



Exploring the Impact of Competition and Incentives on Game Jam Participation and Behaviour

Niamh Germaine
Technological University Dublin
Dublin, Ireland
niamh.germaine@tudublin.ie

John P. Healy
Technological University Dublin
Dublin, Ireland
john.p.healy@tudublin.ie

ABSTRACT

Competitive elements are a common feature of many game jams. However, there has been little research to date on the impact of competition on participants and their behaviours. To better understand how incentives and competition may affect the motivations and behaviour of game jam participants, we surveyed 47 game jam participants and analysed data from 4,564 online game jams. We found that incentives and competition were neither strong deterrents nor significant motivators for game jam participation. However, a significant percentage of the participants surveyed indicated that incentives and competition would affect their behaviour during a game jam. Our findings suggest this effect is dependent on the nature (or contingency) of the incentive. In addition to its practical implications for game jam organisation, this study highlights a largely untapped potential for further research into the complexities of game jams, incentives and competition.

CCS CONCEPTS

• **Software and its engineering** → **Interactive games.**

KEYWORDS

game jams, motivation, incentive, behaviour, competition

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1 INTRODUCTION

A game jam can be described as an “accelerated opportunistic game creation event where a game is created in a relatively short timeframe exploring given design constraint(s) and end results are shared publicly” [14]. On an individual level, these events can serve as an accessible introduction to game development; an opportunity to socialise or network; a space to develop skills and experiment creatively; or an opportunity to have fun and challenge oneself [1, 19, 22]. On a broader scale, game jams are hosted for myriad reasons such as producing commercial value, furthering societal

agendas, or advancing academic research and education [16]. As such, game jam research can potentially benefit many individuals and organisations.

Much of the existing research on game jams has centred on non-competitive events [1, 19, 22, 23]. Some who have touched on the subject of competition have suggested it has a negative effect on the experience of game jam participants [5, 22]. With little research into this area, it can be difficult to determine if the cost and effort of organising competitive game jams is a worthwhile investment.

Building on previous work on game jams and motivational psychology, we will explore how competition and incentives may affect game jam attendance and participants’ behaviour during a jam. To this end, we conducted a survey of 47 game jam participants and analysed their responses in conjunction with data from 4,564 online game jams. A mixed methods approach was employed in the analysis of the data [3]. Based on this research, we posit that careful consideration should be given, not only to the question of whether incentives should be offered at a game jam but also to the specifics of what behaviour is incentivised and how.

2 BACKGROUND

Many researchers have investigated the motivations and experiences of game jam participants, though much of this research has focused primarily or exclusively on non-competitive events [1, 19, 23]. As a result, the existing studies, surveys and meta-analyses on the subject of game jams provide essential context but broader research into the general field of motivational psychology may provide greater insights into the relationship between motivation, behaviour, and incentivisation. In this section, we review these areas in conjunction with each other, before outlining the literature related to incentives and competitive game jams. To conclude, we present two research questions that the study sought to explore.

2.1 Why Do People Participate in Game Jams?

Across the many studies on the motivations of game jam participants, similar motivational factors have been consistently identified. Almeida et al. [1] grouped the recurring motivational factors from previous studies into four “macro” categories:

- personal, such as having fun, curiosity, or self-challenge;
- social, such as making friends, improving teamwork, or engaging in a community;
- technical, such as situational, technical, or experiential learning;
- business, such as establishing connections for future business opportunities or personal career development.

This research established an overall order of motivational influence as follows: personal, social, technical, and business (from



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most to least). However, different motivations were more prevalent among different groups. Professional and indie developers were influenced equally by personal and social motivators, whereas “social and technical motivations [were] equally important for students and hobbyists” [1]. The degree to which technical motivations influenced participants was found to decrease as participants’ level of schooling and experience in game development increased. This research indicates that game jams may attract different demographics depending on whether socialisation or learning is emphasised in the design and advertising of the event, and that all subgroups benefit from and enjoy game jam environments that support the pursuit of personal goals.

