Responding to games development challenges through mood-mediated improvisation

Patrick Stacey
School of Management, University of Bath, p.k.stacey@bath.ac.uk

Joe Nandhakumar
School of Management, University of Bath, j.nandhakumar@bath.ac.uk

RESPONDING TO GAMES DEVELOPMENT CHALLENGES THROUGH MOOD-MEDIATED IMPROVISATION

Patrick Stacey, School of Management, University of Bath, Bath, BA2 7AY, UK. email: p.k.stacey@bath.ac.uk

Joe Nandhakumar, School of Management, University of Bath, Bath, BA2 7AY, UK. email: j.nandhakumar@bath.ac.uk

Abstract

This paper focuses on the process by which developers regulate their moods in volatile and creative contexts. By regulate, we mean the way in which developers rationalise and act upon their moods when they encounter and interpret unforeseen challenges. Little scholarly attention has been afforded to this process, nor the concept of mood per se in IS Development (ISD). To investigate this process we conducted an in-depth field study at a computer games development organisation in Singapore. We found that plan-driven methodologies offered limited guidance when unanticipated challenges emerged, i.e. when the development process broke down due to such disruptions as staff or stakeholder turnover. Instead, developers relied on their innate faculties of mood regulation and improvisation to overcome such challenges. We offer a theory of mood-mediated improvisation, which suggests incorporating sensemaking into ISD approaches with respect to positively influencing developers' interpretations of traumatic challenges to the ISD process.

Keywords: Improvisation, Computer Game, Software Development Process, Mood.

Track: Grand Challenges of System Development

1   INTRODUCTION

PriceWaterhouseCoopers recently predicted that the fastest growing media sector in the coming years will be computer games[1]. The popularity of games and associated business opportunities places immense pressure on studios to produce "hits". This means that many games projects today are made on Hollywood-scale budgets and within an atmosphere of risk taking. As a result, the games industry is peppered with the rise and fall of numerous games studios that could not cope. The opportunistic "rush" in the industry further presents challenges in stabilising a production environment. For example, according to the International Game Development Association (IGDA), one challenge the industry faces is high employee turnover. The volatile and creative nature of this context renders the games development process chronically unpredictable and full of unforeseen events. Plan-driven software methodologies seem to offer limited guidance to managers and developers in this context since such approaches assume a predictable software development process. Instead, game developers improvise to cope with the unexpected. Further, an unforeseen event evokes an emotional or moody response in the actor that mediates their action response or improvisation. In this paper we focus on the process by which developers regulate their moods in such volatile and creative contexts. By regulate, we mean the way developers rationalise and act upon their moods when they encounter and interpret unforeseen challenges. Little scholarly attention has been afforded to the concept of mood per se in IS Development (ISD), with the exception of Wang and Ahmed (2002). Furthermore, Ciborra suggested that in order to improve our understanding of improvisation in information systems (IS), we need more insights into the role of the actor's moods or inner life (Ciborra 2002). This paper's contribution then, lies in it addressing this deficiency in our knowledge; of moods and how developers rationalise and act upon them. To this end, we conducted an in-depth field study at a computer games development organisation in Singapore. We analyse the data we gathered there by drawing on Giddens' stratification model of the agent. This model is relevant because human agency is a theory of how people regulate their actions, and improvisation is a form of human action. However, Giddens' theory has been criticised for its lack of attention to the role of the inner life in explaining an agent's capability to act (Bailyn 2002). This paper extends Giddens' stratification model of the agent with the concept of mood so as to build an understanding of how people regulate their moods as well as their actions. Our theory of mood-mediated improvisation has implications for leveraging moods in the management of creative software development.

