

Story Improvisation in Tabletop Roleplaying Games: Towards a Computational Assistant for Game Masters

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Abstract—In tabletop roleplaying games (TTRPGs), game masters (GMs) facilitate creating an improvisational shared story, responding in real time to the actions that players take and the things that they want to see in the world. In order to examine the process by which GMs co-create such player-driven narratives, we conduct interviews with GMs about their process preparing for and running TTRPG campaigns. We qualitatively code these interviews in order to synthesize a list of techniques GMs can use to move the story forward. We also compare these interviews to other sources of advice for GMing in sourcebooks and essays. Using the GMing techniques found through this analysis, we discuss insights into the GMing process and how this can be used to inform the design of a computational assistant for GMs.

Index Terms—tabletop roleplaying games, game masters, storytelling

I. INTRODUCTION

Whether game masters (GMs) of tabletop roleplaying games (TTRPGs) are running a pre-authored module or creating an open, handcrafted world for players to explore, they must improvise planned content to fit in with and fulfill players' goals and desires during play, such as creating new characters, settings, or situations based on what players want to do and how they deal with the challenges presented to them. Through this process, GMs facilitate and co-create a shared story with a large degree of player freedom that features interesting and meaningful choices and interactions for players during play. Facilitating, real-time, player-driven storymaking can be a difficult task. Because of this, we are interested developing a computational assistant to help with this process, serving as a co-creative partner [1] alongside the GM.

In order to inform the design of such a computational assistant, we conduct interviews with game masters about their process preparing for and running tabletop roleplaying games (TTRPGs) with a focus on GM techniques for story improvisation. We then qualitatively code these interviews to compile a list of techniques that GMs use to facilitate storytelling in their games. We also compare the techniques that GMs discuss in these interviews to other sources of advice for GMing, such as written advice on how to GM, as another dataset that we can use to analyze our interview

findings. Finally, we speculate on the potential design of a computational GM assistant based on our interview findings.

II. RELATED WORKS

Here we examine related studies that use interviews to inform design, qualitative studies of TTRPGs, and existing digital tools for helping GMs.

A. Requirements analyses

In requirements analyses, researchers create iterative designs and conduct interviews with potential end users in order to shape the design and functionality of the tools they are creating. Nelson and Mateas provide digital game design assistants to several groups of game designers with different design needs. The researchers then perform interviews with these designers about their needs and how they can use the tools provided to help with the design process, iterating on the tool's design based on the results of these interviews [2]. Grow et al's approach to evaluating AI architecture authoring tools is similar, using three different case studies to evaluate three different architectures. They use iterative interviews to determine the differences between authoring for specific architectures, using insights from these interviews to evaluate the design of various authoring tools [3].

Interviews can also be used to analyze player experiences and provide qualitative and quantitative backing to software design. Gustafsson, Holme, and Mackay analyze the play experiences and players' stories of important objects from their play using interviews and questionnaires. They also solicit and find online stories of players narrativizing their online experiences. Analyses of these stories are used in order to inform the design of new game architectures that provide a greater support for player narratives [4]. Like these works, we use qualitative interviews to help inform the design of a computational assistant for GMs.

B. Interviews analyzing TTRPG play

There have also been several qualitative studies on TTRPGs and GMing. Tychsen et al. use interviews with GMs along with surveys and recordings of play sessions to analyze how GMs use waypoints to guide the players through the game [5]. Flowers et al. interviewed GMs and used qualitative coding

in order to develop a list of GMing techniques that help incentivize players and curb unwanted player behavior [6]. Bergström uses interviews with GMs to develop a list of “frames of storytelling” such as diegetic dialog or poses that GMs use in the process of playing a TTRPG session [7]. Finally, Strugnell et al. interview GMs to develop a list of the reasons why GMs might need to change a pre-planned story and their techniques for doing so [8].

Some of the findings in these papers such as GMs needing to adapt during play [5] and incorporate players into the story [6] agreed with what we found in our analysis. However, unlike those papers, our interviews here focus directly on the GMing process as related to improvisational storytelling, both the processes involved in running games and planning game sessions. Also, unlike those studies, we compare our interview findings to other sources of advice on GMing.

