Social Interactions in Game Jams - A Jammer Recommender Tool

Johanna Pirker
jpirker@iicm.edu
Graz University of Technology
Graz, Austria

Andreas Punz
andreas.punz@student.tugraz.at
Graz University of Technology
Graz, Austria

Johannes Kopf
johannes.kopf@tugraz.at
Graz University of Technology
Graz, Austria

ABSTRACT

In game jams, the jammer constellations and teams are essential elements for successful and engaging game jams and game jam outcomes. In this paper, we discuss and analyze group forming behavior in jam environments but also look at jammers who want to prefer to jam by themselves. In jam environments, especially the group forming task at the beginning of every game jam is essential for the success of the event and the outcomes. However, it is also one of the most challenging tasks. For this paper, we analyzed the data of the Global Game Jams between 2015-2018 with a focus on the formed groups as well as the linked Github profiles. Based on first results, we build an early prototype for recommending groups for the Global Game Jam automatically.

CCS CONCEPTS

• **Human-centered computing → Social networks**; • **Software and its engineering → Programming teams**.

KEYWORDS

social network analysis, github, game jam, game development

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1 INTRODUCTION

Game jams are valuable tools to connect and collaborate with other developers and people with similar interests but different skills. Game jams are typically organized and hosted by organizers who do not know all jammers personally but are facilitating the jamming experience and also helping building groups to optimize the jamming but also networking experience. However, this is a very challenging task as jammers have different experiences, come from different backgrounds, and bring different skills to jam events [2]. As a results, the group forming process involves several implications [9]. For instance, proper group sizes can be different depending on the tools the group wants to use. Also, jammers with varying levels of experience should be mixed so that new jammers are integrated into the community, and expert jammers eventually learn about new tools or techniques. Additionally, every group should be good balanced in terms of jammers' skills.

While several authors have described the importance of game jams as tools to build social communities, learn how to collaborate, and also learn to work in interdisciplinary teams [1, 3, 4, 7, 10], work on the team forming process is still limited.

One option to look at groups is by looking on the data listed at the Global Game Jam website. The Global Game Jam is a game jam event, where local sites are organized all around the world at the same weekend and jammers would meet at these sites to jam in groups. As they registered on the website and added elements such as their game development skills to the website and note who they have worked with, we have access to data from several years of game jam teams and the team members' skills.

In this paper, we want to shed more light on the issue of finding well-formed teams using the Global Game Jam dataset and start a first discussion on what criteria are necessary to consider when building groups.

1.1 Related Work

Many authors have analyzed and discussed social aspects in game jams and described their value as social and collaborative events [1]. For many game jam participants, the social element is even one of the key motivators to attend [11]. As a result, also the formed groups are essential for a successful and engaging game jam experience and resulting games. In [9], a typical group forming process and regular well working group sizes and group constellations are described. Additionally, issues and challenges of the group building process are discussed. Functional groups sizes are described as 3-5 member teams, which contain people with skill sets, including audio, programming, and art. Different authors also pointed out the importance of providing a collaborative setup and atmosphere and not a competitive one [13]. Collaboration is not only a motivator but also a skill they learn and deepen while participating in game jams[4]. Especially for students, collaboration, also in an international setup, is an essential skill for the resume and the future career [5].

Summarizing, several authors have shown and discussed the importance of game jams as a tool to collaborate and learn how to collaborate and have also pointed out game jams as a great tool to research these phenomena. However, only limited quantitative studies on jammers' behavior are available. In a few previous studies, the social interactions among jammers have been analyzed with social network analysis (SNA) techniques [6] and have shown this technique as a valuable tool to explain the Global Game Jammer community. In this paper, we want to advance these studies by looking closer at the built groups, their outcomes, and what those results can be used for.

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1.2 Contribution

We present a first discussion and analysis of jammer groups and also jammers who prefer to jam by themselves. We also analyze and discuss features and elements of well-functioning groups based on social network analysis and present a first recommender tool for automatically recommending groups.

2 GROUPS AT GAME JAMS

The group forming process differs between the different game jam organizers. In a traditional game jam format, most groups are formed on-site, and the organizers help in the group forming process. The groups usually are built around different requirements such as [9]:

- Typical groups size between 3-6 jammers
- Group is balanced based on jammers' skills (usually at least one programmer, one artist, and optionally one audio engineer)
- Groups want to work together on ideas they all find interesting
- Decisions around art style (2D vs 3D)
- Decisions around used game engine/programming language

Research Questions

In this work, we want to use a data-based approach to identify well-working groups to find out which group constellations worked best for the teams. Thus, the questions we want to raise and try to answer in this early work are: (1) How can we identify well-working groups? (2) How do well-working groups look like? (3) Can we use this information to build an automatic group recommender tool?