2   THEORETICAL FOUNDATIONS

2.1   Related IS Development Research

Traditionally, software methodologies have been advocated as a means of making the development process more controlled and smooth (Nandhakumar and Avison 1999). However, they offer limited guidance when unexpected challenges emerge during the software development process. Agile methods such as eXtreme Programming (XP) (Beck 1999) and the Rational Unified Process (RUP) (Kruchten 1996) have been proposed as more responsive approaches to software development. However, it is debateable just how distinct from traditional approaches they really are (Paulk 2001). Some Agile authors express desires which are reminiscent of methodology authors, "we want to do everything we must do to have a stable, predictable software development." (Beck 1999); Agile is not anti-methodology (Highsmith 2002). However, when the process breaks down, due to a developer resigning for instance, a plan is of little use and developers must improvise. To understand how they improvise necessitates detailed interpretive field studies of ISD, such as the ones by Curtis, Krasner et al. (1988) and Jones and Walsham (1992). Such studies address ISD as a situated social process (Hirschheim, Klein et al. 1995), bringing into focus the "everyday life" of software developers and the emergent social and political challenges developers face. An abundance of application development

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[1] Gamasutra - Analyst: Video Games To Lead Entertainment Growth, October 6, 2005.

processes have already been studied such as those for the manufacturing industry. We chose a development process which has thus far received limited attention – the games development process, although we acknowledge papers by Baba and Tschang (2001) and Holmström (2001). Otherwise, much research on computer games has focused on the user/player end of the stick; issues such as obsession (Rehak 2003), aggression (Williams and Clippinger 2002), acceptance (Hsu and Lu 2004), virtual social conflict (Lastowka and Hunter 2004), and real-life mimicry (Nutt and Railton 2003).

2.2   Improvisation and Agency

Improvisation is situated and emergent (Ciborra 2002), occurring at the meeting point of thought and action, at a moment in time (Orlikowski 1996; Ciborra 1999); it is extemporaneous. This is particularly noticeable during emergencies where capable individuals and teams improvise life-saving solutions out of chaos (Ciborra 1999). Such solutions also reflect the role of local conditions or social and physical contexts in enabling and constraining improvisation (Nandhakumar and Jones 1997). How and whether contexts enable or constrain partly depends on the capability of improvising "agents" in the situation; some may feel there is nothing they can do whereas others may leverage context for action. Just because things have been "so" does not mean they should continue as such, "the seed of change is there in every act which contributes towards the reproduction of any 'ordered' form of social life" (Giddens 1993b:p108). In social theory this concept is examined within agency theory. For Giddens this has much to do with an agent's capability or power to take action in a situation. In this paper therefore, we think of and analyse improvisation in the context in terms of human agency. However, Giddens' ideas have been criticised for their lack of attention to the role of the inner life in explaining an agent's capability to act (Bailyn 2002), which is reminiscent of Ciborra's critique of the limited *extant* understanding of improvisation, "What is missing from the situated action literature is precisely an enquiry into the situation of the actor, specifically his moods. Only by bringing back into the picture the situation of the actor, those fleeting personal circumstances (captured by the term 'mood'; in Latin, affectio), and not only the emerging environmental circumstances can we get a fresh understanding of improvisation" (Ciborra 2002). This lack of attention to the inner life in studies of improvisation in IS constitutes a motivation for ours.

2.3   Moods, Emotions and Inner Life

Furthermore, little scholarly attention has been afforded to the concept of mood in ISD (throughout this paper we assume *mood* to have an equivalent meaning to emotion and inner life). This is surprising given the numerous studies that have drawn attention to the political and conflictual nature of the ISD process, such as Robey and Markus (1984), Wastell (1996), and Sawyer (2001). An exception is Wang and Ahmed (2002), who define moods as reactions to a certain situation, based on the person's interpretation (Wang and Ahmed 2002:p1291). However, moods may also, "impel us unwittingly along particular paths" (Fineman 2003). So, moods are not just reactions, but triggers for action too; they mediate action. According to Bagozzi (2003), the positive organisational behaviour literature shows how negative moods like embarrassment may have positive effects by provoking efforts to repair relationships, for example (Bagozzi 2003:p192). In this paper, it is such potentially negative moods as provoked by unforeseen events like staff or stakeholder resignations (commonplace in the games industry) that we focus on in this paper.