There are two other adjacent areas of study related to our work. Firstly, there are many studies on live action roleplaying (LARPing) including storytelling in LARPs [9] [10] [11]. While related, we focus here on TTRPGs, which differ in terms of the role of the GM and the play experience [12]. Secondly, some studies look at TTRPG techniques in order to apply them to digital games, such as creating more personalized play experiences in online multiplayer games [13] or creating a digital game master [14] [15] [8]. While these are helpful in understanding other applications for GMing techniques, here we are interested in how we can use computational tools to assist GMs in a co-creative way.

C. Digital tools for running TTRPGs

We are interested in creating a mixed-initiative system to help GMs with improvisational storytelling, with the human and computer working together to create something new [16]. Currently there exist many commercial digital tools for helping GMs, such as random generators, rules references, or online platforms to display maps and media to players remotely. Here we examine some digital tools developed by researchers to aid GMs.

The tool *Undercurrents* helps the GM facilitate hidden information communication by allowing them to share information with only a single or a few players [7] using a digital interface. This helps maintain hidden information in what is traditionally an open space of information, and provides a way of keeping track of what has happened in the game so far. *Imaginarium* uses procedural text generation to provide descriptions that are constrained by the author but still have variations to them, using an authoring language similar to natural language [17]. This serves as a casual authoring tool for GMs to develop semi-randomized content on the fly, for instance descriptions of monsters.

These are helpful for exploring the space of possibilities for digital tools for GMs and seeing how GMs might integrate digital tools into their workflow. Although there has been theorization and speculation about such tools (such as in the works of [7] and [18]) we have not yet found digital tools

that focus on helping to facilitate collaborative storytelling in TTRPGs.

III. METHODS

For our qualitative interviews, we draw on the work of Spradley’s *The Ethnographic Interview* and Saldaña’s *The Coding Manual for Qualitative Researchers*. Spradley describes still-standard techniques for conducting expert interviews, discussing different methods for eliciting information from experts in order to capture information based on experts’ own experiences [19]. Saldaña describes the process of first and second cycle qualitative coding in order to compare similar and dissimilar information across interviews and derive general insights based categories of codes [20]. We use these methods to analyze our interviews through qualitative analysis and forming specific and general categories for GMing techniques. This paper uses similar methods to [5], [6], [7], and [8], interviewing a small sample of expert GMs about their process running TTRPGs to get insights into this process.

We interviewed seven GMs with varying levels of expertise running TTRPG campaigns ranging from several months to several decades of experience. These GMs have run games using different existing or homebrew game systems and have run or are currently running a TTRPG campaign as of the time of the interviews. In this paper, we use the term “homebrew” to refer to rules or content that the GM adds to the game beyond what is provided in game modules or the core rulebook [21]. Interviewees marked as having a low level of experience in Table I have run several sessions of a single campaign, while those marked as having a high level of experience have run many different campaigns. Participants in Table I are ordered in a rough approximation of their level of experience.

TABLE I
A LIST OF INTERVIEWEES, THEIR EXPERIENCE LEVEL RUNNING TTRPGS, AND THE TTRPG SYSTEMS THAT THEY HAVE RUN IN THE PAST

Participant #	Experience Level	Game Systems
1	Low	Dungeons & Dragons 5e homebrew
2	Low	Dungeons & Dragons 5e homebrew
3	Low	Dungeons & Dragons 5e homebrew
4	High	Dungeons & Dragons 5e modules, homebrew
5	High	<i>The Burning Wheel, Mouse Guard, Blades in the Dark</i>
6	High	Homebrew
7	High	<i>13th Age, Unknown Armies</i>

Participants were selected via convenience sampling [22] from the population of graduate students and faculty in the nearby area, utilizing a network of individuals who know others that run TTRPGs. Part of the criteria for selection was based on choosing participants with varying levels of experience running TTRPGs. We conducted interviews either in-person or via phone call for non-local GMs. Interviewees were contacted via email, told about the premise of this project (interviews towards understanding how GMs facilitate storytelling in tabletop roleplaying games) and were asked if

they would like to participate in an hour-long interview about their process. Interviews were recorded with permission of the interviewee.