The relative impact of the different types of motivation appears to remain consistent among participants with vastly different levels of game jam experience. Kultima notes that exceptionally experienced game jammers have indicated that they participate in game jams for broadly the same reasons as those who are less experienced [15]. Notably, although the importance of the various reasons provided was not ranked, the majority of the reasons listed did align with personal motivation. Social motivation was the second most common theme. The overall order of motivational influence seems to apply even to game jammers with varying levels of experience.

These studies suggest that personal motivation is likely the most significant factor in the average game jammer’s decision to take part in a game jam. There are numerous reasons why this may be the case. Firstly, not only are most jammers game creators outside of game jams, they are also overwhelmingly game players; a group with an arguably higher drive to create with and for games compared to consumers of other media [2, 19]. This creative drive is evidenced by the wealth of player-created game content, such as mods, maps and custom levels, and the popularity of in-game creation toolkits such as those of *Little Big Planet* [17] or *Super Mario Maker* [18]. Game jams typically provide an environment that supports creativity and experimentation. Therefore, it’s unsurprising that many jammers report variations of seeking creative fulfilment as one of their primary reasons for attending game jams [15, 19].

Another of the most commonly reoccurring forms of personal motivation among the various reports and surveys of game jam participants is the desire to have fun [15, 22, 23]. Preston et al. [19] demonstrate that participation in game jams can provide the same cognitive arousal as play. In essence, the development of a game during a game jam can be a game in itself. Viewing participation in game jams as ludic craft (a constructive form of play) provides a means to understanding why so many people enjoy it [10]. The distinction between making as play and making as work may also explain why many professional game developers choose to spend their free time doing what resembles unpaid labour. Although game jams draw on the skills developed in the workplace, they allow participants to leave the values (e.g., efficiency and productivity) of the workplace behind and work towards open, self-determined outcomes without external pressure [10]. This emphasis on playful participation is a significant factor in many people’s enjoyment of, and choice to participate in game jams.

The reasons for participation in game jams seem to be well-established, however, much of the existing literature doesn’t address

the subject of competition. Many studies focus on those participating in non-competitive game jams [1] or the Global Game Jam, which is primarily a non-competitive event [19, 22, 23]. We propose that further research into the motivational impact of competition on game jam participants is merited.

2.2 The Psychology of Extrinsic and Intrinsic Motivation

Motivational forces can be described as either extrinsic or intrinsic, with the difference between the two being described as follows:

Extrinsically motivated behaviours are governed by the prospect of instrumental gain and loss (e.g., incentives), whereas intrinsically motivated behaviours are engaged for their very own sake (e.g., task enjoyment), not being instrumental toward some other outcome.

[6]

This description provides insight into the nature of motivation, however, as Cerasoli et al. note, it is a simplification of existing theories on motivation. Self-determination theory [8, 20] offers a more nuanced perspective on the nature of motivation, viewing autonomous (self-determined) and controlled (determined by external factors) motivation as the poles of a continuum.

In the context of game jams, the prominent role that personal motivation plays, as outlined in the previous section, suggests that many game jammers are primarily intrinsically motivated or lean towards the intrinsic/autonomous end of the motivational continuum. Goddard et al. [10] suggest that, as a form of ludic craft, participation in game jams must be voluntary and intrinsically motivated. Intrinsic motivation is also commonly associated with many of the behaviours that game jam organisers typically seek to encourage; increased creativity, open-mindedness, cognitive flexibility, and problem-solving [8, 13].

In addition to the continuum of motivation, self-determination theory asserts there are three basic psychological needs essential to mental health and well-being; autonomy, relatedness, and competence [20]. Almeida et al.’s [1] research suggests that participation in game jams supports the fulfilment of these needs. Personal factors, such as deciding to challenge oneself or satisfy one’s curiosity, can be associated with autonomy. Socialisation is linked with relatedness: the desire for belonging and connection [20]. The development of competence is strongly tied to technical learning. Thus, participants’ drive to fulfil their basic psychological needs, as defined by self-determination theory, arguably underlies their motivations for taking part in game jams. It’s conspicuous that business aspects are both the least influential across all groups by a large margin and the only category of Almeida et al.’s motivational aspects without an immediate link to the needs of self-determination theory [1].

