YOUR GAME: Fundamentals of Game Design via Constructionism

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by

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ABSTRACT

YOUR GAME suggests that fundamental game design practices can be communicated via games and learned by a target audience ages 18 and above without prior experience. YOUR GAME represents a synthesis of current game design curriculum and practices; teaching these concepts to players via its assets and gameplay. YOUR GAME is a tabletop “game-creation-game” which employs constructionism learning theory; meaning – players, via gameplay, discover problems with their designs as they create them and learn by solving these problems. Players execute a bottom-up (bricolage) iterative and exploratory game design methodology using rapid prototyping (a low cost and efficient manner by which game designs are tested on paper). A foundational design language is communicated to players while they produce visual and written documentation through the course of play. YOUR GAME leverages player imagination to create unique experiences each game session. Twenty-four people participated in a qualitative study using Grounded Theory to understand YOUR GAME’s effect. Participants’ responses suggest learning occurs. Further studies are required to assess participant comprehension of fundamentals and improve YOUR GAME’s effect. An Excel Workbook containing coded participant responses is included as supplementary material.

Keywords: Game-based learning, Serious games, Constructionism, Game design, Rapid prototyping, Paper prototyping, Game-creation-game, Tabletop game, Exploratory game design
1. INTRODUCTION & MOTIVATION

The purpose of *YOUR GAME* is to efficiently introduce a set of game design fundamentals and industry terminology to people eighteen years of age and above interested in game design but with no prior experience. It is assumed that members of the target demographic will maintain varying amounts of technological skill. *YOUR GAME* is a tabletop game played with decks of cards, a board, and generalized pieces to allow all members of the target demographic to engage in the game design process. *YOUR GAME* must also allow players to prototype all types of core game systems to be of benefit. Players map semi-random and generalized atomic game elements to systems of interaction; creating unique rapid game prototypes during a typical game session.

*YOUR GAME*, hereafter referred to as “YG”, promotes simplicity of design via its structure, assets, and procedures. Players are presented with constraints that facilitate creativity by narrowing player focus to specific elements and their interaction. Players practice a bricolage, or “bottom up”, design process where they take turns defining the individual elements and interactions forming a core gameplay system. A game session ends when a player completes a goal defined as a win condition. The iterative design process, where players conceptualize, implement, and test their prototype’s system, is embodied by YG’s player actions. Players may either play their prototype or use cards to design/alter their prototype on their turn but may not perform both actions. This forces players to experience their design choices and identify problems prior to making corrections. YG promotes an atmosphere of collaboration among players to simulate the compromises one must make while working with a design team.
2. BACKGROUND

Review of “Game-Creation-Games”

To our knowledge there are no games, tabletop or otherwise, whose purpose is to create a unique rapid prototype of a game as an artifact while teaching game design fundamentals simultaneously. However, there are titles in both the tabletop and digital mediums which allow players to practice game design as exercises or as entertainment. These design tools do not deliver the goals of YG in different ways. The existence of such tools, at the same time, demonstrate a demand for such a product.

Aki Järvinen’s (2008) GameGame is a system to brainstorm and pitch game ideas (p. 96-98). The GameGame communicates a standardized terminology of game elements on its cards. Players do not experience a design process, however. Annakaisa Kultima, Johannes Niemelä, Janne Paavilainen, and Hannamari Saarenpää (2008) created three separate games, based off Järvinen’s work. VNA (Verbs, Nouns, Adjectives), GameSeekers, and GameBoard are games where players collaboratively author a high-level game concept (Kultima et al., 2008, p. 6-9). These games are brainstorming tools whose aim is not to teach game design fundamentals. Each game does communicate a list of game element terminology.

Jesse Schell’s Deck of Lens is an analytical tool to be used by designers to help spur creativity and innovative game designs (2014b). Similarly, Grow-A-Game is a card game that facilitates brainstorming of innovative game designs and analysis of game designs from the perspective of “values conscious design” (the systematic consideration of “moral, social, and political resonances of design features”) (Belman et.al., 2011). Grow-A-Game allows players to
create game pitches and vote on them (Grow-A-Game: Overview: Values At Play, n.d.). Grow-A-Game’s purpose is not to teach game design fundamentals. 1000 Blank White Cards allows players to collaboratively define game elements and playtest game elements simultaneously during each play session (1000 Blank White Cards: The Rules, n.d). 1000 Blank White Cards does not communicate formal terminology or a formal design process.

Stone Librande (2011) (2015) created a series of small tabletop game prototypes that are designed to teach students specific principles of game design. Librande’s games do not teach a general design process. Similarly, Salen and Zimmermann (2004) list several game design exercises (p.15-17). The exercises are designed experiences which teach specific game design fundamentals but cannot be used as a general design process. The Game Designer’s Toolkit is an un-finished tabletop project on Kickstarter (https://www.kickstarter.com/projects/eaglegryphon/the-game-designers-toolkit-meet-your-new-project) being created by Eagle-Gryphon Games. The Game Designer’s Toolkit only provides game prototyping materials without instruction on game design process.

Digital titles which allow player customization of existing game systems do not allow players autonomy to create any prototype which can be imagined. For example, GameStar Mechanic presents an extensive website which allows players to experience existing game designs, iterate on those designs, and learn formal game design methodology from professional game designers (Product Components: What do students do with Gamestar Mechanic?, n.d). However, GameStar Mechanic is limited via its medium, which cannot allow players to create any game system which they imagine.

It should be noted that none of the games players produce via existing digital game systems (i.e. the game being played maintains an internal feature allowing players to edit/modify
the game’s system; e.g. *Dreams*, *Minecraft*, *Disney Infinity*, *Little BIG Planet*, etc…) allow players to create *any* game system they wish. Also, these games do not create design documentation through the course of play and any game may take days or weeks to author.

Thus, to our knowledge, no product exists which allows people to *rapidly* prototype *any* theoretical game design, playtest and iterate upon those designs, practice game design methodology, produce game design documentation, and, via participation in said game, learn fundamental terminology and principles.

*Games as Learning Devices*

Using the LOGO programming language Dr. Seymour Papert demonstrated that students learn more efficiently and effectively when they engage in constructing artifacts that are meaningful to them (1980). Students wrote programs using LOGO that manipulated a digital turtle on a computer screen. Students used the turtle to draw pictures and by doing so learned fundamental computer programming techniques and mathematical concepts. This learning process was termed by Papert as “constructionism”. The main tenets behind constructionism are:

people “learn by doing”, “hard fun” - meaning that people enjoy overcoming difficult challenges,

“learning to learn” - people learn more effectively by authoring their own curriculum, “taking the proper amount of time for the job” - learning how and what to spend one’s time on, and “you can’t get it right without getting it wrong” - meaning people must be allowed the freedom to fail repeatedly such that they learn from their failures (1999). Papert in *The Children’s Machine* states that people often do not employ the strategy of deconstructing large problems into smaller easier problems, as a means of solving the overall problem. This behavior must be learned.
Papert also states that what is usually required to solve a problem is for people to spend time thinking about the problem while in a relaxed state of mind. It is thinking about a problem and communicating with others about the problem that fosters learning (as cited in Kafai & Resnick, 2012, Chapter 1). Celia Hodent corroborates Papert’s assertions when she states that, “You will not learn something as efficiently if you are [stressed]” (2018, Chapter 2, Section 2.4, para. 3).

