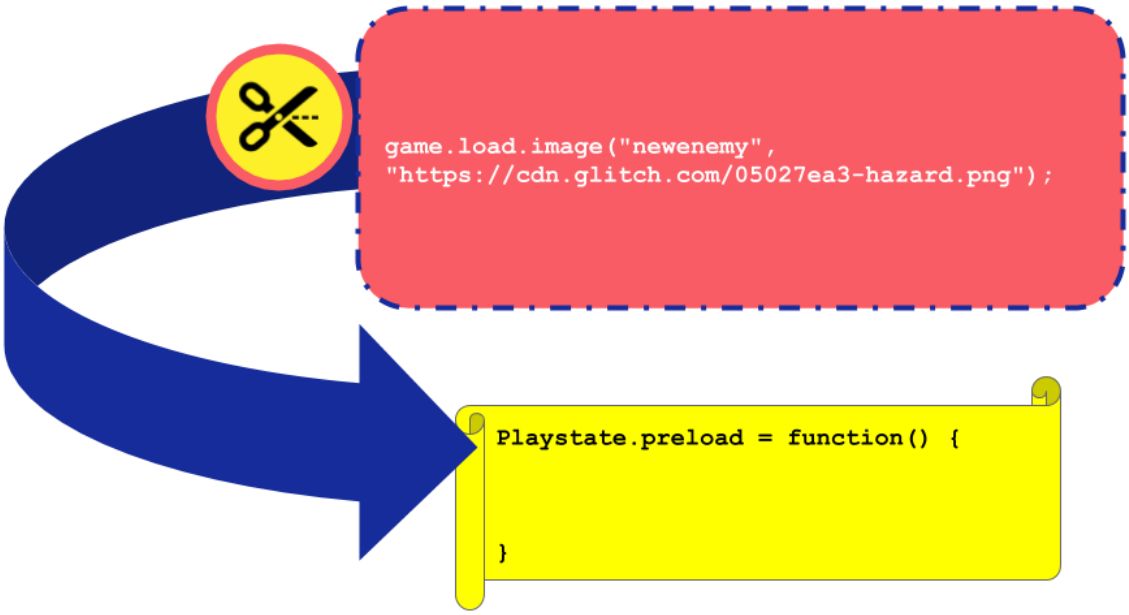
Vignette 9 - Vignette.documentation - Introducing documentation in drama frame

Do you know what I also wanted to share with you? Last time we were doing different sheets and everything. You were getting good at working through the sheets. And also looking at this page (show splash page on screen of menu of game design patterns) which is at ggc-examples.glitch.me . And I've done some changes to it. There are two different parts. I want to make this better for you guys, I want to make this somewhere you can go so you can click to find out the help that you need. Any ideas you have for making this better would be really good.

One thing I can think. You see here (points to moving enemies as an example on screen). If you want moving enemies. If you click on it, it opens an example with the code to make moving enemies but it's not really obvious how you would to put that into your game. So to find that you'd have to click on this here link to tutorials. (Mick points to the link to tutorials text/link). Which tells you how you put it in the game. And then you'd scroll down this bit (demonstrates navigating the tutorials menu) and select add moving enemies here. So, I was showing this to some people yesterday and they couldn't really work that out.
So what they suggested is. why don't I put it so there's a link so right to the chapter for how to do it right next to that image.
So that makes sense really so I'm going to to do that.

So if you click on that (referring to tutorial link) if you want to add a moving enemy.
I've tried to put a bit like that (referring to illustration below on code patching). What that means is, you're looking for that bit of code at the top. And you're going to copy it and paste it into that bit at the bottom. Where it says Playstate.preload. That's the part of the code that you need to put

it into. Just to make it a bit clearer.



![Figure 5.1. Code Patching](./Pictures/vign_5_1.png){ width=80% }

Madiha: So you're not cutting the bit at the top out, in red. You're using that bit instead of the yellow bit.