Interviews were semi-structured, consisting of a series of prepared questions, with follow-up questions and requests for elaboration depending on topics the GM covered in their interview relevant to our research topic. Questions covered the interviewee’s background, their work preparing for games, how they run games, and how they deal with storytelling in their games. Some examples of prepared questions include:

- How long have you been running TTRPGs?
- Tell me about the story of a campaign that you are running or have run in the past.
- How do you typically prepare for running a campaign? How much do you plan out in advance?
- How do you typically prepare for each individual session? Do you plan out specific events?
- How do you prepare for running pre-written campaigns? Is this different than your process for running homebrew campaigns? If so, how is this different?
- Tell me about a time when something unexpected happened that caused you to have to improvise new content. How did you deal with this situation? What was difficult for you in this process?
- In what ways do players influence the story of the campaign either before or during play?

Follow-up questions and clarification focused on getting more information on a specific GM’s techniques and how they deal with issues that arise during play, including asking for specific examples illustrating the concepts that they discussed.

Using notes from the interviews as well as recorded interview audio, we then performed first cycle qualitative coding on each interview. We primarily used “descriptive” and “process” codes [20] in order to analyze the techniques that GMs use in preparing for and running their games. We developed a list of codes based on this interview analysis, adding a new one to the list whenever a topic or process arose that had not previously been mentioned. We also marked specific examples of moments that arose during play that illustrate specific techniques. We used these codes in order to develop broader categories of which each of the codes are a part. Examples of these codes and general categories can be seen in Table II. We also used these codes and general categories to capture the similarities and differences in how GMs approach a particular problem in preparing for and running their games. We grouped the codes in terms of the problems that GMs were trying to solve or similarities in technique in order to create the list of findings we discuss in our results (Section IV).

Similarly to [4], we use a triangulation approach [23] that draws on multiple sources for analysis, combining our interviews with other sources on advice for GMs in order to balance the trade-offs in our methodological approaches. By looking at advice for GMs, offered both by rulebooks and other experts, we can better understand the context by which GMs might learn to GM (by looking at advice for new GMs offered by sourcebooks) and better understand how experts

TABLE II
A LIST OF CODES AND CATEGORIES CREATED FROM ANALYZING INTERVIEW CONTENT

General category	Category description	Examples of codes in this category
GM Problems / Wants	Problems that arose for GMs during play, or things that they would like to see from a computational assistant	Pacing, Player vs module, Keeping track, Player downtime, GM busy during play, Time to prepare
Running games	Techniques that GMs use during the play of their games / while running their games	Immersion, Incorporating players, Player-driven solutions, Onboarding, GM vs player reality, Inducing emotion, Player consequences
Preparing for games	Techniques that GMs use when preparing content for an upcoming session or section of the campaign	NPCs, Encounters, World, GM intention, Story structure
Stories within campaigns	Specific examples during play that highlight how the GM uses techniques	Player consequences, Surprise, World as agent, Player motivation, Keeping players on track
GMing background	Information about the GM’s background, game systems that they’ve run, general information about TTRPGs and their design	GM style, Game systems, Homebrew, Background, Recommendations for GMs, Experience

might codify their process in order to teach others how to GM.

IV. INTERVIEW RESULTS

From these interviews, we found the following insights about how GMs prepare for and run their games, specifically focusing on techniques that they use in facilitating player-driven storytelling in their games. Each technique is attributed to a particular GM or set of GMs who mentioned this in their interview, with the relevant GM’s interviewee number in brackets (as corresponds to the interviewee number in Table I). A quantitative breakdown of each of these sections (stating the interviewees who discussed given techniques) can be seen in Table III.

A. Player investment

One area GMs discussed was the importance of the players in their game—getting players into the game and keeping their attention during play. The GM often introduces players to the game’s world and becomes the expert on that world, giving this information to the players as they explore and inhabit it. As stated by interviewee #2, they as a GM want the players to have the same “visceral” reaction to the world as they do, but they worry that their players might feel at a loss as to what the world has to offer and why they are acting in the world. Creating a means for players to get and stay invested in the game can help to mitigate this.