Yasmin B. Kafai applied constructionism to her studies relating to learning through design. Students built their own knowledge base through designing digital games using LOGO (Kafai & Resnick, 2012, Chapter 4). Kafai stated that students constructed their own learning environment by studying material that was important to their individual goals. The amount of knowledge gained by a student was not necessarily reflected in that student’s game. Kafai stated that the process of designing is more important to one’s learning than any artifact produced during the process. This is because the design process presents a variety of problems to be solved over time. Students must critically think to engage with the material on a deeper level, which is where learning occurs, when solving these problems (Kafai & Resnick, 2012, Chapter 4). Kafai described that students executed the iterative design process over the course of six months. In doing so, students took ownership of the games that they produced, which increased their desire to learn and the efficiency of the absorption rate of knowledge. James Gee corroborates Kafai’s findings by describing what he terms as critical learning, “… [Critical Learning is] metalevel thinking, thinking about the [subject area in question] as a system and a designed space, and not just playing within [that space]. Such thinking can open up critique of [the subject area]. It can also lead to novel … strategies … never anticipated” (2003, Chapter 2, Section Back to Pikmin: Critical Learning, para. 14).
Games provide the constructionist learning environment that Seymour Papert and Yasmin B. Kafai describe. James Paul Gee (2005) echoes constructionist principles by stating that games produce meaningful experiences which engage players, hold their attention, and therefore players retain information communicated during play. Gee states that “… human beings are powerful pattern-recognizers … [Humans] think best when they reason on the basis of patterns they have picked up through their actual experiences in the world …” (2003, Chapter 1, para. 29). Celia Hodent corroborates this by stating “One of the most important [things to remember about teaching information] is to make the teaching meaningful and to repeat the teaching in different contexts and activities.” (2018, Chapter 2, Section 2.1.4, para. 1). Repetition of content in a variety of forms increases the likelihood that a person will absorb that information.

People demonstrate a desire to learn information when they feel that the information facilitates the accomplishment of their own goal(s). “Co-design means ownership, buy in, engaged participation.” (Gee, 2005). Players of games need agency over their environment to continue to engage with it. It is repeated engagement with the game environment that allows players to practice and apply concepts, which promotes formation of long-term memories. Gee (2005) explains that identity bestowed upon the player elicits continued involvement from players because this identity provides context for the information that is being communicated. Yasmin B. Kafai noted this effect in her studies, as students took on the persona of a game designer when tasked with designing a game using LOGO (Kafai & Resnick, 2012, Chapter 4).

Games can be thought of as a series of problems to be solved. Games can design these problems in a series which challenge the player to learn game mechanics and dynamics progressively (Gee, 2005). Games can be designed to employ a cyclical dynamic which repeats the communication of new information coupled with the application of prior information to solve
current problems. This dynamic promotes continued engagement and repeated application of knowledge, which promotes a deeper understanding of the material. Again, this is consistent with Yasmin B. Kafai’s findings (Kafai & Resnick, 2012, Chapter 4).

3. DESIGN RATIONALE

*Overview*

YG must teach a design language to its players so that they may create and communicate game element definitions. A portion of this study was devoted to examining approaches towards creating a common game design language to facilitate this end, such as Staffan Bjork’s and Jussi Holopainen’s (2004) work which adapted Christopher Alexander’s *A Pattern Language* (1977) to create a game design pattern language. Their work provides a common design language, but the patterns are not atomic. However, Aki Järvinen (2008) proposes a set of atomic game elements. Järvinen (2008) explains how his work may be used as “… tools for design” by designing games, via rapid prototyping, from these atomic elements (p. 26). Järvinen (2008) states that “… game mechanics present particular means in a particular game that bring to realization the implementation of a particular design pattern” (p. 381). YG employs some of Aki Järvinen’s atomic game elements and categorizations to players as their design language. YG’s design language affords players the materials and guidance necessary to complete a unique rapid game prototype each game session, while also providing an experience that practices and communicates game design fundamentals.
Some Fundamentals of Game Design

Bernard De Koven (2013) explains that what players truly want is to achieve a “purposeless state” in which they are “playing well” with each other. We interpret the “purposeless state” now as “flow”. Mihaly Csikszentmihalyi (2008) defines flow as “… optimal experience. … situations in which attention can be freely invested to achieve a person’s goals…” (p. 40). De Koven explains that flow is a symptom of the interaction between participants engaged in play (2013). Csikszentmihalyi (2008) corroborates De Koven’s finding when he states, “What each person seeks is to actualize her potential, and this task is made easier when others force us to do our best.” (p. 73). Therefore, one fundamental concept that YG needs to communicate is that games facilitate the flow state when they present challenging but attainable goals to players.

One process that game designers use to discover challenging goals and design mechanics around them is termed rapid prototyping (representing core game mechanics quickly, using a minimal amount of materials and resources, and then playtesting the prototype). Analog materials (“paper prototyping”) do not present a barrier to one’s technological skill level, which allows everyone on a design team to contribute to a design. Rapid prototyping is recommended by game designers to quickly identify problems in a game design and correct them, prior to spending large amounts of resources on a formal development process. The overall process is termed iteration (Fullerton, 2019, Chapter 7; Gibson, 2015, Chapter 9; Hiwiller, 2016, Chapter 2; Salen & Zimmerman, 2004, Chapter 2; Schell, 2014a, Chapter 8). YG must incorporate the process of iteration within its rhetoric, thereby teaching this process to players implicitly.
“Meaningful Play” is defined in *Rules of Play* as “… when the relationships between actions and outcomes in a game are both discernable and integrated into the larger context of the game. Creating meaningful play is the goal of successful game design” (Salen & Zimmerman, 2004, p. 34). Meaningful play can be achieved by designing games as systems of interacting components (Salen & Zimmerman, 2004, Chapter 3). Players will engage in meaningful play for prolonged periods if that play satisfies basic psychological needs (Rigby, Immersyve, Inc., 2009). A person’s basic needs are described in Self-Determination Theory as: autonomy - the freedom to choose how one performs an action, relatedness - knowing that one’s actions are relevant to others and vice versa, and competence - feeling that one’s actions were performed well (Ryan & Deci, 2000). YG must guide players to incorporate mechanics within their prototypes that facilitate behavioral dynamics consistent with Self-Determination Theory.

**YOUR GAME’s Design**

YG’s game design terminology is communicated to players explicitly on YG’s Design cards (See Appendix B: *YOUR GAME* Instruction Manual). Players, via YG’s gameplay, are practicing the iterative process of: conceptualize – implement – test – repeat, implicitly during gameplay, as players systematically create design problems for themselves to solve. Play continues until a win condition, relating to the prototype the players have authored, is completed to promote “positive feedback loops”, systems which decrease a possibility space (Salen & Zimmerman, 2004, p. 215).

