The Implications of Improvisational Acting and Role-Playing on Design Methodologies

Ben Medler

Georgia Institute of Technology

686 Cherry St., Atlanta, GA 30332

benmedler@gatech.edu

Brian Magerko

Georgia Institute of Technology

686 Cherry St., Atlanta, GA 30332

magerko@gatech.edu

ABSTRACT

For decades designers have used theatre metaphors to describe design methodologies and have used performance techniques to enhance the design process, two of which are improvisational acting and role-playing. Unfortunately, most design literature does not differentiate between these two practices even while using them in combination with various design methods. This paper discusses how improvisation and role-playing have been employed during the design process and why they are distinct from one another. The authors draw upon their current research involving improvisational acting and compare it with other role-playing research which examines role-playing from both a serious and entertainment angle. They conclude through this comparison that both performance techniques have their place in the design process and that more informed definitions of each technique can aid designers in deciding which technique's properties will benefit them the most.

Author Keywords

Improvisation, Role-playing, Design Methodologies, Performance, Theatre.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design.

INTRODUCTION

Theatre as a metaphor for describing computer use or the design process has been employed for decades. This has included using theatre practices to design computer interfaces [24], build intelligent computer agents [7, 19, 32] and enhance design research methods such as brainstorming [8]. One theatre practice that is applied in each of these

examples is *improvisational theatre*, a modern theatre form that involves unscripted performances.

Designers see improvisation as a flexible, unique method that can be used to break themselves out of their normal or common ways of thinking about their product [8, 16, 39]. However, we understand very little about what people *do* when improvising. What research has been conducted has focused only on understanding group communication and improvisation [36]. Other canonical texts on improvisation, which designers often reference, describe how to teach, rehearse, or ideally perform in an improvisational theatre [22, 38], but they shed little light on what people actually do in terms of group dynamics, cognition, communication, etc. when on stage. This lack of an understanding the practice has lead to many designers blurring the lines between improvisational acting and another theatre practice, *role-playing*.

Unlike improvisational theatre, an enormous amount of research has been conducted on role-playing; everything from using role-play as part of the design process [37] to understanding how game role-players interact in virtual spaces [40]. Role-playing allows individuals to "get into character," or to become another person. Previous design research literature [5, 6, 8, 11, 16, 20, 31, 37, 39] has shown that role-playing is valued by designers because it allows them to see their products from another person's perspective (often a potential user of their product). Reviewing this literature has shown that "role-playing" and "improvisation" are often used inner-changeably, drawing upon the similarities that exist between the two acting methods. Designers combine these performance techniques with design methodologies, such as brainstorming and user testing, without any differentiation of where one technique ends and the other begins, losing the chance to determine if one technique may be more valuable during different design stages.

This paper argues that a disconnect exists between how researchers and designers use improvisational theatre, or *improv*, as part of a design method, typically linking it with role-playing, verses improv acting as a staged performance. Drawing upon research findings from the authors' large-scale study of the cognition involved in improvising actors [26], we compare and contrast the properties of improv and

role-playing in respect to the areas of design research methods (e.g. brainstorming, user testing) and the methods of producing digital artifacts (e.g. product design). This includes combining other research areas which have their own definitions of improvisation (e.g. organization science), and role-playing (e.g. psychology). The goal of this paper is therefore to review these techniques as tools for designers, to understand each technique's properties and where they should be used to inform HCI design methods and practices.

THE DIGITAL IMPROV PROJECT

This paper was created in light of the authors' current research involving improv actors as part of the Digital Improv Project [26]. Unlike other improvisation research that study musical improv [21, 34] this project focuses on studying the underlying cognition of improvisational actors and looks to apply what is learned to the construction of synthetic characters. In the last year we have conducted our studies with 26 actors across four improv troupes. Sixteen performances have been collected along with 65 interviews and over 35 hours of video recorded.

Improv theatre typically involves one or more actors performing short scenes called "games" in front of an audience [22, 38]. Each game has a small set of rules for the actors to follow, which we call *functional constraints*, such as one actor cannot verbally communicate. Other content suggestion may be made as well, including character relationships, film genre, and location. which help initialize the scene and are called *content constraints*. Games take place in a fixed area where the improv actors perform their unscripted scene in real time. We ask our participants to perform improv games that following certain functional and content constraints while each performance is video recorded. For example, improvisers will be given initial scene location and character traits (content constraints) then told to act out a scene where someone must guess another actors character trait before the game ends (functional constraint). Retrospective protocol collections [23] with each improviser are conducted after every game, or scene, while they watch a replay of their performance. Upon completing the individual collections each improviser rejoins their other scene partners for a group interview, once more reviewing the performance. See [26] for our current findings.