One way in which GMs get players invested in their games is by figuring out what players want to see in their games and providing more of this. Two GMs (5, 7) talk about using the character sheet as a reflection of what players want to

TABLE III
CATEGORIES OF GMING TECHNIQUES AND INTERVIEWEES WHO DISCUSS
USING THIS TECHNIQUE

Category of technique	Technique	Interviewee(s) (by #)
Player investment	Using character sheets to understand what players want to see	5, 7
Player investment	Building personal relationships to NPCs	2, 4
Player investment	Managing player attention	5, 7
Player agency and consequences	World with momentum	6
Player agency and consequences	Continuing story by thinking through logic of world	3, 6
Managing planned content	Planned story structure	3, 4, 5, 6
Managing planned content	Story based on movement between locations	3, 6
Managing planned content	Random tables	5
Managing planned content	Planned modular encounters	4, 6

see in the world. While character sheets provide some content that would naturally lend itself to introduction into the story, such as the character’s backstory, personality, or goals, GMs also talk about how player attributes can help to determine the kinds of actions that a player might be interested in taking in the world. For instance, if a player chooses to invest points in skills pertaining to sneaking, they likely want to encounter situations where they can have the opportunity for a stealthy approach to problems in order to show off their abilities in this area. Interviewee #5 said that interpreting player intentions through their character sheets could also have complications. For instance, if a player chooses to have a high dexterity attribute, it could be because they enjoy and want to encounter many dexterity-based challenges. It could also mean the opposite, though—maybe the player doesn’t want to deal with these kinds of challenges, and thus wants to guarantee that they always succeed at them.

Another way to encourage player investment in the game is by building up personal connections between players and the non-playable characters (NPCs) of the world. Interviewees #2 and #4 talk about this, discussing the difficulties motivating players to follow the plot of a module, or giving players a reason why they are acting in the ways that they are. By creating NPCs that players are attached to, though, it is much easier to get player buy-in and give them a “why” for their actions. Players are more inclined to want to perform tasks that help out particular friendly NPCs because they are friends, and this personal connection helps to solidify the player’s place in the game world as affiliated with (or enemies of) particular characters and factions.

Finally, interviewees #5 and #7 talk about managing player attention at the table in order to keep players invested in the game during play. Interviewee #7 discussed helping keep players invested in the game by introducing two parallel storylines in which players divide up, with some players in one group and some players in the other. Both groups have

different tasks to accomplish, but the success of one group is contingent on the success of the other. Each cross-cut between the storylines ends in a “micro-cliffhanger,” and thus each group of players, even the group not directly in the spotlight, is invested in both what’s happening with their allies and what will happen to them next.

B. Player agency and consequences

One of the areas that GMs discussed was giving players a sense of control over the world and providing player consequences. One way in which interviewee #6 does this is by creating a game world that has “momentum.” For her, this means that the world and its agents are headed in a particular direction, and events will play out in a certain way. The players can choose to intervene in the world, changing the trajectory of events. She gives an example from one campaign she ran in which a group of NPCs were trying to stage a revolution against the authoritarian governing power. Regardless of the players’ actions, the NPCs would attempt to lead a rebellion, which without intervention would be destined to fail. If the players choose to help, though, they could potentially steer the rebellion towards success. This gives the players a feeling of being able to exercise power over the world, and makes it clear that their choices matter. Because of this momentum, both player action and inaction have consequences. This GM (6) describes that when players choose to perform actions that are away from the main storyline, the world continues on without them. They might hear updates from those they have left behind, and the parts of the world that the players have left do not stay static until the players’ return. This can help steer the players back towards the main storyline, but also emphasizes that even inaction or engagement with other content is a choice that has consequences that affect the rest of the world.