3   RESEARCH SETTING AND APPROACH

We conducted an in-depth field study of a computer games studio in Singapore. We decided to pursue a case study in Singapore because the games industry is still taking shape there. The carving out of this industry is a response to the economic and social crises Singapore has faced, such as Asian Financial Crisis (1997) and SARS (2003). Three agencies are involved in cultivating this industry; the Media Development Authority (MDA), the Infocomm Development Authority (IDA) and the Singapore Economic Development Board (SEDB). The MDA established the Media21 initiative, "to increase the

GDP contribution of the media cluster from the current 1.56 per cent to 3 per cent…[and] nurture home-grown media enterprises"[2]. The SEDB persuaded internationally renowned games companies to setup fully operational offices in Singapore, such as Lucasfilm (US), Koei (Japan) and Genki (Japan). The IDA focused on the deployment and distribution of online games through initiatives such as Games Bazaar.

The research approach adopted in this study is interpretive (Walsham 1993) involving a collection of detailed, qualitative data on the game development process in its context. We conducted twenty-four interviews with developers at a small game studio in Singapore called CGS (a pseudonym) to try to understand their development process and the unforeseen challenges they face. CGS was founded in March 2003 with a development team of twenty staff or so. Even though the company's main operations are in Singapore, it has developed numerous games in association with studios in France, Italy and Ireland, and distributed them throughout Europe. When we visited their premises the meeting room was filled with antique Indonesian furniture and mythical games merchandise hung on the walls. In the engineers' office the walls seemed to reflect their female fantasies, and there were various physical games like table football, and basketball in the artists' office; a working environment that seemed conducive to long hours of work. The company focused on producing computer games for mobile phones although they had produced a small number for the PC format too.

3.1 Data collection and analysis

This study employed interviews as the primary means of data collection. Between January 2004 and September 2005 we conducted twenty four semi-structured interviews, which were really guided conversations, i.e. at times the interviewee was given or took the "reins" of the conversation as they talked about games projects they had been involved with. However, given these were semi-structured interviews, we prepared an interview guide prior to each conversation so as to ensure our key topics of interest were explored. We asked each interviewee to talk about past projects, to recount them as stories so we could understand what had happened. We then asked them to talk about unexpected events which occurred during the lifetime of the project, and how they dealt with them. This was not always necessary however since mostly it was included in their story. In addition to the recordings of the interviews, we kept detailed notes during their enactment. We also noted down observations we had made of their work practices and filed photocopies of company documents they made available to us. Table 1 exhibits the people interviewed and their position at CGS.

Alf	John	Gayle
Managing Director	Project Manager/Programmer	Artist
In his mid thirties	In his late twenties	In her early twenties
Mac	**Andy**	**Mike**
CG Programmer cum artist	Programmer	Programmer
In his late twenties	In his late twenties	In his early twenties

Table 1. The interviewees

We adopted an interpretive approach to collecting and analysing the interview data; we attempted to understand game development challenges by trying to make sense of the meanings that each interviewee expressed with respect to the development process and emergent events. To help organise the data and its analysis the interview transcripts were imported into nVivo – a Computer-aided Qualitative Data Analysis Software (CAQDAS). nVivo is simply a tool for organizing, structuring and thinking about the data; the analysis is ultimately done by the researchers "outside" of the tool. The software was useful in the preliminary stages of analysis. We used Giddens' theory on human agency as a lens, and thereto the elements of his stratification model of the agent as codes during the analysis process. Initially we coded textual "chunks" – words, phrases, sentences, passages – simply as events and actions, i.e. the interviewees' descriptions of what they did in the stories they recounted to us. We

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[2] Media21:Transforming Singapore into a Global Media City, Media Development Authority, Singapore, 2001

then "unpacked" the actions into the elements of Giddens' stratification model of the agent - reflexive monitoring, rationalization, and motivation. Giddens' structuration theory (Giddens 1984a), which incorporates his ideas on human agency, has been widely used in the field of IS and is valuable in understanding IS phenomena (Jones and Karsten 2003). In addition, the moods of the interviewees were too "loud" and too recurrent to ignore. This was noticeable both during and after the transcription process, i.e. from hearing and "reading" the voices of the interviewees. For example, the passage "you better get someone local right? You can get him out and meet him up so can have a better explanation or communication, rather than overseas, because how are you going to contact him if he really disappears?"; the interviewee was obviously worried about working in a team where some of the members were based overseas. We began to differentiate between moods, such as "anxiety", "desperation" and "giving up" whilst examining their association with other codes that related to elements of agency such as reflexive monitoring. The theory developed in this study therefore represents bottom-up conceptualization.