A play session of YG begins without a predefined game design. YG’s game board is divided into two main sections: design space on the top half of the board and the player’s
prototype game space on the bottom half of the board (See Appendix B). The center of the board is used for YG’s two decks of cards (116 Design cards and 31 Alteration cards). Design cards consist of adaptations of Aki Järvinen’s universal game elements: component, mechanic, attribute and goal (2008, p.91). Design cards allow players to define the game elements of their prototype. Alteration cards, which allow players to change and iterate on existing game element definitions, are adaptations of Jesse Schell’s *Deck of Lens* (2014b).

YG includes abstract materials which are consistent with common rapid prototyping resources (See Appendix B). The chess, hexagonal, and score card boards, which may be used by players to prototype and playtest their game, are printed on the same overall 34” by 34” game board for convenience and to promote inspiration. Players are also informed that the prototyping space may be used with any materials they choose. Players are required to provide paper and pencil to record the collaboratively defined prototype game rules in a “Design Document” during play. The Design Document simulates a design team’s documentation during a development.
Figure 1: Typical Playtest of YOUR GAME – (Far Left) Instruction Manual, Generalized Playing Pieces, (Bottom Half of Image) Design Cards played within the Design Space, (Top Half of Image) Game Prototype and Playtest Area, (Right) Design Document

Mihaly Csikszentmihalyi (2007) states that “… creativity does not happen inside people’s heads, but in the interaction between a person’s thoughts and a sociocultural context. It is a systemic rather than an individual phenomenon” (p. 23). The creation of game elements and their systems of interaction form the core challenge of YG. Games facilitate flow and flow facilitates creativity, which playing YG requires. Therefore, YG is designed to be a turn based three to four player game. A multi-player atmosphere simulates the experience of working with a design team.

Each player starts the game with seven Design cards. This semi-randomized set of options constrains player options to facilitate creativity and helps to create different prototypes every game. Players are tasked with forming interpretations of general word prompts on mechanic and goal cards to define them. This is done to assure that different players using the same set of resources will produce different rule sets. Wildcards are included in the Design deck to afford the opportunity to create game mechanics and goals not within YG’s card set.

Players may play as many cards as they wish from their hand on their turn to define game elements. However, players normally do not maintain enough Design cards to define an entire system by themselves. This constraint simulates the individual limitations of each member of a design team and necessitates player collaboration, which simulates design team collaboration. Players draw additional Design cards when they define interactions of game components, which in turn form basic systems and facilitate meaningful play experiences.

A player may decide to playtest their prototype rather than using cards on their turn. Playtesting leads players to identify problems that may exist. However, players may only change prototype rules with Alteration cards. Players may only draw Alteration cards when they
complete goals they define within their prototype, which requires them to playtest their prototype. This procedure forces players to experience a rule set prior to altering it, which helps to prevent players from eliminating mechanics that create meaningful interaction.

Each basic need within Self-Determination Theory was deconstructed into two opposites: (Autonomy) Chaos and Control, (Relatedness) Competition and Collaboration, and (Competence) Cognitive and Corporeal. Each polar relates to a primary or secondary color in the color wheel. Each YG mechanic card is encoded with a general word prompt derived from Aki Järvinen’s list of 40 game mechanics, which Järvinen derived from his *100+ Games Project* (2008, p. 273-274). Each mechanic word prompt was categorized into one Self-Determination Theory polar. Each mechanic card is encoded with a color and a simple shape that affords players the opportunity to match mechanics in a specific order consistent with the color’s progression around the color wheel. Therefore, when players match mechanic cards in the color wheel progression, they are afforded the opportunity to create a game system which poses interactions representing all aspects of Self-Determination Theory.

4. STUDY METHODOLOGY

**Researcher Role**

The designer of YG is the researcher. The researcher was present during playtests, to observe and record participants’ interactions/reactions to YG as well as spectator interactions/reactions. The researcher provided participants with instructions (See Appendix B & C), on paper, describing how to play YG and the playtesting process, answering any questions as
needed, to minimize bias. The researcher administered and collected all questionnaires (See Appendix D through F) to/from participants. Participants interacted with YG’s materials however they wished. The researcher was responsible for coding all participant responses to determine if any learning had occurred during the playtest.

Context

YG is designed as a fun and casual social experience. Therefore, playtesting took place in social settings. Northeastern University’s Meserve Hall Game Science & Design resource room 168 served as a playtest venue. Northeastern University’s Curry Student Center served as a playtesting venue. The Northeastern University Association of Gaming Enthusiasts (NUAGE) gaming club event space (rm 201 and 202 Forsyth Hall) served as a playtesting venue. Participants of convenience (Northeastern University students and faculty) were solicited, as well as groups of tabletop gaming enthusiasts outside of Northeastern University’s campus, who participated at their home. All participants were adults eighteen years of age or older and informed that participation was unpaid, voluntary, and anonymous.

Materials

The researcher is the designer of YG and used their own tools and materials to produce most of YG components. The designer’s personal computer was used to create YG assets as well as all thesis proposals, questionnaires, results, analysis, and papers. This required the software: Adobe Photoshop, Adobe InDesign, MS Word, MS Excel. The game boards and cards were
prototyped by the designer via materials of convenience (paper and foam board). Printings of YG iterations were conducted with the designer’s personal printer as well as services provided by the Staples company. Playing pieces (pawns, checkers, tokens, etc…) were purchased from www.BoardGameMakers.com website.

Data Collection & Analysis

Three questionnaires (See Appendix D through F) were distributed on paper to twenty-four participants spanning seven groups, labeled Group A though Group G. Group A played YG over the course of January, February, and March a total of five separate times. Feedback from Group A was used to iterate on YG as well as participant questionnaires, during the development cycle. Only the responses for Group A’s first playtest questionnaires and final playtest questionnaires were used during data analysis, due to the variation of questionnaires. All other groups followed a standard playtest structure and responded to the same questionnaire used in Group A’s final playtest.

Participants responded to five questions prior to engaging with YG (See Appendix D), to evaluate their existing knowledge of game design practice and terminology. Participants were instructed to read YG instructions (See Appendix B), play YG while the researcher observed, and then answer two post-playtest questionnaires immediately following the play session. The Post-Playtest Questions questionnaire (See Appendix E) asked participants questions relating to YG, its instructions, and what participants liked/disliked about the experience. This questionnaire also asked questions relating to what participants liked/disliked about the prototype that they authored, as well as what problems, if any, they had identified with their prototype and how they corrected these problems. The second post-playtest questionnaire (See Appendix F) repeated the
same five questions that appeared on the pre-playtest questionnaire for comparison. The final questionnaire also contained two additional questions, for a total of seven questions, which asked participants what they felt they had learned from the experience and what cards they had played during the game and why. Participants engaged with YG for as long as they wished and were free to solicit others to participate. All participation was completely anonymous. Researcher observations, participant responses, within their playtesting group as well as between playtesting groups, and design documents created during playtesting were compared for analysis.

The researcher used Grounded Theory (Glaser & Strauss, 2017) to code all questionnaires and playtest documentation to assess what patterns emerged from the data. Open coding was performed on all questionnaire and design document artifacts collected from participants. Questionnaires were coded by the researcher using a priori code scheme, informed by game design literature. In-vivo codes were also generated during open coding. A combination of priori and in-vivo codes comprised the final codebook (See Appendix G), which was used to code all participant responses and design documents.