3 ANALYSIS OF GAME JAMMER GROUPS

To answer the research questions, we look at one of the most significant corpora of jammer data available: the Global Game Jam® (GGJ) website.

3.1 Dataset

The dataset is built by crawling data from the Global Game Jam® website[1] and enhanced by data from linked GitHub profiles.

3.1.1 Global Game Jam Data. The Global Game Jam (GGJ) is an international event, where jammers all around the world meet at organized local sites (hubs) and jam together to the same topics. The group building often happens on-site, some groups come preformed. Jammers have to register and fill out forms to indicate their skills and specific background information to attend the game jam. At the end of the game jam, they upload information about their developed game (such as used game engine or the Github repository link) as well as link all involved jammers to the project. We crawled data from the website containing data of the organized jam sites (country, year), jammer information (name, skills, previous games), and games they developed (used engine, technologies, repository link, distributed platforms, team members). Table 1 gives an overview of the data sets of the previous five years.

We are in particular interested in the data of jammers who visited more than one jam to get insights into groups that worked well. The typical jammer attended 1.38 game jams in the tracked five years. 25.69% of jammers visit more than one game jam. The majority visits only one.

[1] www.globalgamejam.org

Table 1: Overview of the dataset

Year	2018	2017	2016	2015	2014
Countries	102	89	89	75	67
Sites	767	669	616	503	460
Jammers	28,997	25,700	24,618	19,863	16,052
Games	8,575	7,192	6,856	5,430	4,203

3.1.2 GitHub Repositories. Additionally, we used data from the linked GitHub repositories. Overall, we used that data of 3,680 linked GitHub profiles and a total of 86,250 commits.

3.2 Social Network Analysis of the GGJ

To get a better understanding of the social structures, we applied social network analysis to this dataset [12]. Past work on network analysis of the jammer graph can be found at [6, 8]. We illustrate jammers as nodes and build a graph by connecting jammers when they have developed a game together. We use a weighted graph for the representation to explain when two jammers have developed more than one game together. A total of 83,876 nodes (jammers) are illustrated in the graph we created and used for this work connected through 222,028 edges. In this work, we mainly use metrics such as the degree to discuss social growth. This is used to illustrate if the jammers connection to other jammers grows over the number of participated game jams or stays the same. Jammers who have worked alone on projects have a degree of 0. The average degree is 2.29, and the average weighted degree is 5.70.

3.3 Jammers' Skill Distribution

When registering for a game jam site, a participant of the Global Game Jam has to choose between 15 different skills such as 2D Art, 3D Art, Animation, Audio, Programming, or Marketing. In average, jammers indicate to have 3.35 skills. The most general skills are programming and game design. Figure 1 gives an overview of the skill distribution and also the distribution in relation to the number of game jams a jammer has attended.

3.4 "Ideal" Groups

To understand better the jammers and ideal groups, we need to understand better the skills of players within groups, as well as finding a definition for an "ideal" group.

3.4.1 A Definition. To define an "ideal" jammer group is a challenging task and probably is a different one for various stakeholders such as organizers, sponsors, and the jammers. While some may be interested in building groups with a high chance to release a game after a game jam, others may look for groups where they posterior learn the most from. Motivators for jammers and organizers vary. Motivators include:

- Publish a game, finish a game, continue developing a game
- Learn new skills and tools

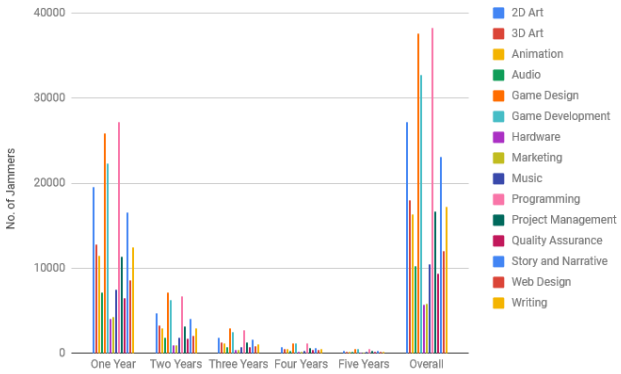

Figure 1: Number of Jammers with certain skill and how many Global Game Jams they have visited. An interactive version of the graph can be found on http://jpirker.com/GGJ

- Connect to new developers
- Build a social network
- Connect to industry partners, organizers, sponsors

Looking at these success factors for "ideal" groups, we can identify different measures on how to analyze them. We can measure their social connectedness and the growth of this connectedness by looking at the growth of the average degree over the years. We can also measure if they developed new skills over the years by looking at the changes in their profiles[8]. However, to measure their likeliness to finish their games is a more challenging task. One way, we present in this paper is to analyze their linked GitHub profiles and analyze changes after the end date of the game jam.