Mick: Well actually, you're putting it inside of it. So here you would copy it and in your code example. You then look for that bit where it says preload. You then put it inside of it at the bottom of that.

Madiha: So just insert it somewhere.

Mick. Yeah insert it. So here we've got different parts of our game. We've got preload. We've got create. And we get used, we start to get used to finding them. In this one it's preload that's the one that its saying we should put it inside of. And then this next bit. It's saying, ah, you should put that into your create function.
So we're moving in the right direction. But any other things where you think. Ah that could be easier. Let me know and I'll try to make these resources much easier.

Mick: It's almost like this is our control panel. (you decide) what do you want to do next and we jump off from there.
And I've put it down on a bit of paper. It's just gcc-examples.glitch.com

So, I'm going to now leave it to you guys. What do you want your game to be about? What are your characters going to be?
What do you want to put in your new game what wasn't in your old game? Yeah, you can start

thinking about it.

Commentary

I suggest that noticing, celebrating and exploring the sources of unintended behaviours may be an inclusive strategy to mitigate the potentially frustrating process of debugging.

To support this facilitators can reflect on the following…

Vignette 10 - Session reflections and secret missions in P3 – APPENDIX?

This second extract comes from the following session in phase four. In three of the four session the last 10 minutes of each session involved giving a progress update to the aliens.

In my journal notes for phases prior to using the drama process, I documented that the occasional end of session debriefs as _go-rounds_ had limited success in terms of amount and quality of participation compared to these sessions. The video and audio recordings document rich feedback from individuals and pair teams, near complete participation and productive elements of interaction as the feedback progresses.

In previous iterations, my omission of end-reflection in sessions stemmed fomr a lack of time in sessions and reluctance to shift learners away from making activities to reflective activities. I found the need to maintain the drama narrative served as a high motivation factor to complete reflection activities.

To begin the reflection session I ask participants to gather around a particular computer which the aliens are monitoring which helped moving participants closer to each other and stop their coding activity. It is of value to review the grouping of participants in the still image in the vignette above in Fig 5.x.

The simple clustering of participants so they were side by side and talking to a disembodied audience via a computer seemed to make the feedback process less daunting for students. One of the younger participants Richie is participating on the margins but clearly following proceedings as his facial reactions to ongoing contents of feedback. He later participates more actively when reflecting on his process than in previous sessions. Even participants that were initially reluctant to share back and had never shared back publicly before in sessions, chipped in after other family member had started the process for them.

Mick: Ok are you guys ready to share back if you could come to this side of the room we are going to get Mark and Edward to share back first. Everyone can share back using this computer

that the Weean are watching if that's alright.
organiser

<!-- {width=90%} -->

Mark: All we've done today is just get a background in and then we were just working on the one that the Weean had sent us about dropping the coins in. Now that the Weean have sent us the code we need for basically dropping stuff.

Mark: The idea is planting trees. about dropping seeds. So we want to drop those and have some enemies that are tweening randomly around and also taking them away. The idea is to have a timer to drop a certain amount in a certain time frame or you can't go through to the next level. And the next level would be you go around and water all the trees. And the third one is you have to look after them all making sure they are not getting chopped down again by that tweening enemy. So we've got the concept and everything now and we've got the code So we should be able to make a bit of a jump forward now this week. It doesn't look like we've got any where but we have. (Mark laughs and others follow). So we've got the the background in and we know what we need to do about scrolling as well because we want to scroll across.

Mick: That's great. Is there anything that you think you definitely want to be able to do for next time that you might want help with?

Mark: Oh yeah. We'll we've got a bit of space where we can work on it before we next come in so we'd like to ask the Weean some more questions. Is that the best way to do it?

Mick: Yeah for sure and I can see that you guys have been talking to the Weean, Here this project here in your home page called Talking to the Weean allows you to talk to the Weean. So you can go in there, click on Edit Project and if you click on this bit here that says WEEAN and then Markdown you can actually just ask questions in here.