GMs (3, 6) also present players with the consequences of their actions by thinking out logically what might happen as a result of player actions. One GM (3) gives an example of what this kind of thinking might look like: specifically, how he might play things out if the players decide to rush off to try to kill the antagonist of the game, even if he wasn’t expecting or prepared for the players to do so. He describes what his thought process might look like in such a circumstance—he would think through what’s going on in the antagonist’s life, where they should be at the time that the players attack, what their weaknesses are, how the players can exploit those weaknesses, and who would take over if the players killed them. By thinking through the logic of the world, the GM can determine consequences for actions, even for player actions that are unexpected or unaccounted for.

C. Managing planned content

A third area that GMs discussed when talking about how they facilitate storytelling in their games is managing planned content. All GMs discussed doing some level of preparation for their campaigns and individual sessions such as planning out particular story events, encounters, lists of characters and

locations, and other content. They discussed their process for creating planned content while working around the fact that players are unpredictable and might not want to follow the path that GMs have planned for them.

Some GMs (3,4,5,6) talked about having a planned story structure for their games, discussing how they plan out the story in general, with particular story beats that they want to happen, but much of the story is still driven by the players. One way in which some GMs (3, 6) handle this is by structuring story progression in terms of movement between locations rather than movements in time. Interviewee #6 discussed this in particular, explaining how she begins one of her games in a small neighborhood that might have some local problems going on that the players can help with. This starting neighborhood has several different “calls to action,” she states, but although she’s not sure which one players will take, they will engage with this first area, and then things can expand organically. As players explore more, they go to new, bigger areas, meet new factions, and are given new paths in the story to follow. This expanding outward helps to limit player overload, says the interviewee, and lets the GM trace out story content through these locations.

Another example of planned content is planning encounters, letting the GM figure out what they want to happen in any particular session while still allowing for a large degree of flexibility to account for what players want to do. One interviewee (5) describes how he relies on randomness and procedural generation to help him create relevant encounters during play. He describes planning the content for this more as a kind of “meta-prep,” in which he lays out the “possibilities” of the world rather than what players will find at a certain location. Instead, he describes the world in terms of what one might find or would be likely to find, rather than what is definitively there, using randomness as a “serendipity engine” for interesting outcomes. He describes the experience of play in this as his setting up the “world skeleton,” and letting the players “wander around and find the details.”

Another example of planning encounters is creating content that is more modular, as described by interviewees #4 and #6. Interviewee #6 provides a specific example of this, describing how she plans out general encounters that are thematic and can be slotted in at the appropriate time as needed. For instance, she describes when preparing for a game that she would put together the information for and a list of creatures that the players may encounter if at the moment she needs something such as a “creepy” encounter, or a combat-oriented encounter. This way, content isn’t planned out in a linear fashion and the GM can call upon whatever she has prepared based on what is needed at the time, responding to player actions.

D. Improvisation

In general, novice GMs tended to use more pre-planned or scripted material and struggled more with managing unexpected player actions. These unexpected actions often resulted from a disconnect between the GM’s plans and the player’s goals, or expectations about the tone of the game (1, 2). Par-

ticipant #2 describes their experience running module *Curse of Strahd* [24] as becoming “railroady” at times, as there are “certain things that need to happen” that aren’t always conducive to what the players do. They describe the process of GMing as being “like herding cats.” Having players that understood the GM’s hints and attempts to shepherd players helped keep the party on track.

In contrast, many expert GMs saw improvisation in games not a challenge to overcome, but part of the benefit of the TTRPG experience, with one GM describing it as the “entire reason I play the game,” and that they choose to “improvise as much as possible” (5). These GMs still sometimes offered deterrents to players. One GM, for example, describes presenting players with a “waterfall of poop” (6) to disincentivize them from going in the sewers, because the GM had not planned for them to go that way. However, when players behaved unexpectedly, expert GMs seemed more comfortable improvising and creating new content. In the example above, the players decided to enter the sewers anyway and the GM describes thinking through what the players might find based on the layout of the city and the subplots going on in the story, laying out new locations and encounters for them rather than forcing players back on track. Improvisation may be easier for expert GMs because of different factors—more experience and ease with running games, preparing for games, or running games that are not pre-written.