5. RESULTS

Overview

Eighteen out of twenty-four participants learned how to play YG. Responses from seven out of the twenty-four participants’ Pre and Post-Playtest Questionnaires (See Appendix D & F) suggest that these participants practiced application of some fundamentals of game design, though we cannot say the extent to which information was comprehended. This information includes: meaningful play - thinking of games as systems of interacting components,
terminology – as it is explicitly communicated in YG, autonomy – as it relates to player agency within a game. Only two participants, from this group of seven, demonstrated no prior knowledge of game design fundamentals and/or terminology.

Fourteen of the seventeen participants that did not indicate learning terminology and/or fundamentals had prior knowledge of three or more game design fundamentals and/or terminology. Responses from twenty-one participants on Post-Playtest Questions (See Appendix E) suggest that game fundamentals were applied by participants who indicated that no learning had taken place. These responses suggest that some fundamentals were discovered by participants that did not indicate learning had taken place.

The majority of participants reported enjoying YG. Figure 2 displays participants’ hand drawn interest curves (Schell, 2014a, Chapter 16), used to report their level of interest over the course of a playtest. An upward general trend is seen during a typical game session, with a few exceptions.

![Graph](image)

*Figure 2: Participant Interest Curve Responses on Post Playtest Questions, Question 4*
All groups demonstrated authoring prototypes which incorporated individual participants’ preexisting gameplay concepts. Five playtests were conducted with Group A over the course of January, February and March. Group A played every iteration of YG’s board and card designs. Group A’s questionnaire responses from the group’s first playtest and final questionnaire responses were collected for analysis. Groups B through G played YG once and were tasked with learning YG’s rules, completing a game, as well as answering all questionnaires in one session. The average length of a playtest ranged from three to five hours, for Group A, to one to two hours, in the case of Groups B through G.

**Group A: Playtests 1-3**

Group A was not successful in learning YG’s ruleset until their third playtest. Group A’s first playtest was conducted with YG’s cards and an assortment of game materials. YG’s original ruleset consisted of a short list of open-ended instructions printed on its cards such as, “Use component cards to define rules and game objects”. Participants reported that they were confused over how to play YG’s Design cards due to the ambiguity of the ruleset. A board was designed to communicate YG’s rules as well as provide commonly used prototyping materials (See Appendix A, *YOUR GAME* Board 1st Iteration). Design card images and text illustrating gameplay procedures, as well as a pre-defined game design, were printed on the board for player convenience. The printed game design starts the players from a functional but incomplete design to demonstrate YG’s rules. Group A successfully learned YGs ruleset using this iteration, citing the tutorial game illustration as the primary reason. Redesign of YG’s board proceeded, based on
Group A’s feedback, until its fourth iteration, adding more descriptive text (See Appendix A, 
YOUR GAME Board 4th Iteration).

**Group G**

All participant responses of Group G suggest learning of some fundamental of game design information, as evidenced by their responses on pre and post-playtest questionnaires, including: terminology and/or thinking of games as systems of interacting components. When we take Group G’s responses to “Post-Playtest Questions” into account, participants demonstrated writing rules and defining game components relating to the following game design fundamentals: systems, self-determination theory, and flow. Participants also wrote responses that indicated critical thinking.

Group G was unable to learn YG’s ruleset using YG’s fourth board iteration. Group G collaborated with one another to form their own unique interpretation of YG’s ruleset. It was observed that participants read the ruleset printed on the board up to a point and then began playing the game with incomplete information. This resulted in Group G not understanding how to draw Alteration cards, which allow players to correct design flaws. Group G noted that they identified the problem with their prototype, a win condition that was “too easy”, but did not know how to correct the flaw. Group G indicated that they were thinking of game design in terms of systems of interacting elements, using statements such as, “The specific components and mechanics were interesting to see broken down”. This response uses terminology explicitly communicated on YG’s cards. The participants stated that the game session served as a team collaboration exercise.
**Group F**

Group F consisted of professional game designers who demonstrated complete understanding of game design fundamentals on pre-playtest questionnaires, as expected. Participants used the fifth iteration of YG’s game board (See Appendix A, YOUR GAME Board 5th Iteration). The participants stopped reading the game instructions at a point similar to the point at which Group G stopped reading the instructions. The participants constructed their own interpretation of YG’s ruleset. They then played YG until realizing that they did not know how to draw cards correctly. This realization prompted the participants to re-read instructions until they located the ruleset regarding how and when to draw cards. Group F ended their playtest before completing their game prototype, citing the length of the playtest as the cause.

**Comparison of Groups F & G**

Group F participants exhibited behavior similar to Group G, in that participants collaborated to identify and correct what they perceived as “problems” with their prototypes, which were identified by participants when attempting to play their game prototype. Both Group G and Group F noted that YG’s gameplay results in the creation of unexpected gameplay mechanics, due to YG’s design, as a positive creative experience fostered by player autonomy. Feedback from Groups G and F confirmed that participant expectation is for an instruction manual. Both groups cited that having the ruleset printed on the game board posed physical problems significant enough to prevent players from reading the rules. For example: Participants
noted that they had to stand up to be able to read the rules on the board. Confirmation of participant feedback prompted the authoring of an instructional manual and a redesign of the game board which removed the instructional text sections (See Appendix A, YOUR GAME Board 8th Iteration).

**Group A: Playtest 4**

Group A’s fourth playtest was conducted using a twenty-page instruction manual. The primary purpose of this playtest was to test the instruction manual. The first ten pages of the manual maintain a step by step tutorial with images similar to YG’s previous board iterations, with the exception that the tutorial instructs participants to author their own rules and game element definitions. Participants completed the tutorial, read all text within the manual, and demonstrated an understanding of YG’s ruleset. The result is significant due to the large quantity of text contained within the manual as opposed to the quantity of text maintained on the game board, which is far less. Groups E, D and C exhibited similar behavior during their playtests.

**Group D**

Participants of Group D suggest learning some fundamental of game design information, as evidenced by their responses on pre and post-playtest questionnaires, including: terminology and/or thinking of games as systems of interacting components, though we cannot say to what extent. When we take Group D’s responses on the “Post-Playtest Questions” questionnaire into
account, participants demonstrated applying the following game design fundamentals: systems, self-determination theory. Participants also wrote responses that indicated critical thinking.

Group D’s playtest results were similar to previous playtests. Participants collaborated while writing the ruleset for their prototype, noting that they were “super engaged to the game” due to “using your brain to think.” Participants noted multiple times that they enjoyed discussing rules to “find the flaw” in them. The playtest drew spectators. However, Group D also noted that their play session was “long” and that they “lost interest along the way.”

**Group E**

A comparison of Group E’s responses to pre and post questionnaires do not indicate that any game design fundamentals were learned. Responses to the Post-Playtest Questions questionnaire demonstrate applying self-determination theory principles to their prototype as well as critical thinking. Group E’s playtest yielded similar results to previous playtests. Participants noted that they enjoyed a collaborative dynamic to correct issues with their prototype and the autonomy to create their own rules, which resulted in discovery of new game dynamics. Group E’s playtest drew spectators. Participants noted that they enjoyed being surprised by how their prototype developed over time and by its competitive dynamic.