IMPROVISATION AND ROLE-PLAYING IN DESIGN

Improvisation and role-playing are generally seen as techniques that can supplement other design methodologies. Burns et. al. [8] uses the term "Informance" to encompass the practice of using performance techniques in combination with design methodologies, such as brainstorming, storyboarding and rapid prototyping. This practice helps designers to focus on their designs, emphasize user needs, communicate with one another and become less self-conscious. Simsarian [37] came to a similar conclusion with the concept of "Bodystorming," or brainstorming while role-playing. Bodystorming is a sort of

role-playing that "is similar to the practice of improv theater," and is good for: group focus, bring teams onto the same page, deferring judgment of ideas, gaining a deeper understanding of the design, and viscerally exploring a design's possibilities. Gerber additionally argues that improvisation techniques are similar to Osborn's rules for brainstorming which are: "1) withhold judgment 2) build on the ideas of others 3) generate a large quantity of ideas 4) free-wheel and 5) identify a leader" [16].

Other design literature focuses on user testing and how improvisation and role-playing allows real users to provide insights into a product's design. In both [6, 31] a series of branching video scenes of a product interaction are shown to a focus group who is then asked to role-play how the scene's actors would react after each branch of the video is shown. This presentation technique is supposed to help the "attentiveness to social change" by giving users the ability to reflect on a social situation based on a product in development. While in a different study [5] design students were asked to create their own role-playing stories while using various products. The study questions whether role-playing helps design students: understand and question interaction, create ideation, and inspires them to use role-playing in their own work. The students were given product prototypes, an initial situation to role-play and told to improvise with the given elements to create a story using the product. The research found that the initial criteria given to the students needed to be simple, otherwise this type of design role-playing was more useful as an evaluation process rather than an ideation exercise.

In contrast, Svanaes and Seland conducted a series of user testing workshops which focused on constraining the users while role-playing [39]. Each workshop had a main facilitator or leader who controlled the flow of the testing while developers observe the users, who were asked to role-play different scenarios using the prototype or technology the facilitator gave to them. What was found is that constraints affect the role-playing outcome but greater constraints keep users on task. They also found using real users is important and no special training was required to participate. However, a good facilitator was essential to keep users on task and to interject when it was necessary.

Finally, Davidoff et. al. uses the concept of "user enactments" which are mixed reality role-playing user tests [11]. Users improvise their "daily routines" and "designers are able to integrate context rich feedback while designing." This takes place in a physical location with "low-fidelity props" where users act out roles in given scenarios created by the designers. User enactments help "teams explore a critical set of design issues within [an] earlier-identified subset of opportunity areas" and allow them to focus on those opportunity areas when determining new design solutions.

As these literature examples have shown, role-playing and improvisation are used to supplement many design

methodologies. Designers use these performance techniques to achieve the following effects:

- Become less self-conscious. [8, 16, 37]
- Better group communication. [8, 16, 27, 39]
- Create new ideas. [5, 11, 16, 37, 39]
- Greater group focus. [8, 11, 16, 37]
- Inform of user's needs. [5, 6, 8, 11, 37, 39]

However, these studies had different requirements for how their performance enhanced design methods should be conducted:

- With a Leader [16, 39] \ With out a Leader [5, 11].
- More constraints [39] \ Less constraints [5, 16].
- User training [5, 16] \ No user training [11, 39].

This confusion over which requirements are proper leads us to the following conclusion:

While the ideal results for using improvisation and role-playing are shared among design researchers, the actual methods for achieving those results are scattered.

Linking improvisation and role-playing together does not help designers if everyone defines how to use the techniques differently. Therefore, we must review research which studies improvisation and role-playing directly to find what differentiates these terms and discover how each performance technique can benefit design methodologies.

DEFINING IMPROV AND ROLE-PLAYING

Outside of their uses in design, improvisation and role-playing have many definitions across various areas. Improvisation is defined in the artistic domains of jazz [21, 34] and theatre [22, 38], as well as organizational science, management and a number of other areas [10, 30]. Role-playing, on the other hand, is used for entertainment [13, 29], training [2] and psychological treatment [42]. While the definitions may be numerous there are commonalities that exist among them. Combining the work of other researchers, together with the findings from our own research involving improv actors, we will attempt to layout the main properties of each performance techniques in an effort to clearly define each domain and ultimately their relevance to design.