E. Game systems and GM style

Among our interviewees, expert GMs had been exposed to a greater variety of roleplaying game systems and had more experience playing in and running a variety of different systems. They discussed drawing on this variety of sources as part of their process (5, 6, 7), in one case (7) even using different game systems within one game in order to create a variety of experiences for players. In contrast, those with little experience GMing had primarily only been exposed to *D&D*. When they did discuss drawing material from other sources, these were generally related to *D&D*—for instance, podcasts or example scenarios that use this game system.

This exposure to a variety of different sourcebooks or materials also influences how GMs run their games. For example, GMs talk about how systems like *The Burning Wheel* [25] (5) or *Unknown Armies* [26] (7) have “expressive” (7) character sheets, where the characters have player-defined traits that go beyond numerical values. They work to incorporate this expressivity into their own games, making the characters a greater part of the story.

V. COMPARISON TO GMING ADVICE

We also look at other sources of advice for GMing to explore the context for GMing and see how written advice on how to GM had similarities or differences with our interview findings. We are particularly interested in how GMs might learn to improvise and guide the story based on player actions. We find in looking at these texts that improvisation is important and discussed by experts, as demonstrated by an analysis

of *Unframed* [27], but undersupported in learning materials for new GMs, as discussed below.

Firstly, we examined the guidebook and starting scenario for *Dungeons & Dragons (D&D)* 5th edition. Because of the game system's popularity, it is likely to be the introduction to GMing for many new GMs. The *Dungeon Master's Guide* [28] is a guide for GMs to help them create a world and campaign. The *Starter Set's* pre-written module for new GMs is *Lost Mine of Phandelver*, a multi-part adventure in which the party seeks out a lost mine fabled to be filled with riches and lost magical artifacts. According to the module, as the "narrator" of the game, the GM serves as the "interface" [29] between the players and the game world, setting the pace of the story, providing challenges for the players to overcome, and describing what happens in the world based on characters' actions. The game is a "shared story" to which players and the GM contribute [29]. The text provides information that NPCs might know, offers advice for roleplaying NPCs as having their own lives and goals, and introduces conflicts that the GM can use to move the story along. While the module offers some player freedom, such as allowing players to follow up on various plot hooks gained from the town of Phandalin, other parts of the story necessitate that players have taken specific actions previously. The module also provides little in the way of advice regarding larger improvisation within the story. In some cases it reminds GMs of problems—for instance, warning them that players will have trouble in Wave Echo Cave if they skipped too many of the optional encounters in earlier sections and are thus underleveled—but doesn't say how the GM can circumvent these problems during play.

The *Dungeon Master's Guide* provides more in-depth advice on GMing without being tailored to a specific module [28]. It provides examples of different play styles GMs might want to use in their games (from "hack and slash" to "immersive storytelling") and then "elements of a great adventure" [28]. These include providing players with a credible threat, providing tropes that have a twist to them, focusing on the present situation, letting the players be heroes that matter, and providing surprises for players. Planning is also dependent on the kind of scenario the GM wants to run. For instance, planning an adventure based on a certain location may include identifying important NPCs, fleshing out the details of the location, developing an introduction and climax, and planning out encounters affixed to particular locations on a map. Planning a mystery adventure looks different, with the GM choosing a victim, suspects, and clues that point to the identity of the villain. The book then provides tips on introducing complications such as quandaries for players, twists to the story, and encounters for the players to overcome.

Some of the GMing advice presented in the *Dungeon Master's Guide* and the *Starter Set* fits with what we found GMs were doing during play in our interviews. For instance, the *Dungeon Master's Guide* states that part of planning an event-based adventure involves the GM mapping out how the antagonist's actions might change as the game progresses and in response to players. This is similar to how the GMs

interviewed think through the logic of player consequences and adapt the world to the actions that the players take. The book also recommends pulling on player characters' ideals, bonds, and flaws (various elements of the character's values and history), as well as tugging on tensions between character goals or interpersonal relationships in order to provide interesting dilemmas for players. This is similar to how interview participants discuss their experiences using character sheets to inform the challenges they provide to players. It also emphasizes the importance of the relationships between NPCs and players during play which also came out in our interviews.