**Group C**

A comparison of Group C’s responses to pre and post questionnaires do not indicate that any game design fundamentals were learned. Responses on the Post-Playtest Questions
questionnaire demonstrate applying self-determination theory principles to their prototype as well as critical thinking. These responses also demonstrate that Group C intentionally avoided creating systems of interacting components. Multiple participants in Group C noted that YG is reminiscent of 1000 Blank White Cards. Group C approached YG with the intent of authoring as many “degenerate strategies” (strategy and tactics which leverage game mechanics to one’s advantage) as possible. However, this led to similar results seen in previous playtests. Participants ultimately came to collaborate with one another to correct issues in their prototype which prevented the game from progressing and concluding. Group C participants noted that their rulesets resulted in “meaningless play” but that this was their intention. Participants enjoyed observing all the various ways that their prototype ruleset created flaws in their game. Group C’s playtest drew spectators, which participants then incorporated into their prototype as a component. This addition subverted participant expectations of gameplay dynamics.

Comparison of Groups C, D & E

Individual participants within Groups C, D, and E all reported that the length of the playtest became a problem, as players noted that a loss of interest could be associated with time. It was advised that a redesign of the twenty-page instructional manual for brevity would benefit subsequent playtests. A new instruction manual (See Appendix B) was designed and tested with Groups B and A. The redesigned manual consisted of four pages and decreased the amount of time players required to learn YG’s process from thirty minutes to fifteen and showed a marked improvement in the overall time required for a playtest.
Participants of Groups C, D, and E all noted a subversion of expectations relating to their authored rulesets as a positive. Participants from all groups continually built off other participants’ rule and component definitions in unexpected ways. Multiple participants made responses similar to “they did not know what was going to happen next” and that they “were excited to see what other participants would do”. All participants defined rules and components based off of their desired play dynamics and/or previous game knowledge.

**Group B**

Group B’s responses on pre and post questionnaires suggest that one participant learned about player autonomy as it relates to player agency. Responses on the Post Playtest Questions questionnaire show participants’ application of aspects of self-determination theory, critical thinking, and constructing games as systems of interacting components to facilitate meaningful play. Group B’s playtest yielded similar results to previous playtests without participants referring to a loss of interest. Group B’s responses to questionnaires contrasted with most other groups, in that Group B participants requested *more* instructional text. The four-page manual used with Group B did not include a tutorial. Participants *requested* that a tutorial be added.

Participants collaborated and competed in various ways. The group formed two teams of two who leveraged the degenerate strategies that they had authored to gain “design advantage” over their perceived opponents. The group’s prototype became a combination of both team’s desired play dynamics. Participants then noted that they enjoyed discovering this system of interaction. Group B’s playtest was significantly different than other groups in that participants played a large amount of mechanic cards. Participants noted that taking advantage of YG’s
mechanic card matching system, which allows players to draw more Design cards, served as a significant source of motivation.

The result was a very complex prototype with many non-interactive parts. Participants noted that this complexity was not needed and meaningless. Participants stated that they wished to draw more and more Design cards based on previous card game experience. They stated that in other card games having cards equates to having more options. They were concerned that if they did not have enough cards they would be unable to win the game.

**Group A: Playtest 5**

Group A demonstrated writing rules and defining game components consistent with applying aspects of self-determination theory and creating systems of interacting components to create meaningful play dynamics. Group A demonstrated a retention of terminology and critical thinking during playtesting. Group A authored rules and component interactions that is consistent with participants’ previous gameplay experiences and desired dynamics. Group A’s final playtest confirmed that the four-page instruction manual decreases the amount of time that players require to learn YG’s process. Group A’s final prototype is an example of a system of interacting components which gives players multiple avenues for victory. Participants also demonstrated dynamics similar to other playtests. Namely: collaborating to correct prototype flaws, creating systems of interaction as they relate to meaningful play, the need to create optimal challenges within their prototype, and the discovery of gameplay dynamics which lead to a subversion of player expectations.
6. DISCUSSION

It was important that players be capable of understanding and executing YG instructions. If players can play YG they will learn all explicit and implicit information while discovering a variety of game design fundamentals. Players demonstrated storing YG’s information into their long-term memory. Long-term memory consists of two main components, as stated by cognitive psychologist Celia Hodent: explicit and implicit memory. Explicit memory relates to information a human can report, such as YG’s terminology. Implicit memory is procedural information which is performed, such as the exploratory rapid prototyping game design process practiced during a session of YG. Both types suffer from memory lapses, which is to say that humans forget information at an alarming rate if that information is not processed “deeply” and then applied in a “meaningful” way (Hodent, 2018, Chapter 4, Section 4.1.4). This phenomenon was encountered during YG’s development. It was observed that participants who engaged with the iterations of YG which maintained its instructions on the game board itself “forgot” what they had read only minutes prior. This problem was compounded due to the non-traditional nature of YG’s structure.

Information is only retained in our short-term memory for a small amount of time (less than one minute) and we can only retain about seven items total (Miller, 1956). Working memory requires more resources as it must coordinate executive functions (those processes which allow mental control and self-regulation) and cognitive tasks (such as a player contemplating how to use a card in YG). Working memory uses two systems relating to a human’s retention of visual information as well as phonological. These systems allow for the processing of both types of information simultaneously, but this does place increased load on a
human’s working memory overall. If learning an unfamiliar task (such as how to play YG) taxes one system significantly (say, the phonological system which is used while reading instructions) the quality of learning as well as the retention of that information will be impacted negatively. However, if the task involved with learning the information requires prolonged engagement and thought about the material (such as a tutorial system) retention of that information will be positively impacted (Hodent, 2018, Chapter 4, Sections 4.1.1-4.1.3). This was the phenomenon encountered when YG instructions were removed from the board and placed in an instruction manual. The instruction manual meets player expectations of how board games communicate their rule sets and the tutorial pages contained within the twenty-page version of YG instructions allowed players to engage with small amounts of information for prolonged periods of time. The four-page instruction manual decreased the amount of time that players had to maintain information in short-term memory prior to applying it in a game session, which promoted retention. It should also be noted that standard eight by eleven-inch pieces of paper do not exceed a person’s visual field to the extent that a thirty-four inch by thirty-four inch sized game board does. The physical size of the board exceeding a person’s visual field may have also played a significant detrimental role in participants’ learning of YG instructions.

Another factor that may have impacted players’ learning of YG’s rulesets was the reading level of YG’s instructions. A general analysis of YG’s instructions was conducted using the Flesch-Kincaid Grade Level Formula (0.39(number of Words / number of Sentences) + 11.1(number of Syllables / number of Words) + 15.59) (Kincaid, Fishburne, Rogers & Chissom, 1975). Each version of YG’s rules, those maintained on boards as well as those maintained in manuals, had an average reading level of 8. However, while analyzing each set of instructions, it was noted that individual section reading levels varied wildly in the case of instructions
maintained on boards. This extreme variation in reading level may be responsible in part for players’ confusion with certain rules.