2.3 Incentives and Competition

It has been suggested that competition is detrimental or even anti-thetical to game jams. Grace [11] argues that game jams’ emphasis on “a state and process” rather than “a measurable result standardised by a shared sense of competition” is what differentiates them from other time-limited creation events, such as hackathons. However, as Lai et al. [16] note, the majority of game jams have at least some degree of friendly competition to them. Kultima’s definition

[14] and Lai et al.'s taxonomy [16] both allow for competitive events to be classed as game jams, with the latter placing them under its "challenge" category.

Given the apparent benefits, it seems prudent that game jams should be designed to support and engender intrinsic motivation among participants. Many game jam organisers and researchers view competition and incentivisation as antithetical to such a design. The undermining effect, a much-studied and debated issue among applied psychologists, refers to this very idea; "the presentation of incentives on an initially enjoyable task reduces subsequent intrinsic motivation for the task" [6]. The effect is attributed to incentives being a means to externally control an individual which reduces that individual's sense of autonomy and, by extension, their intrinsic motivation. Much of the research supporting this theory has been confined to tasks that were intrinsically enjoyable to begin with. As discussed previously many participants find that game jams are intrinsically enjoyable experiences.

If the undermining effect applies, offering prizes, awards or other incentives to game jam participants may be inadvisable. As greater intrinsic motivation is linked to increased creativity, the converse also applies. Furthermore, many types of incentives can create a sense of focus and urgency that is counterproductive to creativity and openness [4]. Participants may be less willing to experiment and risk failure when under pressure. But imperfect games can still be worthwhile: participants have reported that game jams had a beneficial effect on their skills even when they described their games as being "only average" in quality [19].

Even more crucially, there is an argument that incentives can detract from participants' overall enjoyment of a game jam. This is especially concerning as enjoyment of the event is one of the single most influential and common motivators, even more so than other personally motivating factors [1, 15, 22, 23]. Researchers have posited that competition detracts from the general goal of having fun by "making experienced developers take things too seriously" [5] and discouraging the inexperienced. Increased structure and external motivators such as incentives have also been found to limit playful participation [10]. This is supported by the findings of Steinke et al.'s survey, which suggests that noncompetitive jammers are more satisfied with their experience at game jams than competitive jammers [22]. Steinke et al. are hesitant to conclusively state a root cause for this apparent correlation (given they only surveyed participants of the Global Game Jam, which is advertised as a non-competitive event). The popularity of non-competitive game jams indicates that many people highly enjoy a more relaxed, intrinsically motivated game jam experience.

Much of the argument against incentivisation at game jams has reduced the matter to simplified binaries; incentives vs no incentives, intrinsic vs extrinsic motivation. The reality of the issue is much more complex. Multiple factors can influence the effectiveness of incentivisation, such as the type of performance desired or the salience and contingency of the incentives. As such, there may be a circumstantial case for offering incentives at game jams.

Firstly, the type of performance should be considered. Intrinsic motivation is a better predictor of quality performance (complex tasks that require skill, broad focus, autonomous work and personal investment, where the output of the task is evaluated by criteria other than quantity), whereas extrinsic motivators are a

better predictor of quantity performance (tasks that require concentrated focus, persistence and structured behaviour, where output is evaluated by counting discrete units) [6]. While the majority of game jams favour quality performance, incentives may be useful in cases where quantity performance is desirable (e.g., to encourage participants to complete their games on schedule).

Second, incentive salience has a significant impact on performance and motivation. Directly salient incentives that provide a clear, immediate link between the incentive and performance, are more controlling and more likely to "crowd-out" intrinsic motivation [6]. This can be desirable when productivity or compliance is a priority, such as encouraging participants to meet specific requirements. However, "when creativity, autonomy, teamwork, learning, ethical behaviour, well-being, and quality are valued, incentives should be framed as less salient" [6].

Thirdly, and crucially, creative performance is linked to the conditions that an incentive is contingent upon. Creativity-contingent incentives are linked to increased creativity, while incentives that are contingent only on completion or on general performance have been found to have a slightly negative effect on creative performance [4, 21]. Explicit creativity-contingent incentives establish that creativity specifically is valued, while performance-based incentives without explicit creativity criteria can cause individuals to assume that routine (non-creative) performance is desired. In simple terms, the research suggests that explicitly rewarding creativity motivates people to be more creative. Similarly, a level of competition that rewards risk-taking can help create a safe space for experimentation in game jams [9].