Improvisation

Improvisation can be bluntly defined as an act where "an artist creates an original work in real time" [21] and "if erasing, painting over, or non-real time editing exist, improvisation does not" [33]. Original, real time, and error prone creative work generally falls under improvisation. Flexibility is another major part of improvisation too, where designing "in relation to unanticipated ideas conceived, shaped, and transformed under the special conditions of performance" is common [4].

These definitions come from literature discussing musical improv, but other work in the area of organizational science

agrees. Improv is the "fusion of design and execution" [28, 30] where group coherence, novelty, speed of execution and lack of planning are all major factors [9, 30]. However, improv is a specific technique unlike general terms such as innovation, adaption, learning, or opportunistic [30]. For example, an adaptive system implies that a controlling process allows elements to communicate and interact in order to achieve a goal [27]. A system meeting that description can be pre-planned and well defined, taking any improvisation out of the system, but improvisation can be invoked as a technique to achieve similar adaptive effects.

From our own research we define improvisation as the "creation of an artifact and/or performance with aesthetic goals in real-time that is not completely prescribed in terms of functional and/or content constraints" [26]. Performance implies that a single or group of improvisers work to produce an interesting, perhaps novel, experience for an audience. This is done in real time while the improvisers work as a cohesive group with very little explicit coordination. Although, we have found that improvisers learn to anticipate each other even if they do not plan their scenes beforehand.

Learning to improvise allows a person to "anticipate and attend to patterns in the system's behavior" [17]. Anticipation means an improviser has a "predictive model (cognition) of itself and/or its environment" as to react instantly [35]. We have found this to be true in almost all of our observed performance sessions. Improvisers will predict, or infer, where other improvisers are heading in the story and create mental models of where they personally would like to take the story [26].

For example, during one of our recorded performances three improvisers are acting as if they are popcorn vendors. One actress makes the following comment "I wish they would make the pictures cheaper." The actress has an internal prediction that the location of the scene is at a movie theatre. Unfortunately, the other two actors in the scene misinterpret the comment and think she says "pitchers" instead of "pictures." This causes the two actors to change their predictions of the scene and infer that they are at a baseball stadium. The actress immediately switch to the scene's new environment too once the other actors mention a baseball game, causing the actress to realize her initial prediction had to change.

Errors, such as the one described above, can occur between the improvisers and they must work together to gain a *cognitive consensus* given their predictions, or mental models, they have of the scene [26]. This collective group consensus happens in real time and, often, improv scenes have few *constraints* on how a scene unfolds, making it important for the improvisers to work as a cohesive group. A *group's cohesion* is stronger when the actors appear to understand each other's characters and can progress a scene together. The actress could have attempted to correct the other actors' error but would have endangered the group's

cohesion, going against one cardinal rule of improv to always accept what another improviser presents in a scene [22]. The lack of constraints and group cohesion allow an improv scene to produce a novel performance that other acting techniques could not achieve without explicit pre-planning. This means improv is about discovering what is hidden within a scene and its characters verses acting within the defined parameters that role-players often do.

Role-playing

Role-playing is used in the domains of training, psychological therapy and entertainment. In general "role-playing is the practice of group physical and spatial pretend where individuals deliberately assume a character role in a constructed scene" [37]. There is a sense of realism associated with role-playing which simulates the "approximation of aspects of a 'real life' episode or experience, but under controlled conditions" [42] but also allows for the "infinite manipulation of time and space, restricted only by pragmatic considerations." In sum, as with improvisation, an individual or group can role-play any given situation that can be created [42]. Unlike improvisation however, performing for an audience is usually not part of role-playing. Instead, the focus is on the participant's actions and how they handle the situation they are given [2], not how dramatic or novel those actions are perceived by an outside spectator.

In this paper we focus on comparing entertainment-based role-playing (specifically role-playing games) with theatrical. We are focusing on entertainment-base role-playing because that type of role-playing allows participants to explore a scenario and character traits. Role-playing in psychological and training domains are used to condition participants to think or act in certain ways, which opposes the effects that designers are trying to achieve by using role-playing within a design method (such as "Create new ideas" [5,11,16,37,39]). There are three basic types of role-playing games: single or multiplayer digital role-playing games, tabletop role-playing (played with pencil and paper) and live-action role-playing, or LARP, which is played in a real physical space. Each employs the same basic techniques except digital role-playing games do not necessarily force a player to act out their role [1].