3.4.2 ***GitHub Analysis.*** One primary goal for many jammers and also organizers is that the development of game jam games is continued after the end of the game jam and eventually published. Thus, we looked at GitHub repositories, which were linked to the Global Game Jam game websites. 4,464 games mentioned to have a repository attached, 82.44% are hosting it on GitHub. In the five years, a total of 3,680 repositories with a total of 281,034 commits are analyzed. Most of the commits (around 86.08%) were added during the game jam.

We can identify teams, which continue working and committing to GitHub repositories also after the end of the game jam. Table 2 gives an overview of how many games continue after the game jam event. For this work, we identified groups which continued working for a more extended period after game jam as "well-formed" groups. A total of 138 games were still in development after 12 months. They share similar features such as similar skill distributions and typical group size of 3-5 jammers. The average group size of these groups was 3.59 (SD=1.9) and a median of 3. We can also see that these groups have a very high degree (higher than the average 5.3) of 7.17. They have participated in a higher number of game jams and have connected to more jammers. We call experienced and well-connected jammers also "veterans."

Table 2: Repositories that received Commits six months or later after their Game Jam

Year	Total Repos	6 Months	12 Months
2014	398	38	31
2015	580	53	41
2016	801	58	37
2017	883	56	29
Overall	2,662	205	138

3.5 Special Form: Teams of One

One unique form of game jammers, which often work very well are "teams of one". While the game jam is an event promoting collaboration and social creations, many jammers prefer to develop games on their own but still be during the development in a social environment such as an organized game jam site. We can identify 3,179 jammers, who participated in several jams but yet have a degree of zero (indicating that they allow worked alone). Most of these jammers have participated only in one game jam (average of attended game jams of 1.1 (SD=0.77), while the average is 1.38(SD=0.77)). 257 jammers have a degree of 0 but participated in more than on Game Jam. One jammer in the data set participated in all five analyzed jams but still has a degree of 0. They developed 3,551 (579 attended in more than one jam) games and linked 221 (44 participated in more than one jam) GitHub repositories.

The groups of one have in average more skills than jammers in groups. They mentioned having an average of 4.7354 skills, while the average is 4.0677. Figure **??** gives an overview of their skills in comparison to the average jammer.

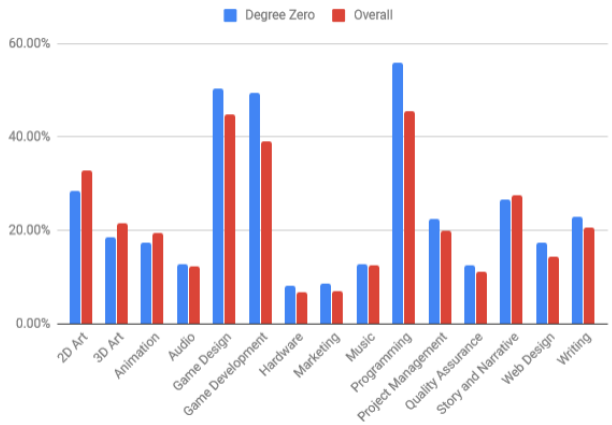

Figure 2: Comparison of skill distribution between Jammer with a degree of Zero and the overall Jammers.

It can be seen that they usually have more skills mentioned in their profile. Especially common are the skills "programming", "game design", and "game development". We can conclude that groups of one bring the core skills necessary for the game development process but often lack artistic skills based on the dataset.

4 GAME JAM RECOMMENDATION SYSTEM - DISCUSSION

The group forming process is a challenging task and is primarily a challenge at large jam sites, or for jam organizers who are not experienced in the process. In this section, we want to discuss and analyze elements for a game jammer recommendation system for the Global Game Jam website.

A game jammer recommender system (recommendation system) should be designed to give users a prediction of well-working groups based on various features. In this paper, we present the prototype of a game jammer recommendation tool as a starting point to discuss further relevant features to be included. The features included at the moment are based on the data of jammers who still worked on the games after one year. Following main features are included:

- Teamsize 3-5 (best 3)
- Average skill distribution
- Inclusion of "veteran" jammers in every group

As the average team size of "ideal groups" was discovered to be 3.56 (1.9) and a median of 3. So the recommender system tried to build groups of about three people with similar scores. Scores are calculated per jammer. The list of scores for skills and being a veteran jammer is illustrated in Table 3.