As self-determination theory outlines, behaviour can be simultaneously driven by both intrinsic and extrinsic motivation [20]. In contrast, the undermining effect theory relies on the assumption that performance can be attributed exclusively to one type of motivation [6]. If both types can co-exist, incentives can exert an external influence on motivation without overriding intrinsic motivation. Research has even indicated that incentivisation can boost the predictive validity of intrinsic motivation on performance, especially when the incentives are less salient [6]. Much like undermining theory, this research is rooted in the idea that intrinsic motivation is linked to personal autonomy [20] and therefore less controlling environments are more conducive to intrinsic motivation.

For similar reasons, creativity-contingent incentives and incentive conditions that offer choice (e.g., a choice of rewards or tasks) have also been found to increase intrinsic motivation [4, 21]. Individuals who are offered such incentives are more likely to feel more volitional and therefore more intrinsically motivated. Conversely, more controlling conditions cause disengagement and reduced intrinsic motivation and creativity. This is consistent with the undermining effect's assertion that excessive external control reduces autonomy and intrinsic motivation but, unlike the undermining effect theory, it suggests that only some types of incentive have this effect. Other incentives may be implemented in an autonomy-supportive fashion. If incentives and intrinsic motivation are not inherently antagonistic then incentivisation may be beneficial in the context of game jams, provided due regard is given to what is being incentivised and how.

Many scholars have argued that competition and incentivisation detract from game jams. Multiple studies have emphasised the

importance of personal and intrinsic motivation, to which, some have argued, incentives are not conducive. However, this point is undermined by the dearth of literature on competitive game jams. Furthermore, theories on motivational psychology suggest that some types of incentives may have beneficial effects. Exploring all these potential effects falls beyond the scope of this study. Therefore, to provide a focus for subsequent research, the following questions were developed to provide insight into the role of incentives and competition on game jam attendance and behaviour:

- (1) What effects, if any, do incentives and competition have on game jam attendance?
- (2) How does incentive contingency affect participant behaviour during game jams?

The following section will discuss the research methodology and describe the methods employed in answering these research questions.

3 METHODOLOGY

A mixed methods approach was applied to capitalise on the advantages of individual methods of data collection and neutralise some of their individual disadvantages [3]. Quantitative research is useful for determining if there is a relationship between incentivisation, motivation and performance at game jams but doesn't explore the complexities of how or why they might be related. Meanwhile, qualitative research takes a more holistic approach that can provide meaningful insight into these complexities but has limited empirical generalisability [7, 12]. A mixed method approach was deemed most appropriate, considering this study's research questions, as it can answer confirmatory and exploratory questions simultaneously. The data for this study was collected through an online survey and from itch.io, a popular platform for hosting online game jams.

3.1 Survey

A survey was conducted from 15-27 November 2021. With the permission of their respective moderators, the survey was distributed via numerous game jam communities such as the "General Discussion" forum of itch.io, various Discord servers, and Reddit subforums dedicated to game jams or game development. A total of 58 people responded to the survey, however, 11 respondents had never taken part in a game jam. These responses were omitted from the analysis which resulted in a total of 47 valid responses to the survey.

To contextualise responses, three of the questions established respondents' level of experience in game development, game jams and, specifically, game jams that offered incentives. The remaining questions covered: Four-point Likert-type statements on participants' motivations for attending game jams and interest in different types of game jams, followed by optional open-ended questions in which respondents could expand on their answers.

The qualitative data gathered were coded inductively. Descriptive codes were developed initially by reading through the data to get a general overview of it, and then further refined during the line-by-line coding process.

3.2 Content Analysis

Historical data from itch.io, a popular platform for hosting online game jams was collected and analysed to provide a broad quantitative overview of participants' behaviour to compare to the results of the survey.