4 CASE DESCRIPTION

We present four narratives relating to four challenges the developers faced during the lifetime of their games projects. It was not always possible for all interviewees to discuss the same project however due to the mobility of staff at CGS. For confidentiality reasons, all the interviewees have been given pseudonyms.

4.1 Jacky and team walk out

When the Media Development Authority of Singapore (MDA) advertised its funding scheme in the press, Alf, an entrepreneur and founder of CGS, pitched his game idea to them and successfully garnered their funding. He and his team began to work on the concept for the game for which MDA gave them five months. On the team was Jacky, who was also the chairman of the Animé Club and had his own artists who were already working on a futuristic animation series. Alf suggested merging their ideas but Jacky did not want to since he had his own animation team and concept already. Jacky shared these ideas with Alf and they decided that Jacky would work on an animation series whilst Alf would produce a PC game based on these ideas. After a month or so into the production phase they began discussing how to share the intellectual property. Alf was surprised when this led to a disagreement and Jacky renouncing their partnership and Jacky's staff "walking out". Although this was a serious blow to the project since the game ideas were Jacky's, Alf did not want to give up, particularly since he had already made a commitment to MDA. Alf persevered and had to decide whether to come up with a completely new game idea or continue with what he had so far but alter the storyline. He decided to do the latter and the game Beyond Event Horizon began to take shape. On reflection, Alf said he was glad that there had been a parting of ways because it became clearer and easier to maneuver. As things started moving again, his senior 3D artist was poached by a US game company. After this second setback Alf decided to coordinate the art team himself, which he described as "a nightmare". However, he mobilised an "army" of freelance 2D and 3D artists. In the end the project was deemed a success; they were invited to Austin, Texas in the US to pitch to a publishing company.

4.2 An image-artist's personal tragedy

Gayle had to work with an image artist during a mobile role-playing game project. The image artist was in his late thirties and based in the US. She relied on email to communicate and share artwork with him. This led to confusion when the image artist did not e-deliver his work by the agreed date. After a protracted period of silence, it emerged that he had been hospitalised due to a heart attack. This broke the rhythm and momentum of development at CGS, "the thing is they cannot give us a direct reply, they cannot give us a prompt reply", she said, using "they" to refer to overseas artists generally as we discussed this event. She was frustrated in spite of the unfortunate nature of the reason for the

breakdown, even though the image artist subsequently introduced CGS to a substitute artist to continue his work. Alf's response to the personal tragedy event was more nuanced. When it occurred, he felt desperate and stressed because the image artist had been leading the art direction on the project. However, this also pushed him to become more ambitious in his talent search; he contacted internationally acclaimed Dungeons and Dragons designer Todd Lockwood, as well as renowned cartoonists at Marvel comics and DC comics. Todd Lockwood introduced Alf to a substitute artist (this was different to Gayle's story who had told us that it was the infirmed artist that introduced the replacement artist).

4.3   A date with Microsoft

Andy talked us through the development of a mobile war game he had almost finished. This was a contract game, i.e. a customer in Ireland had asked for the game, so the concept was already set. Alf, the game designer, came up with a rough draft of a design document that outlined what the game would look like, the game play, the graphics and the storyline. Andy had a quick look at the document to get a rough understanding of what was required, and then asked the client if there was anything on the market similar to what he wanted. Andy said that if there was an existing game on the market, then he could use this as a template and gain a better understanding of what the client wanted. So, instead of having a scenario after a few months of, "this is not what I want, this is not the look I want.", and having to start all over again, he tried to prevent misunderstanding and clarify the vision for the game as early as possible. Andy said he had been in this situation too many times before. Having settled these issues and made some headway after one month into the production phase, Alf told him the client now needed a working demo completed in a few weeks. The client had been given the opportunity to meet with Microsoft's Mobile Division in Ireland and they wanted to show them the demo. So instead of finishing in three months Andy now rushed to implement some of the bells and whistles, such as sound effects, within two months. Andy told us how much he disliked midway changes and he had gone to great lengths to avoid any surprises. He had not anticipated and did not welcome this kind of surprise however; the bringing forward of the deadline as opposed to a change in the requirements. Given the opportunity to have his work seen by Microsoft seemed a motivating factor for him however, and rather changed his tune.