The three major elements of role-playing games are: "an imaginary game world, a power structure and personified player characters" [29]. Unlike improvisation, role-playing games have more functional and content constraints that a participant must follow. For example, the role a player creates is often very well defined (a *content constraint*), with a back-story and many specific character traits or flaws [12], while the game itself will have a number of functional constraints that govern player actions and abilities, such as movement or skills [18]. LARPing games may include other constraining features such as existing social structures, multiple player roles and a shared group history on top of being in a specific physical place [15]. Finally, role-playing games typically employ Game Masters

(GMs) who act as directors and facilitators of a role-playing game making sure the rules are followed and to move the story along (for digital role-playing games some of a GM's functions may be handled by software instead). GMs use attractors and detractors to entice the role-players they are managing into performing, or refraining from performing, certain actions [14]. The job of a GM is very similar to that of a facilitator that designers use when conducting focus groups or user testing [6, 39].

Role-playing in games has been said to have both theatrical and improvisational qualities with participants continually negotiating with one another to shape their game's fantasy [13]. Going even further, Berger attempted to turn a tabletop role-playing experience into an actual theatre performance by performing a tabletop role playing game in front of a live audience [3]. While the audience had a favorable experience there were a number of unsatisfactory assessments: the performance was too long, the game rules continually had to be explained to the audience and the performance diverted attention away from the role-players. The negative assessments illustrate why role-playing and improvisation, while similar in some ways, are very different and those differences need to be understood if these two techniques are to be used with design methods.

Improvisation and Role-playing distinctions

Designers regularly reference improv theatre and role-playing as sources of inspiration to enhance common design methodologies. What has been presented thus far is how improvisation and role-playing are defined and are used as performance techniques. We now focus on comparing improv acting to role-playing and list five major differences between the two techniques.

In this comparison we will limit our scope of improvisation to improv acting. The reasons for this are (a) designers reference improv acting specifically when talking about combining design practices with improv techniques [5, 6, 16, 37], and (b) other forms of artistic improvisation work in different modalities, such as music or body movement, are more difficult to compare to design or role-playing. Improv acting will be compared with entertainment-based role-playing because, as mentioned earlier, role-playing in other domains is used for conditioning as oppose to exploration. Furthermore, each difference between the techniques will be explained using performance examples to show how these difference manifest themselves in a performance. A question follows each stated difference regarding the design implications of that difference and these questions setup the next section where we discuss how the differences between improv and role-playing affect how each technique should be used as part of a design method.

Improv has fewer constraints

Improv acting requires fewer functional and content constraints than compared to role-playing. For instance, improv actors do not need their character or relationships defined in order to perform [25]. Many relationships are

pre-determined in role-playing like the facilitators power over the other participants [37] and of course the role-players character is heavily defined as well [12]. Improvisers, in contrast, can focus on building their character or that character's relationships from the ground up during a performance.

One of our study's scenes explored giving improvisers an atypically high amount of content constraints to see how their performance would differ from less constrained scenes. Two sessions of the same scene were carried out each with a set of three improvisers. A plot was laid out for the two separate groups of improvers as follows:

"You are at a restaurant where three people are meeting for dinner. Two of them are dating while the third, a former lover of one member of the new couple, does not know the two are dating. Sometime during the scene the new couple must reveal they are dating and eventually leave the restaurant."

Compared to other improvisation scenes during our study this plot had higher content constraints which prescribed the plot's action before the scene began. In this situation a group of role-players would have chosen specific roles to play, where one person would become the "former lover" for instance. However, neither improv group we observed made any attempts to determine which improviser would play which role at the beginning of their scene. They insisted on falling into the given roles by spontaneously creating relationships between themselves and the other improvisers during the performance. This is an example of the actors finding the "game within the scene," which means "to introduce additional constraints, ad hoc, into a scene, to help guide which action to execute next in a scene" [26]. The "game" for each improviser was to choose their relationship with the other actors and see who fell into each role. Some improvisers portrayed a very angry or cold relationship between themselves and another actor attempting to play the former lover. Other improvisers chose to be cheerful to a fellow actor if they were trying to play the role of the couple in the scene. The improvisers said that since the roles were so defined it freed them to explore the relationships between the characters. Had the scene's plot defined character relationships or emotions, i.e. functionally constraining the improvisers, the scene would have perhaps switched to an instance of role-playing.