Data collection was automated due to the scale of the analysis. A web scraping tool was used to gather quantitative data from game jams hosted between 2014 and 2021 on the itch.io website and the data was recorded in Excel. Each entry included: the game jam's title, URL, host, time of completion, number of registered participants, number of submitted games, whether submissions were ranked and whether the event was "featured" (promoted on the main game jam webpage on itch.io).

Data was collected on 4,640 online game jams. A total of 26 game jams with no submissions were excluded and a further 50 game jams with over 1,262 participants (two standard deviations more than the mean number of participants) were omitted. A total of 4,564 met the inclusion criteria for the study. While the 50 jams with over 1,262 participants merit further study, we opted to focus our current research on those that are representative of the "average" game jam on itch.io.

The analysis examined the number of submissions, the number of participants and the ratio of submissions to participants across all the game jams and then compared the data between ranked/unranked game jams and featured/not featured game jams. Regression analysis was used to estimate the relationship between the numbers of participants and submissions by graphing the data onto scatter plots and creating trend lines. The validity of the regression model was tested using r-squared values and residual plots, which indicated the linear regression model was appropriate for the data.

4 RESULTS

4.1 Survey Respondents' Backgrounds

Of the 47 valid survey responses, 18 self-identified as hobbyists, 14 as students, 7 as independent game developers (henceforth referred to as "indie"), 6 as professional game developers working with a non-indie studio (henceforth referred to as "professional"), and 2 as having no experience in game development outside of game jams. The majority of the respondents (40) had taken part in game jams only as participants. The remaining 7 participants had some experience in organising game jams. Most of the respondents (30) had taken part in a game jam with prizes or awards.

4.2 Motivations for Game Jam Participation

Respondents rated how significant various motivators were in relation to their interest in attending game jams on a four-point Likert-type scale (Figure 1). "Having fun" is a clear primary motivator, both overall and among each subgroup of respondents. "Improving my skills", "trying something new", "challenging myself" and "socialising with other game enthusiasts" were also consistently highly rated. Overall, respondents were comparatively uninterested in prizes and awards.

Ten respondents elaborated further via the optional freeform text question. Three respondents specifically highlighted the value

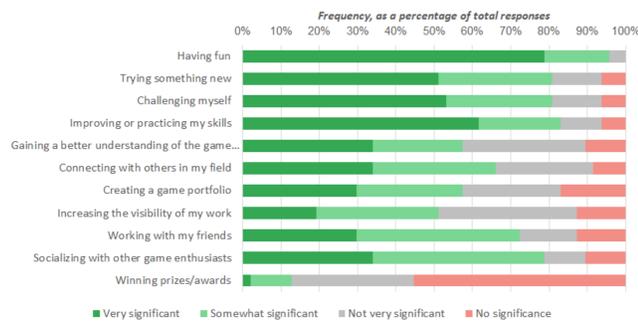


Figure 1: A four-point Likert scale showing the distribution of how respondents rated the significance of each motivational factor in their decision to attend a game jam.

of time limits in relation to challenging themselves or advancing their game production skills. Another 6 expressed appreciation of the opportunity to experiment without the pressure of creating a successful game. One respondent, below, discusses the post-jam benefits of their creative, playful participation in game jams:

The time spent jamming is time I give myself permission to be creative and to play with game design and game development. As a result, the majority of my game ideas have occurred during a game jam and in the immediate days after a jam.

Analysis of these responses suggests an overall order of motivation significance as follows (from most to least): personal, technical, social, business, and incentives. The technical motivation was more significant to students and hobbyists than to indie or professional game developers. Indie and professional game developers indicate that personal motivation is considerably more important to them than all other types of motivation, whereas it is only slightly more important than social and technical motivation, respectively, to students and hobbyists.

4.3 Interest in Different Types of Game Jam

When asked to rate their interest in three different types of game jams on a four-point Likert-type scale, respondents most frequently demonstrated a preference for non-competitive game jams without prizes. The only subgroups who expressed otherwise were students, with a mild preference for non-competitive game jams with random spot prizes, and indie developers, who preferred competitive game jams.