The YG assets participants engaged with are prototypes. These assets are not optimal, and their development continues. However, despite asset flaws, participants enjoyed YG’s experience and indicated a desire to play YG again. In many cases participants indicated that they wished to play YG with different people. This may be because participants feel they are learning about one another while playing.

Players encode their own gaming cultural beliefs into the rules that they author. Roger Caillois (1961) states that “… what is expressed in play is no different from what is expressed in culture.” (p. 64). The work done by the members of Values at Play corroborates this (Belman, Nissenbaum, Flanagan & Diamond, 2011). James Gee states that human’s problem-solving behavior reflects their previous experiences and knowledge (2003, Chapter 4, para. 2-3). Players of YG create design challenges for the other players as they embed their own rhetoric within their rulesets. This rhetoric provides design constraints which, Gregory Gargarian in The Art of Design argues, players need to facilitate creativity (as cited in Kafai & Resnick, 2012, p. 125). This corroborates Mihalyi Csikszentmihalyi’s findings, that creativity is a systemic of a group interaction (2007). This also suggests that groups of players maintaining a diversity of thought would author interesting and unique play experiences in YG as differing systems are combined in a variety of ways, provided members are willing to abide by YG’s ruleset. Prototyping with YG in this way may be of interest to game designers. This also suggests a possible use of YG as a research tool for measuring a specific demographic’s game preferences. The visual representations of rulesets, that YG creates, may serve as an analytical tool for game design analysis.
Some participants who were observed to correctly learn and demonstrate YG’s ruleset responded on their questionnaires that they had not learned anything (See Appendix E question 12 & Appendix F question 7). This phenomenon may be described by Gregory Gargarian in *The Art of Design* when he states that “Experts are often unaware of the skills they have learned; they simply use them.” (as cited in Kafai & Resnick, 2012, p. 125). James Gee corroborates this when he states that, “… learners are not always overtly aware of the fact that they are ‘learning,’ how much they are learning, or how difficult it is.” (2003, Chapter 5, Section Learning in a Subdomain of The Full Domain, para. 9). Participants that executed YG’s process were not told that the intention of the study was to teach them an exploratory rapid prototyping game design process. Some instructional text on some game board designs and manuals used language which stated that players would be conducting the process of iteration. Participants who stated, on their pre-playtest questionnaire responses, that they were already familiar with the iterative prototyping process wrote responses suggesting that they learned other material and not the exploratory process in YG. However, these players also learned YG’s ruleset, completed a play session, and may have even commented on YG as a fun creative and collaborative approach to the creative process, implying that they have not experienced anything similar, but still replied that they had not learned anything.

The questionnaires used in this study pose general questions. The problem of the researcher was to devise questions which test implicit knowledge, which participants may or may not be able to verbalize, while not leading the participant to a conclusion. Most participants did not change their answers on pre-questionnaires to post-questionnaires. This suggests that the questions themselves are not specific enough to assess a person’s knowledge and comprehension of retained explicit and implicit memory. Playing YG should have altered participant responses
in the cases where participants had no prior knowledge of game design, but it did not. However, the Post-Playtest Questions questionnaire elicited responses which suggest that those participants with no prior game design knowledge did discover and apply game design fundamentals. Even so, none of the questionnaire questions properly assess people’s comprehension of explicit and implicit knowledge. This serves as a significant drawback to the study.

7. CONCLUSION

It is clear that the questionnaires used in this study form one shortcoming of it, as they do not properly assess a person’s explicit or implicit comprehension of game design. The responses obtained from participants cannot be used to demonstrate whether any learning did or did not occur. However, the overall responses on all questionnaires obtained from participants do suggest that learning is taking place on some level, the extent of which we cannot measure unless the study is replicated using proven assessment tools. Most participants of the study reported having no game design experience yet demonstrated a knowledge of game design terminology and process. This fact added too many confounding variables, which raise further questions. However, participants were observed and did demonstrate in their responses that they were critically thinking about the effectiveness of the artifacts that they produced. This suggests that they were engaged in the act of problem solving, which suggests that they are learning something.

We know that most participants learned how to play YG because they could not possibly have prior knowledge of how to play and were witnessed executing YG’s process. YG’s process is an exploratory rapid prototyping game design process. Therefore, participants learned this
process. Participants who did not demonstrate prior knowledge of industry terminology demonstrated retention of YG’s terminology, which is industry terminology. Most participants enjoyed their experience which fostered their engagement and retention of the rapid prototyping process and terminology.

YG produces unique rapid prototypes with every game session, regardless of who is playing. YG accomplishes this by forcing players to build upon the artifacts produced by other players. This process fosters collaboration between players. Players engage in this process which, via its design, produces problems to solve. This forces players to critically think and discuss solutions for a duration of time about the problem space to correct it. The solutions that players create are infused with their own personal beliefs and conceptions of game dynamics, which are based on prior gameplay experiences.

8. FUTURE WORK

This study has been limited by the fact that YG was authored and designed over a relatively short amount of time, which was also used to conduct the study, by the researcher, who is not a graphic designer. YG’s design requires additional iterations to clarify language, text, and assets. YG’s instructions will be refined to communicate a concise set of instructions using consistent language of reading level seven. This would reduce the amount of time necessary for players to learn how to play. YG’s cards will be re-designed to make text more legible, which requires patterns to be re-designed and/or removed entirely from the cards (See Appendix B, Page 3). YG’s board will be designed with artwork illustrating gameplay procedures to facilitate play. However, despite YG’s asset flaws, most players found the experience enjoyable, which
suggests that YG’s effectiveness only increases with refinement. This also suggests YG is a viable retail product. Further playtesting of refined assets will be conducted to measure YG’s effectiveness as a constructionist learning tool and to assess its viability as a retail product.

This study will be replicated using a more complete version of YG’s assets, as well as refined and verified questionnaires that properly assess participant knowledge. A replication of this study will screen participants for prior game design knowledge and terminology, only allowing those with no prior knowledge into the study. This will be done to efficiently collect a higher quality of data.
REFERENCES

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APPENDIX A: YOUR GAME Board & Card Iterations

YOUR GAME Board 1st Iteration
YOUR GAME Board 2nd Iteration

GAME MATERIALS

THE GAME

GENERAL INSTRUCTIONS:

DIRECT CARDS:

Game Elements:
- Components: a board, play cards, game pieces, and a deck of cards
- Objective: to collect the most cards
- Movement: players move their pieces across the board
- Scores: players score by collecting specific cards

Instructions:
1. Place the DIRECT CARDS on the table as shown in the diagram.
2. Shuffle the DIRECT CARDS and divide them among the players.
3. Place the game board on the table and arrange the play cards as shown.
4. Each player takes turns drawing cards from the deck and placing them on their hand.
5. The first player to collect all the DIRECT CARDS wins the game.
YOUR GAME Board 4th Iteration

TUTORIAL INSTRUCTIONS

GAME MATERIALS

- Player Tokens
- Counters
- Dice
- Cards

QUICK GUIDE

1. Gather the materials on the table.
2. Each player draws a starting hand of cards.
3. The first player to reach the finish line wins.