Role-players create specific character roles before a game begins and build a structured world around their roles, or use a pre-built world [15, 29, 37]. Some characters are kept for years and will stay in character for long periods of time [13, 29]. Improv acting does not have that level of pre-planning and requires either fewer functional or content constraints in order to allow improvisers their freedom to explore a scene.

Design Implication Question 1: How many constraints are placed on a design method and how do these affect the relationships between the participants?

Improv is a performance requiring a cohesive group
Role-playing is intentionally built to focus on the participants and allow them to act as if they were someone else [42]. Even when brought on stage, game role-players complain that having to play in front of an audience decreases the enjoyment of their experience [3]. Improvisers, instead, must perform for an audience. This outside spectator, i.e. the audience, affects how the improvisers must act and perform on stage. If each improviser acts individually, only forcing their personal ideas into a scene, it becomes harder for the improv group to create cohesive, unscripted scenes. Improvisers must form a cohesive group in front of an audience, one that is aware of the group's external image and be willing to follow other group member's ideas. Therefore, improvisers continuously try to amplify their group's image in front of the audience and stick together as a group.

During our study sessions with improvisers we have witnessed many moments of group cohesion, keeping a scene from becoming too individually motivated. For instance, while interviewing one improviser, we will call him Adam, he specifically stated that he began a scene not wanting to play a woman. We have found that improvisers regularly start a scene with a trajectory representing how they view their character and the scene around them. However, Adam's demand to keep his character a man quickly changed because his fellow improviser acted as if he was a woman. Now Adam could have continued to act as a man because nothing was said to the contrary. Instead, Adam chose to change his views of the scene and align himself with his group members, making the group appear to be in sync.

Tabletop role-players will often feel the need to keep the group together as well [14]. However, this typically happens when role-players play with good friends, and peer pressure keeps them together. Otherwise, there is much more potential for role-players to act individually compared with improv acting. Role-players do not have to perform their roles in front of an audience where the social pressures can be more intense and affect the performance. In some cases a facilitator or leader in a role-playing game will have to force a group to become more cohesive [14]. Thus, role-playing tends towards an individually-oriented experience, lacking group cohesion, and outside forces such as peer-pressure or a leader must keep a group together.

Design Implication Question 2: How important is group cohesion throughout the design process and must an outside audience see that cohesion?

Improv scenes may not be practical
Role-playing is used to simulate reality in training scenarios, meaning that participants are bound to real world rules (i.e. *functional constraints*) like physics (objects cannot pass through walls for instance). Entertainment role-playing games like Dungeons and Dragons [18], while containing fictional objects that may pass through walls, also have a pre-built rule system that create a practical

reality for players, rules that they must adhere too. In short, role-playing has to be practical by its very definition as a rule enforcing activity.

Improv actors, on the other hand, will create new settings and characters spontaneously following very loose rules for acting during a performance. This happened in our study when our improv participants were ask to play a game called *Film and Theatre Styles*. In this game two improvisers are given an initial scene location to begin and throughout the scene another improv actor shouts out film genres which determine how the other two improvisers must act on stage. If the film genre "Western" is shouted the two actors have to act as if they are in a Western film. *Film and Theatre Styles,* as we have found, allows improvisers to spontaneously generate items within the scene without cause. In one scene the improvisers are acting as if they are in a restaurant when the genre "Action movie" is called out. One of the actors then motions like she has a gun and proceeds to shoot at customers in the restaurant. Immediately after that the genre "Infomercial" is called out and the two improvisers act as if demonstrating kitchen equipment in front of a number of cameras.

The gun, the customers and infomercial cameras instantly flashed in and out of existence during the scene as the different genres were shouted out. The scene continues however, as the audience and actors had certain expectations for each genre, and did not care about the persistence of the objects. This would be impossible in most forms of role-playing because strict rules govern the experience. Whether the role-playing participant's are in a fictional or realistic setting, making practical choices based on the rules of the scenario are more suitable.

Design Implication Question 3: At what stage during the design process must practicality trump novelty?

Improv happens in real time.
An improviser cannot typically stop during the middle of a performance and ask their fellow improvisers how they should progress in the scene. During a role-playing game participants constantly wait for other players to take their turn or ask questions to verify the state of their world (each occurring outside their role performance) [13]. Improv actors have no luxury, once a scene starts it does not end until the actors have finished the scene, and any problems that occur must be dealt with dynamically.