However, across all subgroups surveyed, respondents showed a relatively high amount of interest in all three types of game jams detailed (Table 1). This suggests that while prizes and awards don't attract the average game jam participant, their presence does not have a detrimental effect on the intention to attend. One respondent echoes this sentiment directly in their response:

I prefer game jams that are just for the sake of game jams. But I wouldn't avoid a game jam just because there are prizes.

Of the other respondents who chose to elaborate further, 12 stated that competition and prizes are neutral factors. Another

2 respondents indicated a preference for non-competitive game jams, both specifying that "competitive pressure" detracts from their enjoyment. The final respondent explained that they have no interest in non-competitive game jams with random spot prizes, stating that "if prizes are given out, they should be earned".

In contrast, ranked game jams on itch.io are both more commonly hosted (2686 out of 4564 jams) and attract more participants (averaging 61) than unranked game jams (averaging 48). Nonetheless, the percentage of participants who took part in ranked game jams on itch.io is similar to the percentage of survey respondents who had attended game jams that gave out prizes or awards – 64.2% (162 986 out of 253 701 total registered participants on itch.io) compared to 63.8% of survey respondents. Together these findings suggest that, even if individuals are comparatively less interested in competitive game jams, they are still likely to participate in one.

4.4 Effects of Competition and Incentives on Behaviour

Analysing the data from itch.io, shows a linear relationship between how many participants a game jam attracts and how many games are submitted to it. Unsurprisingly, the more people join a game jam the more games are made. However, on average, only approximately 23 games were produced for every 100 participants who entered a game jam. This can be attributed to many factors e.g., multiple people producing one game together, or individuals who register but don't participate.

If a jam is featured on the main page of itch.io it appears to have a pronounced effect on how many participants it attracts (Table 2). Though ranked game jams attract more participants, they also have a lower average ratio of submissions to participants (0.21) than unranked jams (0.265). Ranked game jams appear to have more impact on how many games are submitted per participant even accounting for the impact of being featured (Table 3). This data analysis provides quantitative evidence to suggest that competition does affect participants' behaviour during a game jam, at least in relation to submitting a game to an online jam.

4.5 Incentives in the design process

The survey results provide additional insight into how and why behaviour might change. To establish a baseline, respondents were first asked to describe their "normal" design process. Brainstorming was the first step in this process for 30 of the respondents, with 5 also mentioning prototyping as part of their ideation phase. One respondent stated that brainstorming "can take up to a third of the jam time." Nineteen of the respondents took the scope and the time limits of the game jam into consideration when deciding on an idea, 19 took inspiration from the theme of the jam, 16 picked whichever idea seemed the most fun to make and 8 tried to make something "unique". Teamwork featured heavily, with 22 responses highlighting the importance of communication, agreeing on an idea that everyone was happy with, making good use of everyone's skills and generally working well with others.

While only one comment, from a game jam organiser, made any reference to self-care such as taking breaks and "the importance of sleep", the overall tone of the comments indicates the respondents highly enjoy their typical game jam experiences.

Table 1: Number of respondents who selected each statement on a four-point Likert-type scale, regarding their interest in various different game jams

Type of Game Jam	Very Interested	Somewhat Interested	Not Very Interested	Not At All Interested
A non-competitive game jam with no prizes or awards	22	21	3	1
A competitive game jam, with prizes or awards for the winning games	17	23	4	3
A non-competitive game jam, with spot prizes to random participants	18	19	7	3

Table 2: Analysis of the effects of being ranked and/or featured on the average number of game jam participants per jam

	Ranked	Unranked
Featured	212	175
Not Featured	26	26

Table 3: Analysis of the effects of being ranked and/or featured on the average submission to participant ratio

	Ranked	Unranked
Featured	0.203	0.246
Not Featured	0.239	0.336

Respondents were then asked if and how their design process would change in a non-competitive game jam, a competitive game jam with a prize for the “best game” or a competitive game jam with a prize for the “most creative game”.

The majority of respondents (37) stated they wouldn’t change their process in a non-competitive game jam – possibly indicating they regard these as “normal” game jams. Answers diverged more for competitive game jams, with approximately 39-49% of those surveyed indicating they’d behave differently during a jam if an incentive is offered, even though prizes and awards were a neutral or slightly negative factor in the average respondent’s decision to attend a game jam. Twenty-three respondents indicated they’d change their process if there was a prize for the “best game”, 18 if the prize was for the “most creative game” and 1 being unsure in both competitive cases. Three of the respondents specified they didn’t care for prizes and so wouldn’t be motivated to act differently because of them.

