

Early Game Design Rehearsal with Paper Prototyping

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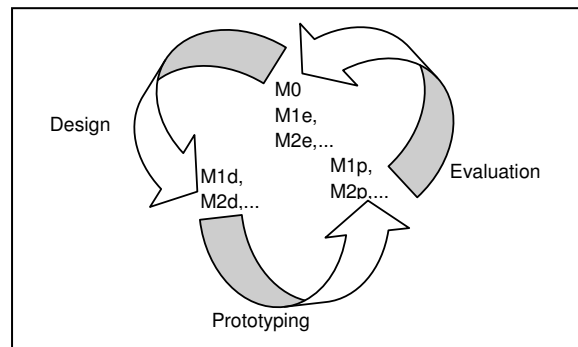


Figure 1: The “Recycler” Approach to Game Design.

Abstract

In this paper, we present the lessons learned while using paper prototyping and game play rehearsal for experience evaluation, in order to inform game design in its early stages. We present a general prototyping framework and report on two design cases where these techniques enabled fast paced collaborative and creative dialogs, enabled a variable degree of design inspections and validations, and enabled a focus on the game experience beyond the game artifacts supporting the concept.

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1. Introduction

Game Design is a complex subject that remains mostly an art form requiring creative experimentation, usually in a complex interactive context, filled with uncertainty. Game designers collect and process influences and motives, generate ideas and try them out by building game demos or prototypes.

Evaluating games implies a prior understanding of the ontology underlying such an evaluation. To see games as interactive objects may lead us to focus on the functional characteristics or the interactive qualities of the object and its fitness with intended actions programs or player actions. To see games as emergent experiences leads to an focus on the subject-object relationships and the subject-subject relationships that are enabled by the game object as mediator or intermediary. To see games as performance leads yet to another perspective as does an ontological perspective of games as messages, text, narrative, simulation, etc.

Thus, game play evaluation cannot be understood or anticipated from an analysis of a game design specification or even from an instantiation of the object alone, but only as an emergent interactive context, when in active relationship with players.

Building functional game demos can be quite costly as it involves not only technical capabilities but the several artistic capabilities to produce a valid aesthetic proposal, reasonably true to the artists intentions, and not to hinder player expectations. A significant challenge for game design is thus how to perform early evaluations of the game play experience, in order to inform the design activity before significant resources are committed to developing a demo.

In this paper we present a discussion of two game design cases where paper prototyping and game rehearsal techniques were used to perform evaluations during early design stages. A focus on the game play experience was preferred over usability or functional considerations and a set of lessons learned are presented.

2. Related Work

2.1 Game Usability

The notion of game usability pertains to the game object properties facilitating or hindering its use. Much like with any interactive product, videogames are especially sensitive to the quality of the interaction design, thus it is only natural that the issue of game usability sprung and gained relevance in the HCI research community. Yet, the concept of usability cannot subsume the entire set of qualities that constitute or contribute to the game play experience.

As an example of the state of the art in game evaluation, Isbister and Shaffer (2008) assembled a collection of contributions and interviews on the general topic of game usability that present a diverse

view of methods that can be put to work, yet no proposal seems adequate for performing evaluations of game play early in the design process. Most of the approaches focus on eliciting user responses during playtesting while experiencing the actual game implementation.

2.2 Evaluating Game Play Experience

The notion of game play as experience implies a concern for the way the player perceives and relates to the experience of playing the game, beyond the mediator objects of that experience.

The notion of Experience has been an HCI/CHI hot topic for the last decade and still remains rather exploratory. Some interesting approaches stray quite far from the traditional notion of usability evaluations, such as those that can be encountered in the essay collection by Blythe et al (2008) under the theme of funology.

Several publications by de Kort, IJsselstein, Gajadhar and Poels work among others also attempt a brother perspective on game experience evaluation, e.g. considering interactions in social contexts, the role of place, or encoding individual behavior and emotions, still these proposals seem to remain mostly dependent on actual experimentation with a game instance (or through post experimentation analysis).

Game Design textbooks such as Brathwaite & Schreiber (2009), Fullerton (2008) and Schell (2008) all refer to the importance of game evaluation. The first specifically opt for an initial low tech, more physical strategy for learning game design technique. Schell writes on playtesting that generally requires a working prototype, but also focus game balancing aspects that we think could be evaluated both conceptually and experimentally.

With the quest to inform game design in its early stages we want to focus our attention on the game play experience evaluation by considering the aspects in which it can be studied independent of specific characteristics of the final mediator object. Thus game usability will only be a concern worthy of attention when under a stabilized game design it becomes possible to have at least a paper prototype that represents the intended interactivity with the game. In spite all the work on experience evaluation little reflects on early evaluation. A collection of articles on game experience evaluation edited by Regina Bernhaupt, includes only one chapter (Brown 2010) briefly mentions focus paper prototyping in industry.

Validating game design before there is an actual functional game is thus our prime concern here. Since to understand the experience enabled through game play it is necessary to consider the subjective relationship the player establishes with the game, we begun experimenting with early stage game rehearsal exercises, supported on paper prototyping and in the

context of learning game design competencies. The learning results from two of those experiences will be reported in the next sections, after a quick introduction to methodological framework under which they have been considered.