4.4   The lead programmer leaves

Richard left CGS after delivering a Kung Fu fighting game, at which point Mac became depressed and retreated from teamwork. He said he was not sure what was going on, that his work was "pretty independent" of everything else, and that he was not acquainted with the actual work flow within the projects anymore. Mac also talked about how roles used to be organised at CGS when Richard was still around, "we delegated certain roles so we know what actually each other is doing." Richard's departure had left him feeling fed-up because aspects of the development process such as documentation had broken down: "I mean, like now, I'm just drawing these days and I'm really not concerned about the other aspects anymore (sardonically put).", and "I don't care what happens". Richard's exit affected John differently. As opposed to retreating, he had been thrown in with full programming responsibility for three upcoming projects. This was "not something enjoyable", he said, with respect to high rate of work he was experiencing. However, despite the initial stress he expressed to us, he found the first project, developed for a Korean car company, enjoyable; he thought it was a "rush" in the sense of rising to the challenge. Given he only had one month to develop the racing game with the assistance of two artists, he evaluated game engines that would spring-board development. A few years ago he had already come across one called Torque. At that time he did not know what to do with it so he just put it aside but kept it in view. He liked Torque as the source code was provided for the engine, so if anything broke down or there were features he wanted to implement which were not currently available he could do so. Most of time however, he made use of the scripts that came along with the starter-kit. Various bugs associated with the engine arose during the course of project, but through trial and error and "hacking" he and his team were able to surmount them.

5 ANALYSIS

The above provided a set of narratives relating to unforeseen development situations. We now interpret each story by drawing on Giddens' theory on human agency.

5.1 Jacky and team walk out

Jacky and his team's departure from CGS led to the breakdown of established routines, and resulted in the incumbents losing their sense of security, or using Giddens' phrase, a loss of ontological security. However, Alf's rationalisation for getting the project "back on track" was two-fold; he had a sense of duty to since the Media Development Authority was funding the project, and also the project excited him. His motivation for steering back the project was therefore linked to his feelings of excitement, loyalty and obligation. These feelings provoked him to adjust his reflexive monitoring so as to identify and draw on new rules and resources that would support his improvisations, i.e. modifications to the game's story and concept, which were originally provided by Jacky. Faced with another unexpected challenge - the resignation of the lead 3D artist and some of his colleagues - Alf took over the reins of lead artist. Through his continuous monitoring of contexts of human resources he assembled a new team of artists. He would not give up. His capability to act and to overcome was related not just to his ability to monitor and mobilise his contexts however, but to his emotional attachment to the project; his motivation was emotional.

5.2 An image-artist's personal tragedy

When Gayle learned about the image-artist's heart attack and his subsequent departure from CGS, she experienced a loss of ontological security. She attributed the consequences of the personal tragedy to a reliance on talent from overseas, the very thought of which seemed to make her anxious, "you better get someone local right? You can get him out and meet him up so can have a better explanation or communication, rather than overseas" Even before this episode, she was experiencing ontological insecurity since Alf brokered the emails between Gayle and the image artist. Alf as broker meant she had to trust him to relay the emails to and fro, thereby introducing another level of uncertainty and anxiety into her working practices. The ambiguous nature of the unit of monitoring made it challenging for Gayle to track social interactions, i.e. the image artist seemed to be at times "online" and at others "offline", detached. She coped with her frustration and insecurity by perhaps rationalising that she needed to be somewhat more independent; a desire for freedom. So she adjusted her reflexive monitoring and began looking for inspiration and direction elsewhere. She decided to consult other mobile games, Dungeons and Dragons, mythical novels and Magic the Gathering playing cards, all of which featured designs similar in tone to what the image artist had set. She improvised as a means of coping with the unexpected. Whilst the unexpected event had initially made Alf also feel anxious and uncertain, at the same time it evoked a reaction to overcome the challenge it had created. He did not let things be "so" but turned around his mood of feeling threatened, to treat it as a test of character which perhaps fed-back to his reflexive monitoring of himself - elsewhere known as one's "ego".