Students were the least likely to change their process in either competitive jam. This could be due to a lack of confidence, possibly related to inexperience, as one student explains: “I never see myself winning anything and am normally even afraid to present it at the end”.

Of those who’d change their design process in a non-competitive jam, 4 said they’d relax and enjoy the process more, 3 would focus on learning, 1 would spend less time “polishing” their game, 1 would

be less concerned with adhering to the jam’s theme and 1 would feel more comfortable taking risks.

In contrast, 10 said they’d take fewer risks in a competitive game jam with a prize for the “best game”. One specifies knowingly “sacrificing learning potential for increased chances of success”. Another 4 would prioritise universal appeal, with 1 specifying they’d adhere closer to the theme to do so. Eight would put more time and effort into their game overall and 5 would change how long they spend brainstorming, though 3 of them would spend more time and 2 would spend less.

Prizes for the “most creative game” elicited quite different responses. Of the 18 who’d act differently, 9 would actively try to be more creative and 10 mention comparing their ideas to other’s games and trying to come up with something entirely different. Four respondents would expend more time and effort on ideation, 3 mention increased focus on the theme and 5 would make more experimental, risky games even if that meant they were less confident they’d pull it off. As 1 respondent comments:

I’d be forced to take risks in hopes of making something creative, and I’d also have to think about what other devs will believe to be original, in order to try and “outmanoeuvre” the others.

References to elevated stress in relation to either competitive jam were noticeably absent.

5 DISCUSSION

5.1 Game Jam Participation and Associated Motivation

This research indicates a majority of game jam participants have attended a competitive game jam, validating the focus of this study despite their controversial status [11]. Competitive events are part of many if not most, game jam participants’ experience of game jams.

The survey identified an order of motivation influence (personal, technical, social, business, incentives) that closely resembles the order Almeida et al. [1] derived from their research on Global Game Jam participants (personal, social, technical, business) and concurred that motivational influence varies by background. The differing importance of technical factors is likely related to the amount of student and hobbyist survey respondents. More specifically, the results firmly align with the general consensus on the

importance of having fun [15, 22, 23] and the comparative irrelevance of prizes and awards as motivating factors for game jam attendance [19].

Despite minor differences, this study's findings are broadly in agreement with the reviewed literature on what motivates individuals to participate in game jams. This gives a solid basis from which to explore the behaviour itself and how incentives and competition may affect it.

5.2 Incentives, Competition and Game Jam Attendance

In line with the reviewed literature, the majority of survey respondents preferred non-competitive game jams without prizes or awards over competitive game jams. Respondents referenced competitive pressure detracting from their enjoyment of the event, echoing the reviewed literature's arguments that the relaxed environment and creative freedom of non-competitive events are more enjoyable [5, 22] and supportive of creativity, experimentation and innovation [2, 5, 19]. As both previous work and this study identified fun, personal challenge and learning as the predominant motivators associated with game jam attendance [1, 15, 22, 23], it follows that non-competitive game jams would attract more participants.

Non-competitive game jams without prizes and awards were also preferred over non-competitive game jams with random spot prizes, indicating that incentives were seen as somewhat negative even without associated competition. Notably, students were the most interested in random prizes while indie and professional developers were the least. This could indicate a relationship between experience, confidence in one's ability to "earn" a prize through merit and disinterest in random prizes.

However, despite these findings, the results of the survey suggest incentives and competition may not be as much of a deterrent as suggested by the literature. The majority of survey respondents had participated in competitive jams and, while non-competitive game jams were most preferred, there was a high degree of interest in all the game jams listed. So, while non-competitive events may be favoured, most of the survey respondents would still be interested in attending a competitive game jam.

Furthermore, the itch.io analysis suggests competition may actually attract participants. Competitive game jams on itch.io were both more commonly hosted and attracted more participants on average than their non-competitive counterparts.