In an improv scene "coordination occurs not so much because people have identical views of 'the' design, but because they have equivalent views of what is happening" [41]. One can see how having only "equivalent views" is affected by performing a scene in real time by returning to the "pitchers vs. pictures" example from our study, as mentioned above. The improvisers did not have identical views of the scene's location; otherwise each actor would have known they were at a movie theatre. Instead of stopping to coordinate their actions, the improvisers implicitly worked towards *cognitive convergence*, which is

defined as each actor attempting to align their mental model of the scene's location with the mental models of the other actors on stage [26]. The two male improvisers achieved this convergence in real time by accepting their scene's location to be a ballpark and the female improviser followed along without hesitation, even though her mental model described the scene as being in a movie theatre. If the actors had been role-playing they could have broken character to clarify the location or a facilitator running the role-playing session would have corrected the mistake.

Design Implication Question 4: How important is it to stop and make corrections during each phase of the design process?

Improv has no leaders
Game masters (referees and trainers too) control the flow of a role-playing event and have ultimate decision making power [13, 37]. Improv scenes may use other actors or hosts who are not on stage to suggest the next scene or end a scene [21] but the improv actors on stage have most of the power over how their scene progresses. That power will also quickly shift from one improviser to another in an improv scene. Improv actors regularly give and take "the focus" of the scene, e.g. where the audience's attention is drawn, from one another allowing each improviser to take control of the scene when they wish.

Taking the focus regularly occurred during an improv game called *Party Quirks*. This game involves several improvisers each having a certain character quirk they must perform while visiting a party and a party host (another improviser) who must guess each character's quirk while acting out the party scene. For instance, in one scene of *Party Quirks* an actress played an invisible woman has her quirk (we will call her by the pseudonym Annie). Of course Annie was not naturally invisible so this was a hard quirk to portray to the host of the party. In order to help the host guess Annie's quirk another actor, we will call him Dan, drew the host's attention towards Annie in certain ways, along with the focus of the scene. Dan would act surprised and shout to the party host when he saw Annie act as if eating food (an act that would be very surprising if Annie were truly invisible). Up until that point in the scene the host was the main focus of the party, talking to the other actors and attempting to guess their quirks. Dan instead took the focus away from the host when he felt he could contribute to the scene. The host went along with Dan's suggestive comments and finally guessed Annie's quirk correctly.

While role-playing, a leader will keep the participants moving through a scenario and each participant accepts the leader's guidance [13, 14]. This keeps the power structure in a hierarchical format. Game role-playing GMs will provide attractors/detractors to push players in different directions, stopping players from making bad decisions or giving players false decision points where no matter what

the player chooses the GM has already determined the outcome [14].

Design Implication Question 5: Who has control over a particular design method and can/should power be disseminated amongst other participants?

COMBINING DESIGN AND PERFORMANCE

In the "Improvisation and Role-playing in Design" section above, we mentioned five reasons for combining performance techniques with design methodologies: *Become less self-conscious, Better group communication, Create new ideas, Greater group focus, and Inform of user's needs*. In the same section, we presented three method requirements where designers disagreed on how to properly use the performance techniques to enhance their design research procedures: *Constraint level, Training and Leadership*. In order to address both the reason for using performance techniques in design and the requirement disagreements, we presented five major differences, or properties of each performance technique, that exist between improv acting and role-playing: *Constraint level, Group cohesion, Practicality, Performance time, and Leadership*.

	Improv	Role-play
Constraint level	*Low*	*High*
Group cohesion	*High*	*Low*
Practicality	*Novel*	*Practical*
Performance time	*Real-time*	*Intermittent*
Leadership	*Dispersed*	*Hierarchical*
Training	*Required*	*Not Required*
Become less self-conscious	☑	☑
Better group communication	☑	☐
Create new ideas	☑	☐
Greater group focus	☐	☑
Inform of user's needs	☑	☑

Figure 1. Properties of improv acting and role-play.

Figure 1 lays out how improv and role-playing have been defined against one another given the properties previously discussed. In this section we relate these differences to design methodologies and discuss the requirements for adding a performance technique to the design process. While we argue that each technique is better suited to produce certain results over the other, the differences within the technique properties themselves are the key ideas for designers to take away. As the design implication questions, which were presented above, are revisited we will be focusing on why certain properties, such as constraint level, are useful to review as much as discussing the usefulness of each performance technique.