5.3 A date with Microsoft

Andy had gone to great lengths to prevent any technical surprises during the course of the war game project. His continuous reflexive monitoring of working contexts over time had taught him to do so, given the number of frustrating projects he had been involved with. Also, his monitoring of other contexts such as the games industry had given him a stock of knowledge of games which he mobilised in order to reach agreement with the customer over the details of the game. However, when his overseas client created a business opportunity with Microsoft, this unexpected occurrence evoked feelings of frustration in him. However, he rationalised his mood with the idea of Microsoft, a "deity" of software development, reviewing his work. This inspired him into a flurry of impromptu activity

including calling on resources to lend "polish" to his work, i.e. he began to focus on the bells and whistles of game. For example, he contacted Arthurian Legend's musician in Italy to courier a CD of samples. However, embedding sound into the game unintendedly presented problems for him. Through trial and error he resolved these "bugs" and drawing on skills of bricolage put together a working demo of the game. Again, the appeal of "something greater" had made Andy shift gear and put aside the scripts of action he had created which he intended to lend order and stability to his project.

5.4 The lead programmer leaves

The unexpected resignation of Richard led to a break down in the working procedures of the developers as he had been largely responsible for their upkeep. His had set an example to the others in the team. However, in his absence, these practices were not sustained at any level in the organisation, including management. John and Andy mused that Alf probably did not have time to follow the procedures. The resignation event affected Mac's mood; he was not willing to exercise his agency anymore, he seemed inert and his reflexive monitoring of his contexts had broken down. His way of coping with the unforeseen was to retreat altogether from teamwork. On the other hand, John responded differently. Since he shared the lead programmer's skill set, John took over Richard's programming responsibilities. John became stressed at the thought of increased workload and perhaps the possibility of failure drove him to turn his mood into one of determination and single-mindedness. To cope he exercised his agency by improvising through rules and resources. For example, instead of programming from scratch he made use of an established game engine "Torque", and the phrase "keep it simple stupid" as guiding principle. The rules and resources that underpinned his capability as an agent were perhaps acquired though his continuous monitoring of his contexts; he had first come across the Torque game engine a few years ago. Unlike Mac, John's reflexive monitoring of others and his contexts heightened.

5.5 Integrating the findings

To begin the gradual process of theorizing through grounded abstraction, we now strip down the interpretations of the above narratives and draw together the elements common to each, in terms of; who was affected by the event, the event itself, the moods the event provoked in those affected and the subsequent impromptu acts of those affected. We assemble these in table 2.

Who	Event	Moods provoked	Acts provoked	Id
Alf	Jacky and team walk out→	Anxiety, but turns to Single-mindedness →	Modification of an existing game concept	A1
Alf	Jacky and team walk out→	Single-mindedness →	Assumes leadership role, assembles team	A2
Gayle	Loss of image artist →	Anxiety, but turns to single-mindedness →	Referring to visual materials, trying to become self-reliant	A3
Alf	Loss of image artist →	Desperation, but turns to single-mindedness →	Global talent hunt, contacting global gatekeepers	A4
Andy	A date with Microsoft →	Frustration, but realises an opportunity for recognition of his work, i.e. turns to self-actualising.	Reprioritises game features for development	A5
Mac	Lead programmer's resignation →	Inertia, giving up →	Retreat from team work to self	A6
John	Lead programmer's resignation →	Stress, loss of enjoyment, but turns to Single-mindedness →	Leveraging technological tools for productivity	A7