We can therefore infer that incentives and competition are unlikely to strongly deter potential game jam participants, but the results are otherwise inconclusive. The survey data suggests a weak deterrent effect while the itch.io data implies a degree of attraction. More in depth-research, accounting for other factors (e.g., location, theme, advertising or the difference between online and in-person events) may help explain this discrepancy and determine how much of an impact incentives and competition have in comparison to other factors.

5.3 Participant Behaviour and Incentive Contingency

Analysis of the itch.io data indicates that competition does affect participant behaviour during game jams, potentially making participants less likely to submit games. Similarly, despite otherwise reporting a general disinterest in prizes, awards and competition,

a sizable portion of survey respondents thought their behaviour during a game jam would be affected by incentives and competition. Almost half (49%) would act differently if there was a prize for the "best game", while 39% would if the prize was for the "most creative game" (many of the respondents who answered affirmatively to the first and negatively to the latter explain that their normal design process already prioritised creativity).

There's also a difference in responses to the hypothetical incentives discussed depending on their contingency. Reactions to the "best game" prize epitomised many of the concerns about incentives and competition at game jams. Answers indicate a shift towards quantity performance over quality; simplifying the work but putting more time and effort into it [6]. This type of incentive seems to introduce external pressure that could be used to control participant behaviour – to the detriment of creativity and innovation [4].

In contrast, the prize for the "most creative game" suggested a much more positive reaction. Survey respondents who thought their behaviour would change due to the creativity-contingent prize reported they'd actively try to be more creative, take more risks and make more unique and experimental games. These results support the theory that only specific types of incentives have a negative effect on behaviour and other types may have a neutral, or beneficial effect [4].

Given the effects of performance contingency on behaviour, the prevalence of prizes for the "best" game (whether overall or in a specific category) among competitive game jams may partially explain why these jams are associated with increased pressure and reduced creativity. Meanwhile, non-competitive game jams are commonly associated with safe, low-pressure environments that foster creativity and experimentation [2, 5, 19].

5.4 Implications

While acknowledging the limitations of this research and its findings, the following insights may be useful to consider when organising a game jam:

- Most people who attend game jams do so, primarily, to have fun. Other common motivators include developing skills, challenging oneself, trying something new and socialising. If all elements of a game jam (including competition and incentives) are designed to support these goals, it's likely to provide a positive experience.
- Competition and incentives affect the behaviour of a significant portion of game jam participants.
- Though prizes and awards will not reliably attract participants, they are unlikely to dissuade people from attending a game jam in which they are otherwise interested.
- If creative performance is desired, offering incentives with explicit creativity criteria (e.g., "Most Creative Game") instead of less specific performance-contingent incentives (e.g., "Best Game") is advisable.

5.5 Limitations

A number of factors limit the nature of the findings from this study. Firstly, the complex potential effects of incentives and competition within game jams, and all the possibly significant variables that may modulate these effects, is an area that warrants significant

further research. The research is also limited by the data-gathering methods, the selection of which was influenced by the practicalities of conducting research during COVID-19 restrictions. The data gathered from itch.io is limited as the type of jam: in-person, hybrid or online was not readily available for analysis. The data on itch.io-hosted game jams deliberately omitted some large jams to better represent the "average" itch.io game jam in the results. These large game jams, often run by popular content creators, may also provide a fruitful avenue for further study given the significant audience dedicated to these events. Future research aims to explore naturalistic study or participant observation of game jams for gaining more detailed and rich insights into the behaviour of game jam participants and the effects of competition and incentives.

6 CONCLUSION

Through analysis of previous studies, a survey of game jam participants, and the analysis of online game jams, this study suggests that incentives and competition may be circumstantially beneficial to game jam participants and organisers. The results of this research indicate that, while competition and incentives are not a significant part of most individuals' interest in game jams, they are still somewhat likely to affect a participant's behaviour during a jam. This effect appears highly dependent on the contingency of the incentive. Specifically, there is evidence to suggest incentives with explicit creativity criteria circumvent many of the negative effects commonly associated with incentives and competition and may instead result in increased creativity. These findings highlight the potential for more nuanced research into the complexities of competitive game jams.

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