Constraint level and Group cohesion

The first design implication question above asked *how many constraints are placed on a design method and how do these affect the relationships between the participants?* As we have shown, improvisation needs fewer constraints, either content and/or functional, compared to role-playing. Fewer constraints means a group of improvisers must rely on one another for help during a performance instead of a common set of rules or a leader, which would be available to a role-player. Brainstorming, for example, is a design method that requires a group to follow few functional constraints (e.g. withhold judgment) and must build on each other's work [16], making improv techniques a good match for that method. Every participant can influence how the group creates ideas during a session, just like an improv scene, meaning they must be aware of what everyone else is doing. In a sense, the group is their own audience and they must live up to their own expectations as a group. This causes greater group cohesion because if the group fails than everyone fails. Therefore, if the level of constraints have an effect on how a group functions, designers must ask themselves the second design implication question at this point: *how important is group cohesion throughout the design process and must an outside audience see that cohesion?*

Allowing an entire design group the ability to have a collective consciousness of their product and goals (such as what happens during a brainstorming session) may not always be possible over the entire design and production process. Late user testing of a product, for instance, has high functional constraints because the specific capabilities of the product will have already been defined. During this stage in the design process individuals within a design team will have their designated tasks or pieces of the project they are working on, which increases focus on individual work not on group cohesion. This individualizing effect can be compared to role-players who each have their own role to play and become focused on their own performance rather than an outside audience or third party. This individualization is necessary at times and managers are then required to keep a design team focused on the overall goals of the project. Thus focusing on role-playing techniques during this period would appear to work best. Focus groups and user tests held during this stage in the process will benefit from constrained environments lead by trained role-playing facilitators will help keep participants within the defined boundaries of the product [6, 39]. The results from these events will also help everyone on a design team see how their separate pieces are coming together [37].

In summary, role-playing helps designers and testers focus on specific areas, which may help inform user needs in the design process. Improv can help inform user needs too and create new design ideas. However, improv techniques requires lower constraints and a group to work collectively, which may require they have a certain level of training as other designers have mentioned [5, 16], in contrast to role-playing techniques which only need trained facilitators.

Practicality, Real time and Training

Improvisers have been shown to work together, in real time, with very few constraints to guide their way. This allows them greater freedom while performing and can lead to novel creations. Designers wish to use improvisation during the design process to help come up with novel designs as well. However, a novel design may be inefficient or impractical as, for example, deadlines approach and more practical design decisions have to be substituted. The third design implication questions touches on this problem: *when does practicality trump novelty while designing?*

Howard et al. [20] is one instance of the fight between practicality and novelty in design research. Similar to the work found in [39], Howard et al. use a trained actor and director to "act-out" (i.e. role-play) scenarios using props while a design team watch and make suggestions. The props stand in for an imaginary product and the actor acts as if using the prop's functionalities. However, how those functionalities are defined and limited is a main discussion point of the article. For example, sometimes the designer gives initial restrictions to the actor on how to use the prop and those restrictions are later removed. Other times the opposite occurs, the actor is given unrestricted control over the prop initially while designers add restrictions as the scenario unfolds. Both ways provided insight for the design team but the authors specifically note that starting with high constraints "strongly limit the creativity of the team even when the constraints are later removed" [20]. Having tight constraints keeps design insights practical but innovation may be stifled, which is on par with our distinctions between improv and role-playing.

Achieving a balance between novel and practical insights in [20] also brings up another point about using performance techniques with design methods. The actor used in [20] was a trained improvisers which may have attributed to the dislike for heavier constraints scenarios, considering that improv is typically unconstrained. A trained improv actor was used in the scenarios because, as the author's argue, the design team needed someone who could act in scenarios with varying levels of constraints placed on them and do so in front of a design team. However, other design researchers who utilized role-playing as part of their design process felt that training users was not required [11, 39] even while those users were asked to act out scenarios while being watched by designers as well.

This disagreement about the level of training required may be affected by whether a design method works in real-time, which is covered by the fourth design implication question: *How important is it to stop and make corrections during each phase of the design process?* In [20] the design team continuously stopped and altered an actor's scenario, introducing challenges for the actor to overcome. A trained improv actor might have an easier time working within this type of environment, compared to an average participant, because improv actors typically take similar suggestions from a live audience, having an easier time staying on task. Whereas in [39], which used users untrained in acting, it was mentioned that stopping a role-playing scenario once started may disrupt the participants creativity, and relied on trained facilitators to judge whether to stop a scenario or not.