(Mick reads out the following extract the organiser screen containting a text chat with the fictional alien audience)

Ed: Weean what's it like up there?

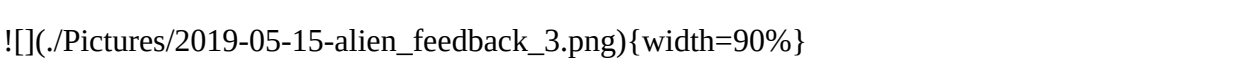
Weean: It's cold and very big but quite tranquil.

Ed: What is your name?

Weean: We are are the Weean we have no name, we are all the same.

Ed: That must be hard at xmas. (Mark and others laugh and smile.)

Weean: It is. It sure is.



>Mark: That’s tickled me that.

Mick: So there you go. You can have a conversation there with the Weean in there using mark up code you can copy what’s there. Nasrin can you talk through what you have added to your game? Is yours called “No Toby Allowed” now.
(Laughs from all)

Nasrin: I’ve not really done much today as I was busy doing stuff with Toby’s

Dan: We noticed.

Nasrin: We’ll I’ve changed the platform a bit.

Madiha : You had a secret mission though didn’t you?

Nasrin: Oh my secret mission was to change someone’s game, their character or something and see if they noticed. And I think they did notice.

Dan: We did. We did notice.

Madiha : You couldn’t not notice.

Mick: It feels like you took the spirit of the mischievous thing and just turned up the volume.
(All laugh.)

Madiha: Sprite!

Mark: We also had a secret mission.

Mick: What was that?

Mark: Ours was to change the sound on somebodies game.

Nasrin: Oh was it?

Mark: Did you notice?

Madiha: Did you notice?

Nasrin: No (laughing)
(Incomprehensible many people talking or laughing at same time)

Mark: Play it now!

Richie: You definitely noticed. (Points to Mark and Ed) You definitely noticed my bit.

(Nasrin goes to the keyboard and starts to play her game)

Nasrin: I can't hear anything different
(Everyone laughs)

Mark: I thought you were going to go- Aaahgh! But you didn't say anything.

Mick: So that's interesting. some people notice some people didn't.

Vignette 11 - .map - Dialogue of use of physical maps at the start of session X

Transcript	**Description**
Mick(f): I'm putting the ones that are hardest further away from our home island. So, because keys and doors is quite tricky, I'm going to put that one over there in the corner, if that's one that you're working on.	Mick cuts a out an image from [^4] representing a GDP of key and doors.
Tehillah(c): So I've gone really far away on the map.	Tehillah(c) quickly places her marker on that image and grins. Other parents and children to the right and left of her look at her marker.
Mick(f): Yeah.	Mick smiles too whilst walking to get and glue another cut out.
Tehillah(c): Heh!	Tehillah walks back to her mother and stretches out her arms to her mother who picks her up. Tehillah whispers in her mother's ear
Mick(f): There should be some blue tack if you are struggling to make your character stand up.	Mick walks around the back of the group and sticks another GDP pattern on a different pre-drawn island. Roxanne(p) notices Agnes's(c) falling character and passes the child blue tack to help.
Rozanne(p): Oh that's something you were wanting to do	Roxanne points at a cut out that Mick has just stuck down
Richie(c): I like the idea of making the enemies move	
Roxanne(p): Ok, there's a worksheet here about that. So you don't want to any any heath meter?	
Richie(c): No.	

Transcript	Description
Roxanne(p): At least not right now. You want to to do this, on a sheet, right here, here you go.	Roxanne waves sheet and smiles at Mick and laughs.
Mick(f): Great that's good. We've got some sheets that I would recommend. That are almost like gateways to other places. One is to make your character move when it moves around the screen.	Mick moves hands when saying make your character move, indicating animation.
Mick(f): Another is to make your enemies move around the screen to make it a bit harder. I know you guys have done that.	Mick moves a pointed hand to indicate an enemy moving on the screen and then points to Clive and Pearl to indicate "you guys".