DESIGN DECKS

THE GAME SPACE

1. Roll the dice to determine the starting point.
2. Players take turns moving their pieces.

CONTROL CATEGORIES

- Resource Cards
- Action Cards
- Goal Cards

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YOUR GAME Board 8th Iteration
APPENDIX B : YOUR GAME Instruction Manual

YOUR GAME : A GAME-CREATION-GAME

INTRODUCTION
The goal of YOUR GAME is to create a game using iteration. Players play cards to define: rules, game pieces, boards, & interactions of Game Elements. Definitions are anything players can imagine.
Players use 2 decks of cards to create their game: Design & Alteration. Design cards allow players to add Game Elements. Alteration cards allow players to change &/or remove Game Elements.
Everything players define is written in the Design Document. Each player must maintain the Design Document for the length of the game.

REMEMBER: If it is not written in the Design Document … IT IS NOT IN THE GAME !!!

RULES of PLAY
• All rules apply to all players
• Players take turns in a Clockwise rotation
• On their turn, players may do either but NOT BOTH of:
  Play as many cards as they wish — OR — Play their game
  Players Draw 1 Design Card when they do any of the following on their turn
• Discard 2 cards - Define a Mechanic - “Match” Mechanic colors
  Players Draw their choice of 1 Alteration card or 1 Design card when they complete any Sub-Goal in their game
• Players may not use the cards that they draw until their following turn
• Play continues until a player “WINS” their game
  (completes any defined WIN Condition)

GAME MATERIALS

5 Colors
10 Each

6 Colors
10 Each

6 Colors
10 Each

X 2

DESIGN DECK : 116 Game Element Cards

Example Card

Unique Identifier

Game Element Type

Description

Card Instructions

Game Elements:

COMPONENT

ATTRIBUTE

MECHANIC

GOAL

Card Title

Card Instructions

(Alteration Cards are Discarded, Face Up, after Play)

Example Card

PROTOTYPING BOARD

Play COMPONENTs to a Controller

Controllers Define who (Player or Game) can use a Component

Design and Alteration Deck Placement

SETUP
1. Shuffle the Design & Alteration Decks. Place them on the board.
2. Each Player Draws 7 Design Cards.
   (Players may look at their cards)
3. Elect a Player to maintain the Design Document
   (That Player Requires Paper & Pencil)
4. The Oldest Player goes first.

Play GOALS to the WIN COND area to define WIN Conditions

Play MECHANICS to the Interactions area to Define how COMPONENTs interact

Play GOALS to the Interactions Area to Define SUB-Goals

You may use any of the included Game Boards as the Game Space - OR - You may use anything else you wish
Define the Game Space

1. Play any COMPONENT card to the Game Space Controller.
2. Choose a board provided or anything you wish.
3. Write the COMPONENT number and your selection in the Design Document.

Define what Players Use

(such as a Checker):
1. Play any COMPONENT card to the Player Controller.
2. Place one of the pieces you have chosen on the card.
3. (Optional) State only 1 thing the COMPONENT can do (such as "move").

DEFINING COMPONENT & ATTRIBUTE CARDS

Define a MECHANIC

(How COMPONENTS Interact)
1. Play any MECHANIC card to the Interactions area.
2. Place the COMPONENT Type that performs the MECHANIC on the "Top" of the MECHANIC card.
3. Place the COMPONENT effected by the MECHANIC on the "Bottom" of the MECHANIC card.
4. State what the COMPONENTs "do" to each other (Players must use the Word Prompt on the MECHANIC card to define the MECHANIC).
5. Write the MECHANIC's definition in the Design Document.

Define a WIN Condition

1. Play any GOAL card to the WIN COND Area.
2. State the Condition that satisfies the WIN Condition. (Players must use the Word Prompt on the GOAL in the Condition's definition).
3. Write the WIN Condition definition in the Design Document.

NOTE: Design Cards do not allow players to add and/or modify rules of YOUR GAME: A Game Creation Game.

Define a SUB-GOAL

1. Play any GOAL card to the Interactions Area.
2. State the Condition that satisfies the SUB-GOAL (Players must use the Word Prompt on the GOAL in the Condition's definition).

Add a Rule or Procedure

(Rule - such as: "Players move once per turn.");
Game Procedure - such as: "To Setup the Game, Players...")
1. Play any COMPONENT card to the Game Controller.
2. State the Rule or the Steps of the Procedure.
3. Write the COMPONENT number and the Rule or Procedure in the Design Document.

Add ATTRIBUTEs to any Game Element

1. Place an ATTRIBUTE on top of any Game Element.
2. State the additional behavior (such as "jump") or trait (such as "price") you wish the element to have.
3. Write the ATTRIBUTE number and the element's behavior/trait in the Design Document.
ALTERATION CARDS

Problem Solving
You may Alter the Definition of any 1 Game Element and/or all of its Attributes however you wish.
(You may not remove any Game Element. Definitions may be changed but not removed.
For Example: You may not modify any/all definitions to be “nothing”)

Use Alteration cards to change rules in the Design Document.

Alteration cards do not allow players to change the rules of YOUR GAME: A Game-Creation-Game.
(with the exception of the Action Alteration card)

Players follow the instructions on the Alteration card when it is played and then discard the card into the Alteration card discard pile, face up.

Players may draw 1 Alteration card (OR 1 Design Card) when they complete any defined SUB-GOAL.

EXAMPLE PLAY 1
The Player Draws 1 Design Card for defining the CONTROL Mechanic (Defines Pawn Interaction).

EXAMPLE PLAY 2
The Player Draws 3 Design Cards for: Defining the Compound Mechanic of DEFEND & JUMP between the Pawn and the 8 Sided Die. Matching DEFEND to CONTROL, Matching JUMP to DEFEND.

EXAMPLE PLAY 3
The Player Draws 4 Design Cards for: Defining the Compound Mechanic of “GUSS - CONTRACT - CHOOSE” between the 8 Sided Die and Pawns, Matching GUSS to JUMP, Matching CONTRACT to GUSS, Matching CHOOSE to CONTRACT.

MATCH COLORS EXEMPLE
More “Blizz-Blazz”

**QUESTION:** “I am running out of cards! How do I draw more cards?”
**Answer:** Please see “Rules of Play” on Page 1 (Top Right Corner)

**QUESTION:** “I don’t like the Rules of YOUR GAME: A Game-Creation-Game. Can I change them?”
**Answer:** There is an Alteration card titled ‘Action’ that allows you to alter the rules of YOUR GAME.

**QUESTION:** “What do WILDCARDS do?”
**Answer:** WILDCARDS can be substituted for any Game Element (COMPONENT, ATTRIBUTE, MECHANIC, GOAL).

**QUESTION:** “The game we are making doesn’t account for a certain situation (e.g. what happens when a player rolls a 20 but the game board doesn’t allow them to move their piece 20 spaces?) What do we do?”
**Answer:** “The Design Document must be amended to account for the situation. The player that is currently taking their turn may play a card to implement a solution immediately, but must ‘take back’ their gameplay turn (reverse all the decisions that they made while playing the game being created). If the player (for whatever reason) cannot correct the issue, discuss the problem with all players. If everyone unanimously agrees on the same solution then change the Design Document to reflect everyone’s solution. Otherwise, the current player passes their turn to the next player.”