While these sources do discuss some advice for performative GMing, they don't provide as much advice about story improvisation during play. They do offer some advice for story inspiration such as rolling on random tables, but they also assume some level of player buy-in when it comes to running a game. For instance, both assume a clear, planned beginning, middle, and end for the story, with players exploring the story and making choices within it. This doesn't necessarily help GMs when players drastically alter the story, though, for instance by killing the antagonist at the beginning of the game, or skipping over important information needed to progress—both experiences that interviewed GMs faced in their own games.

We also looked at the essays in *Unframed* [27]. This book features twenty-two essays from prominent TTRPG designers and GMs on tips for improvisation. In these essays, the writers discuss their techniques for GMing while building the story based around the players. Many of the techniques discussed in these essays were similar to ones we found in our interviews. For example, in our interviews, interviewees emphasized the importance of using character sheets and players' discussions to influence what should appear in the game. Similarly, several of the authors discussed these elements in their essays. Boss states that "In roleplaying, we use our character sheets and world write-ups to create the circle of expectations that help us navigate creative channels together" [30]. She describes how character sheets and other elements established about the world create a shared understanding of what can (and cannot) happen within it, from which the story can be developed. Schneider also recommends that GMs draw from character sheets as inspiration for adding to the story, asking, "Has anyone taken an unusual skill or ability, but not used it yet? How could you create a situation in which they could use it?" [31]. Authors also discuss how players can be a part of the worldbuilding process and how GMs can use what the players want to see to shape the story. Players and the GM can "build the world's history together" in preparing for a new game, with players becoming an expert over some part of the world [31]. Hartley also talks about listening to players to get a sense of what they want to see. For example, if players are asking around for more social interactions or looking for something to fight, the GM can provide these kinds of encounters [32]. This removes some of the burden of content creation from GMs as they can draw inspiration from their players, and allows them to create play experiences that fit with what the players want.

Another recurring theme that arose in our interviews and in the essays was planning and creating content based around the need for improvisation. Arcadian discusses the need for GMs to relinquish “strict and rigid approaches to storytelling,” stating that this doesn’t work in a collaborative storytelling environment [33]. Instead he advocates for what he calls the “Island Design Theory,” in which “the plot points, encounters, leads, clues, and other important components of the game” are broken down into “simple, independent pieces with multiple ways into and out of each piece” so that players “make their own connections... they put together their own story out of the elements you provide” [33]. This modular content allows the players to have more control, with paths through the story largely influenced by players’ choices and actions. Vecchione also describes his approach to eschewing a fixed story, describing his campaigns as “collections of interesting NPCs and conflicts” [34]. While he might start a session with some idea for its general direction, he states that “What actually happens in that session will emerge through play. The story volleys back and forth among the three of us, being created layer upon layer” [34]. He emphasizes the importance of the players in story creation and finding the direction of the story through play. Story management based on improvised storytelling is important too—Jacquays describes this process, describing how parts of the story are planned but allow for flexibility, such as allowing the locations of events that need to happen “to slide around to be convenient to the flow of the adventure” [35].

The authors of these essays, like the expert GMs interviewed, also discussed the joys of improvisation in TTRPGs. For instance, Hartley states that in TTRPGs “There’s no way to avoid players going in directions you’d not anticipated, or reacting in ways you could have never expected. It’s not a flaw in your game—it’s one of the joys of roleplaying” [32]. It makes sense that the authors of this series of essays dedicated to tips for improvisational GMing would speak on the pleasures of improvisation as part of the roleplaying process. We also saw in both cases GMs discussing drawing from a variety of sources (either many kinds of game systems or other reference documents) as a base for inspiration in their own games [36] [34].

VI. DISCUSSION

Analyzing these interviews allows us to gain insights into the techniques that GMs use in facilitating storytelling in their games. Many of the techniques that GMs discussed involve developing the game world around who the player characters are and the actions that they take, such as creating challenges suited to player characters’ skill sets and changing the game world based on the results of players’ chosen actions and inactions. Both beginner and expert GMs also discussed improvising around unexpected player actions by thinking through the logical consequences of those actions. Because of this, we find that improvisation, particularly the ability to modify prepared content and adapt to players’ actions, is key to play for GMs.