Table 2: Consequences of unforeseen events

We now assign a descriptive code to (i) "event", (ii) "moods provoked" and (iii) "acts provoked" (the columns in table 3) to interpret their essential meaning: (i) the events seem to have *staff or stakeholder resignation* in common, with the exception of "a date with Microsoft", which we interpret as an *opportunity*, (ii) these events provoked negative moods of *anxiety* and *frustration*, however in most cases these turned around into positive moods of single-mindedness, or desire for independence or *freedom,* (iii) these moods in turn provoked a variety of improvisations - *experimenting, searching, leveraging, seizing* and *reprioritising* (refer to table 3). Some of these smack of *creativity*, e.g. experimenting and searching. Drawing on this, we can broadly say that staff or stakeholder resignations initially provoked moods of anxiety and frustration in the developers, but this then evoked a desire and mood for independence or freedom, which in turn provoked creative improvisations.

Id	Acts provoked	Type of impromptu act
A1	Modification of an existing game concept	Leveraging
A2	Assumes leadership role, assembles team	Seizing
A3	Referring to visual materials, trying to become self-reliant	Searching
A4	Global talent hunt, contacting global gatekeepers	Searching
A5	Reprioritises game features for development	Reprioritising
A6	Retreat from team work to self	Introspecting
A7	Leveraging technological tools for productivity	Leveraging

Table 3: Simple taxonomy of improvised acts

6   DISCUSSION AND IMPLICATIONS

Section five demonstrated the unforeseen challenges faced by the agents in the development process, particularly relating to staff or stakeholder resignations, their moody responses, and how these constrained and enabled their improvisations, i.e. the process by which they regulated their moods in a volatile context. Most in our study were able to regulate their moods effectively, to use negative moods to affect positive action (e.g. table 2, codes A1, A2, A3, A4, A5, A7). This seemed to constitute part of their agency; their capability to act. Given the importance of moods and the "scaffolding" Giddens has already provided us with in the form of his stratification model of the agent, we may learn more about how moods affect agency or improvisation by extending Giddens' model (see figure 1). After all, Giddens does at least acknowledge that an agent's emotions are directly connected to their motivation to act, "The connection of motivation to the affective elements of personality is a direct one, and is recognised in everyday usage; motives often have 'names' – fear, jealousy, vanity, etc." (Giddens 1993:p92). However, he does not develop this further nor incorporate it into his stratification model of the agent.
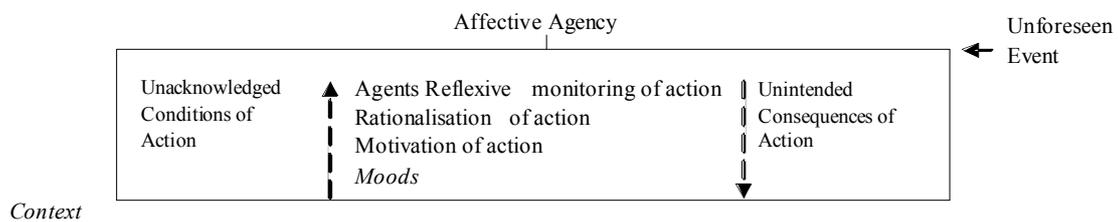

Figure 1: A model of mood-mediated improvisation

6.1   Conceptualisation

The conceptualisation in figure 1 theorises about the process by which agents regulate their moods; how they rationalise and act upon them in a volatile context. We now offer an interpretation of this model. Starting from the top of the model: as developers reflexively monitor their contexts they become aware of unforeseen events, such as staff or stakeholder resignations. They then interpret and rationalise the meaning of the event in their context. As they do so this affects their motivation for

action and produces negative moods of anxiety and frustration – these are the unintended consequences of the actions or unforeseen events that originate in the context. Now we follow the model from the bottom back to the top: these moods become part of the unacknowledged conditions for a developer's action or improvisation. In their practical consciousness the agent's will or motivation to overcome negativity leads them to reinterpret and re-rationalise the meaning of the (resignation) event in their context, which in turn produces a positive mood of and desire for freedom. The developer then adjusts their reflexive monitoring and leads to a number of improvisations such as experimenting, searching, leveraging, seizing and reprioritising. These improvisations evoke creativity and learning. This then is the process by which agents/developers regulate their moods; mood-mediated improvisation.