**QUESTION:** “WILDCARDS do not have any ‘word prompts’ on them. How do I use them to define a MECHANIC or a GOAL?”
**Answer:** “Since a ‘word prompt’ does not exist, you may define a MECHANIC or GOAL however you wish.”

**QUESTION:** “Do WILDCARDS defined as MECHANICs ‘match’ colors with other MECHANICs?”
**Answer:** “Yes. WILDCARDS defined as MECHANICs ‘match’ any other MECHANICs.

**QUESTION:** “When I ‘match’ a MECHANIC to another MECHANIC, do I have to use the COMPONENT at the ‘top’ or ‘bottom’ of that card?”
**Answer:** “Yes. A ‘Matched’ MECHANIC’s definition must incorporate one of the COMPONENTs referenced on the MECHANIC.

**QUESTION:** “Can I use a COMPONENT to define an entire game as part of the game we are making?”
**Answer:** “Yes. COMPONENTs can be used to define entire sets of things, like: decks of cards, sets of dice, pieces from other games, or entire games that you want to use with your own.

**QUESTION:** “Can I make a rule (using a COMPONENT card) that just says ‘I WIN’?”
**Answer:** “No. Players cannot make rules that only apply to themselves. All rules created apply to all players (not to mention that rules such as these generally make a game that is not fun).
APPENDIX C: Playtest Questionnaire Cover Page

YOUR GAME : Questionnaires

Play Session # _____

Participant # _____

NOTE: Participation is Voluntary

You are free to leave at any time.

Your participation is greatly appreciated.

Feel free to ask any questions.

: INSTRUCTIONS :

Answer the 5 Pre-Playtest Questions prior to beginning the game session.

Answer the remaining two questionnaires after the game session has completed.

Thank you for your participation.
APPENDIX D: Pre-Playtest Questionnaire

Instructions:

Your participation is highly appreciated. Participation is anonymous and voluntary.

You do not have to answer any question(s) if you do not wish to.

You are free to leave the Playtest at any time.

If you feel a question is confusing (or you would like more information on a question[s] or these instructions) please ask for assistance.

Please print “NA” if you feel a question is “Not Applicable” to you specifically.

Please Print the Participant Number given to you in the space provided: ______________

Questions:

Please Print responses to the following:

1. What is your background in Game Design?
   a. Examples: You have a formal degree or you are pursuing a degree in Game Design. Or, you have made games in the past as: a hobby, part of a class, or professionally.
2. Please provide a summary (to the best of your ability) of a process used to design games in general. (If you do not have any knowledge of a game design process write down your best guess.)

3. What must all games have at a minimum?
   a. Please note why each is needed.
4. Define what a game is using only one word. You may list multiple words (definitions) if you would like. If you do list multiple words, please circle the word that you feel provides the “best” definition of “game”.

5. How many Rules should a game have?
APPENDIX E: Post-Playtest Questions

: INSTRUCTIONS :

Thank you for playing *Your Game*. Your participation is highly appreciated. Please take as much time as you like answering the following questions. Your answers will be used to improve the design of *Your Game*.

Reminder: Participation is Voluntary. You may leave the study at any time.

Please Print the Participant Number given to you in the space provided ________.

: QUESTIONS :

Please reflect on your experience and Print answers to the following:

1. What did you find Fun about the game? Why?

2. What did you like (if anything) about the “game-creation-game”? Why?
3. What did you dislike (if anything) about the “game-creation-game”? Why?

4. Please draw an “Interest Curve” that reflects your interest level at the start of and during the playtest. An Interest Level of “1” indicates “Little or No Interest”. An Interest Level of “10” indicates “High Amount of Interest”.

   a. Please label any/all points on the curve that reflect a change in the direction of your interest curve and note why your interest in the game changed at that point.
5. What “game-creation-game” instructions were confusing?
   a. How would you rephrase the instruction(s) to eliminate confusion?

6. What about the “game-creation-game” do you like the most? Why?
7. What do you like about the game prototype that you and the other players created during the “game-creation-game”? Why?

8. What do you dislike (if anything) about the game that you created? Why?
9. What problems did you identify with the game that you and the other players created during the playtest?

10. How did you correct the problems that were identified with the game that you and the other players created?
11. (If given the opportunity) Would you like to use the “game-creation-game” to continue to develop/design the game prototype you created and/or other prototypes? Why or Why not?

12. What do you feel you learned by playing the “game-creation-game”?
APPENDIX F: Post-Playtest Questionnaire

: Instructions :
Your participation is highly appreciated. Participation is anonymous and voluntary.
You do not have to answer any question(s) if you do not wish to.
You are free to leave the Playtest at any time.

If you feel a question is confusing (or you would like more information on a question[s] or these instructions) please ask for assistance.

Please print “NA” if you feel a question is “Not Applicable” to you specifically.

Please Print the Participant Number given to you in the space provided: ______________

: Questions :
Please Print responses to the following:

1. What is your background in Game Design?
   a. Examples: You have a formal degree or you are pursuing a degree in Game Design. Or, you have made games in the past as: a hobby, part of a class, or professionally.
2. Please provide a summary (to the best of your ability) of a process used to design games in general. (If you do not have any knowledge of a game design process write down your best guess.)

3. What must all games have at a minimum?
   a. Please note why each is needed.
4. Define what a game is using only one word. You may list multiple words (definitions) if you would like. If you do list multiple words, please circle the word that you feel provides the “best” definition of “game”.

5. How many Rules should a game have?
6. What cards did you use/play during the game session?
   
   a. Why did you choose to use those particular cards?

7. What (if anything) do you feel you have learned by playing the “game-creation-game”? 

APPENDIX G: YOUR GAME: Codebook

**PRIORI Codes**

FLOW – as in, the need for ‘optimal challenge’ in game design

SIMPLICITY – as in, the benefit of concise rules that lead to emergent gameplay

RELATEDNESS – as in, the benefit of player interaction in game design

COMPETENCE – as in, the benefit of challenge in game design

AUTONOMY – as in, the benefit of allowing players as much freedom as possible

SYSTEMS – as in, a way to think about game designs: a group of interacting components

TERMINOLOGY – evidence of using the design language explicitly communicated

*Used on Pre-Playtest Questionnaire Only – to denote pre-existing knowledge*

PRIOR KNOWLEDGE – evidence that the participant is already cognizant of a fundamental

**EMERGENT Codes**

PROBLEM SOLVING – evidence of identifying errors in one’s design

COLLABORATION – evidence that the participants actively help one another write rules

GOAL – evidence that the participant is aware of the benefits of clearly defined goals

CREATIVITIY – evidence that the participant noted this type of fun as a benefit
SUBVERSION (of EXPECTATIONS) – the participant noted discovery of dynamics that they did not expect as a benefit to their game design

PROCESS – the participant demonstrates that they understand and/or perform YOUR GAME’s ruleset, which constitute an Iterative Exploratory Rapid Prototyping Design Process

CULTURE – evidence that prior knowledge/personally desired game rhetoric influences the participant’s authored rules/game object definitions