Table 3: Score value of specific skill for Team Recommender

Skill	Score
2D Art	0.30516736
3D Art	0.18052105
Animation	0.15489993
Audio	0.14635956
Game Design	0.54496204
Game Development	0.53744824
Hardware	0.10751380
Marketing	0.05695307
Music	0.13853520
Programming	0.63946687
Project Management	0.26211180
Quality Assurance	0.15813492
Story and Narrative	0.24258109
Web Design	0.22974465
Writing	0.17548309
Veteran jammer	0.60346791

In the current prototype, users enter the link to the organized jam site, and the recommender system automatically recommends groups).

This illustrates a very early version. We seek to identify more prominent features and also specific features for different motivators to create a more flexible tool for game jam organizers to make the game jamming experience event more exciting and optimized for social experiences.

5 CONCLUSION

Game jams have great potential to support collaborative and social experiences. However, bringing jammers together to ideal groups is a challenging task. Also, the definition of an "ideal" group differs from jammer to jammer and from site organizer to size organizers. Additionally, many jammers prefer to work in groups of one. In this paper, we have analyzed features of "ideal" groups and also features of "lone" jammers. This is a first step toward being able to develop a flexible recommender system for jam site organizers to help jammers finding their groups.

REFERENCES

[1] Allan Fowler, Foaad Khosmood, Ali Arya, and Gorm Lai. 2013. The global game jam for teaching and learning. In *Proccedings of the 4th Annual Conference on Computing and Information Technology Research and Education New Zealand*. 28–34.

[2] Tracy Fullerton, Chris Swain, and Steven Hoffman. 2004. *Game design workshop: Designing, prototyping, & playtesting games*. CRC Press.

[3] Micah Hrehovcsik, Harald Warmelink, and Marilla Valente. 2016. The Game Jam as a Format for Formal Applied Game Design and Development Education. In *Games and Learning Alliance*. Springer, 257–267.

[4] Juergen Musil, Angelika Schweda, Dietmar Winkler, and Stefan Biffl. 2010. Synthesized essence: what game jams teach about prototyping of new software products. In *2010 ACM/IEEE 32nd International Conference on Software Engineering*, Vol. 2. IEEE, 183–186.

[5] Johanna Pirker, Daphne Economou, and Christian Gütl. 2016. Interdisciplinary and international game projects for creative learning. In *Proceedings of the 2016 ACM Conference on Innovation and Technology in Computer Science Education*. ACM, 29–34.

[6] Johanna Pirker, Foaad Khosmood, and Christian Gütl. 2017. Social network analysis of the global game jam network. In *Proc. of the Second International Conference on Game Jams, Hackathons, and Game Creation Events*. ACM, 10–14.

[7] Johanna Pirker, Annakaisa Kultima, and Christian Gütl. 2016. The Value of Game Prototyping Projects for Students and Industry. In *Proceedings of the International Conference on Game Jams, Hackathons, and Game Creation Events*. ACM, 54–57.

[8] Johanna Pirker, Isabel Lesjak, Andreas Punz, and Anders Drachen. 2018. Social Aspects of the Game Development Process in the Global Gam Jam. In *Proceedings of the International Conference on Game Jams, Hackathons, and Game Creation Events*. ACM, 9–16.

[9] Johanna Pirker and Kimberly Voll. 2015. Group forming processes-experiences and best practice from different game jams. In *Workshop Proceedings of the 10th International Conference on the Foundations of Digital Games (Pacific Grove, California, Asilomar Conference Grounds)*.

[10] Jon A Preston, Jeff Chastine, Casey O'Donnell, Tony Tseng, and Blair MacIntyre. 2012. Game jams: Community, motivations, and learning among jammers. *International Journal of Game-Based Learning (IJGBL)* 2, 3 (2012), 51–70.

[11] Lars Reng, Henrik Schoenau-Fog, and Lise Busk Kofoed. 2013. The motivational power of game communities-engaged through game jamming. In *Proceedings of the 8th International Conference on the Foundations of Digital Games*. 14–17.

[12] John Scott. 2012. *Social network analysis*. Sage.

[13] Kiyoshi Shin, Kosuke Kaneko, Yu Matsui, Koji Mikami, Masaru Nagaku, Toshifumi Nakabayashi, Kenji Ono, and Shinji R Yamane. 2012. Localizing global game jam: Designing game development for collaborative learning in the social context. In *Advances in Computer Entertainment*. Springer, 117–132.