6.2   Implications

This conceptualisation has implications for our knowledge of how moods mediate the way creative software developers improvise through the unexpected; the process by which they regulate their moods in volatile contexts. According to our conceptualisation in section 6.1, rationalisation and interpretation play an important role in this process. According to Wang and Ahmed (2002), moods are reactions to a certain situation based on the person's interpretation. Therefore, by modifying an interpretation or the meaning of an event in context, we may influence the moods of the agent and the way they are harnessed for improvisation. This modifying of interpretation is evocative of sensemaking, "sensemaking is about authoring as well as reading" (Weick 1995:p7). By affecting the sensemaking process then, so we perhaps can influence the mood response of developers or the way they regulate their moods. This has implications for our knowledge of approaches to software development. It is not sufficient to have approaches such as Agile methods that emphasize cooperation and embrace change (Beck 1999). We also need approaches that actively incorporate the *sensemaking* of change, of the unforeseen, so as to influence moods, their regulation and their offspring improvisations. Our findings and theory also have implications for practicing managers in creative software development. In order to effectively manage developers' moods when faced with volatile contexts and disruptive events, managers need to consider means of influencing developers' interpretations of events. This is perhaps a matter of charismatic leadership. Managers need to be able to reinterpret for themselves the negative moods produced by such events as staff or stakeholder "walkouts", before then helping those under their charge make positive sense of them – help developers to regulate their moods, so as to produce creative improvisations. This does not mean wiping out a negative response to an event, but rather leveraging it and turning it into a positive one. This is consistent with Bagozzi (2003), who shows how negative moods can produce positive effects, such as embarrassment provoking efforts to repair relationships. Furthermore, during volatile times developers should be encouraged to open up their social working contexts and continuously monitor them instead of shrinking, so as to build their stock of resources; resources of a material, technological and social nature that may be invoked at the appropriate time; being prepared; readiness through reflexive monitoring. If developers remain close to their screens however they may be assuming safety in blindness, particularly in SMEs such as CGS where the manager may be away and incumbents have to fend for themselves or improvise in his or her absence. In volatile situations then, management should encourage searching, seizing, reprioritising and leveraging of resources (refer to table 3).

7   CONCLUSIONS

This paper has focused on the process by which developers regulate their moods in the volatile and creative context of games development. By regulate, we mean the way developers rationalise and act upon their moods, i.e. improvise, when they encounter and interpret unanticipated challenges. There has been little scholarly attention paid to this process in ISD. We investigated this process through an in depth field study at a games development company in Singapore. We used human agency as a lens to analyse the data and subsequently extended Giddens stratification model of the agent with the concept of moods; we called this extension a model of mood-mediated improvisation. Briefly, the

model theorises that through their reflexively monitoring, developers interpret the meanings of unexpected events, which affects their motivation for action and produces negative moods. These moods constitute unacknowledged conditions for action or improvisation, but through an agent's will or motivation to overcome negativity, they reinterpret the meaning of the event, which in turn produces a positive mood and desire for freedom. This produces a number of improvisations such as experimenting, searching, leveraging, seizing and reprioritising. These improvisations evoke creativity and learning. Therefore, since moods are reactions based on a person's interpretation, by modifying an interpretation or the meaning of an event in context, we may influence the moods of the agent and the way they are harnessed for improvisation. This modifying of interpretation is evocative of sensemaking (Weick 1995). By affecting the sensemaking process we can influence the mood response of developers or the process by which they regulate their moods. The implication for our knowledge of software development is that it is not sufficient to have approaches that emphasize cooperation and embrace change (Beck 1999). Such approaches should also actively incorporate sensemaking with respect to change and unforeseen events, so as to influence the regulation of consequential negative moods, and subsequently leverage these moods for positive and creative improvisation.

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