What these disagreements show is that designers do not have to necessarily infuse their design methods with a strict improv or role-playing technique. The properties of each performance technique, as laid out in Figure 1, are the actual additions that designers can combine with existing design methods. Using a trained improv actor may help designers discover novel ideas about their product but allowing designers to stop that actor during testing can help keep created ideas tractable.

Leadership

The final design implication question asks designers: *who has control over a particular design method and can/should power be disseminated amongst other participants?* The previous two sub-sections have already given examples for how a leader may be helpful during the design process. These are leaders who take an active role and coach participants through a design method, whether a user test, focus group, etc. A good leader can greatly increase how well certain design methods, such as user testing, can help designers evaluate their prototypes [5, 11, 39] just like a good leader can help keep a role-playing game dramatic and flowing [13, 14]. Improv-based design methods which lack a leader require groups to learn how to disseminate power amongst members [5, 16]. Although, there are ways to provide leadership while still making a group feel they are controlling the situation.

"Wizard of Oz" techniques allow designers to have control over user testing while still giving participants the freedom to improvise their actions. This technique works is similar to a role-playing game where one leader controls a scenario except when running a Wizard of Oz scenario the participants do not know that there is someone guiding the experience. One example talked about earlier was Davidoff's "user enactments" [11]. Users were placed in a low-fidelity, mixed-reality environment where the designers had control over certain aspects of each user scenario. The users had the freedom to perform their "daily routines," or actions, but designers could trigger different events or constrain the user in different ways in real-time [11]. This meant that while users felt like they were free to improvise their actions a designer acted like a GM in a role-playing game controlling the flow of the story.

Leaders can also help with the one goal that has not been discussed in regards to using performance while designing, being less self-conscious. Gerber states that by using improv warm-up techniques and having a good leader it can help designers become less self-conscious while in a brainstorming session [16]. Improvisers without a leader instead have to be taught to be less self-conscious and learn to trust their fellow group members.

Using leaders can be a quicker way to maintain group focus and help group members become less self-conscious with one another. The down side is that leaders may work against an improv-based design process by: adding constraints, decreasing group cohesion and stifling the creation of novel ideas. However, certain techniques like the Wizard of Oz scenario are able to combine both improvisation and role-playing techniques where a leader can operate outside of the participant's knowledge.

CONCLUSION
The goal of this paper is to differentiate improvisational acting and role-playing from each other as performance techniques and how they have been used as part of design methods. Previous design literature has explored combining these performance techniques with other design methods but used the techniques interchangeably without a clear understanding of the properties of each technique [5, 6, 8, 11, 16, 20, 31, 37, 39]. This not only can cause confusion when other designers wish to use the techniques themselves but also disregards each technique's particular properties which may benefit certain design methods compared to others.

Improvisation is shown to be beneficial for the design process because it allows the creation of new ideas, informs designers of user needs and makes designers less self-conscious in a group. In order for improvisation design to work, a design method must have fewer functional or content constraints, operate in real time and a group must work without a leader. This means that designers will generally have to be trained to function as a cohesive group and work in an un-constrained environment.

Role-playing, on the other hand, is better for design methods with more constraints. In a typical design process as a product becomes finalized role-playing can help designers evaluate their prototypes, determine user needs and focus on specific, practical, design areas. Leaders are required to keep a group focused because higher constraints can force group cohesion to suffer. However, having a leader means that designers or users do not have to be trained to participate in a role-playing scenario.

With these distinctions, designers can now examine how their current design strategies can use improvisation and role-playing techniques. For instance, improv techniques may be more suitable for brainstorming while role-playing might be useful for conducting user testing. However, a combination of the two techniques is not out of the question. Improv and role-playing properties can be altered

to fit different circumstances, namely the ones discussed earlier (e.g. constraints, leaders, participant's skill level, etc.). For example, one may vary the level of constraints within a design method. Each technique may be suited for different design methods but can certainly be modified to suit anyone's design process. Even so, as design research moves forward it is imperative that the distinctions between performance techniques are maintained if only to achieve a certain degree of clarity in how they can be implemented and benefit design methods. Hopefully these clarifications will draw attention to the particular ways theatre techniques, such as improvisation and role-playing, can affect the design process and promote the use of these techniques as design tools in general.

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