We also find that improvisation is a skill cultivated by expert GMs but undersupported in learning materials for novice GMs. Expert GMs more readily and enjoyably incorporate improvisation into their process, and this is likely a skill developed with practice. Additionally, expert GMs have had greater exposure to sources of TTRPG advice as well as multiple TTRPG systems, and thus have more techniques and playstyles available to them while improvising. Our findings suggest that there is a need for greater support for novice GMs to learn the improvisational techniques described by our expert GM interviewees and by the essay authors of *Unframed* [27]. Common materials for learning GMing don’t heavily support the kinds of adaptation that we see experts perform. Below, we discuss how a computational assistant might help scaffold novice GMs and assist them with this improvisational process.

VII. TOWARDS A COMPUTATIONAL ASSISTANT

We seek to use our interview findings to inform the creation of assistive tools for GMs grounded in GMs’ actual practice. As we discussed in Section II-C, there has been some research into designing digital tools to support GMs, but this is a relatively underexplored field, particularly in the area of improvisation assistance. Here we suggest some design directions for such a computational assistant, discussing three ways that it could help to support GMs: 1) by providing planned information in an accessible format, 2) by allowing the GM to easily track changes that the players make to the game world, and 3) by providing suggestions for interesting things that can happen next based on the current state of the world.

We see in Section IV-C that much of the work that GMs are doing in preparing for and running their games is taking planned content, either from a module or of their own creation, and breaking it down into a state that is more manageable. Taking information from a pre-scripted narrative and breaking this into smaller chunks can also help to make this content more modular (the necessity of which is discussed in Sections IV-C and V) so that GMs can more easily pull out the materials they need at any given time. A computational tool that keeps track of story information can serve as an alternative to the denser book format of a TTRPG module. By storing information about the game world (such as characters, locations, or quests) the digital tool could make this information more queryable and visualized, allowing GMs to more easily improvise around this information.

GMs also emphasize in their interviews the importance of incorporating the players into the game’s story, whether that is through incorporating player choices made during character creation (Section IV-A) or during play (Section IV-B). A digital assistant could allow GMs to more easily keep track of changes to the world and the actions the players have taken, for instance allowing GMs to indicate information that the players already know, or changing an NPC’s state from alive to dead, through a visual editor that contains information about the game world’s state. If such a tool were to be used during play, it would need to be lightweight and extensible enough

for GMs to make modifications quickly and easily during the game session so as not to create a large amount of additional overhead for the GM.

A computational tool could also support improvisational storytelling for GMs. We found that novice GMs found improvisation difficult and when faced with players behaving unexpectedly, struggled to get them back on track or tried to enforce the story on players (see Sections IV-D and VI). A digital assistant could help scaffold this improvisational story creation. By having the game state and changes made to it stored in a digital form (as described earlier in this section), next steps for players can be suggested based on the information that the players know and the players' goals. This could also help to accommodate unexpected player actions—for example, if the players kill off an NPC that has information that the players need to know, the tool could provide suggestions for other NPCs who might have that information. We plan to evaluate these design directions for a computational assistant with another round of requirements research.

VIII. CONCLUSION

Running a TTRPG is a process that can be rewarding but difficult, requiring improvisational skills that let the GM facilitate a shared story based around the game's players. In this paper, we analyzed interviews with GMs and advice on GMing in order to understand how GMs facilitate storytelling in an improvisational, player-driven and collaborative context. We want to use these findings to inform the design of computational assistants for GMing. Next steps in this research would likely involve the design and development of such a digital assistant, which can be evaluated based on playtesting with GMs. The insights presented in this paper also have ramifications for other areas of the field. As noted above, researchers are already looking at applications of GMing techniques in areas such as personalization in MMORPGs and creating digital GMs for computer RPGs [13] [14] [15]. We can apply the improvisational storytelling techniques found in this paper in order to further the design of digital games that offer player-driven stories and allow for a high degree of player freedom.

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