3. The Methodological Framework

3.1 Problem Statement

From previous discussion it becomes clear that conventional one-man-show design approaches based on individual foresight, and with the production of extensive design documents that try to convey a game specification to a team of developers are prone to failure and There is a clear need for an approach to early game play evaluation that can enable a highly iterative design with a fast paced rhythm and early evaluation of the emergent game play experience. Only under those circumstances can designers:

- a) engage in participatory or open innovative game sketches, involving users in the creative process;
- b) perform efficient collective design jam sessions;
- c) get immediate feedback to quickly redirect and explore further possibilities.

To reason about the techniques that can be used to achieve design results and to evaluate the game experience under these contexts we will need to consider a reasonably neutral conjecture about a generic game design and development approach. From such a generic approach we will work out the requirements for specific techniques to perform activities to intended goals and milestones. In our cases we worked with a typical prototyping cycle which we begun calling “the recycler approach”, and that will be presented in the next section.

3.2 Doing Design Research

A generic prototyping cycle will involve as a minimal set of goals and activities three basic stages that tend to be addressed circularly until a desired results is achieved (in the case the process becomes convergent) or resources are exhausted.

- a) Design stage – initially a conception stage, further on tending towards a specification – it has as main goal to generate or propose options and make design decisions as to what fits with the design intention;
- b) Prototyping stage – focused on the construction of artifacts – its main goal is to produce media enabling the performance of the game;
- c) Evaluation stage – focused on getting feedback about the qualities of relationship the player establishes with or through he the game-as-object – typically based on an appreciation of the actual or simulated performance of the game.

The process departs from Milestone M0 for the first iteration taking as input a design intention or

motivation. And the first design stage run is concerned with establishing a clear departing concept, while not a definitive one, nor a complete sketch of the game. Possibly, initial design will just be concerned with proposing a possible game goal, some conditions or polarizing elements of the game mechanics and a set of possible actions for each role to take.

3.3 Paper Prototyping Games

The designers would then move to the construction of media that could be used to represent basic elements within the game, enough to enable the game enactment. A first try can usually be made cost-effectively with pencil and paper mockups. A discussion of the role of sketching while designing experiences can be found in (Buxton 2007). While attempting to paper prototype the game at least two main perspectives can be taken that will lead to radically different outcomes. The designers can focus their attention on enabling actual game play albeit not resembling the actual game object as it is anticipated, or they may chose to create a mockup of how you would interact with the game as software and thus draw the interface, illustrating the several contexts, interaction paths and outcomes. A prognosis can be made that, while the later approach would probably lead to a focus on the usability of game object, the former goes more directly to what is at stake from the point of view of the game design: to enable an evaluation of the game-as-experience emerging and not of the media support itself.

3.4 Game Play Rehearsal

The evaluation stage may start by being a rehearsal of the game play, based on the paper mockups. Players interpret their roles according to the elements already in the game concept and with the help of mockup elements. Using their imagination, they supplement missing elements or sketch their own. In effect it can quickly turn into an extension of the paper prototyping stage to the point new or missing elements get sketched and prototyped on-the-fly, while rehearsing is going on. A collaborative sense-making and exploratory activity involving designers and players arises. The critical aspect of game play rehearsal seems to be the focus on getting more and valuable information about the perceptions, interpretations, attitudes, and other relationships players may establish with the game concept, pulling it into several different directions. An interesting possible change in the designer's role in the game rehearsal context is towards being less of police and more of an arbiter or translator of player's intentions before the game.

Successive runs of the cycle can be performed moving from contingent pencil and paper media onto more permanent digital media instantiations and more formal game design structures, such as role definitions, actions and outcomes, scenarios, rules and constraints, algorithms. With each step in the direction of the digital realm, effort is committed to the current understanding of the game context and more and more

difficult it becomes to make changes to the game. Thus, as it is common with low-res and high-resolution prototyping practitioners are advised to resist a depth-first approach that frequently leads to too much detail too soon, on some parts while keeping uncertainty about others. As a general policy, we would start by proposing a notion of game design to be pursued as an organic growth process.

As more detailed and functional game demos are built, game play evaluation would naturally move from the early stage game rehearsal technique into the more traditional forms of playtesting with observation and data collection, interviews, briefings and data analysis.

4. Experience Reports

4.1 The Silk Road Experience

A set of seven Humanities and Digital Media and five Computer Science students doing a Game Design and Development post-graduation course get an assignment: to collaboratively design a digital game about the Silk Road phenomenon that could be used as a support for learning about historical and cultural aspect of the Silk Road concept. In effect, there was not one but several geographical and point-to-point commercial routes that together enabled the emergent phenomena we now know and collectively refer to as the Silk Road.

Historians and Anthropologists generally agree on the great impact the Silk Road played not only as an economic phenomena underlying many imperial, military and common day-to-day motivations, but beyond that, as a cultural exchange phenomena between Eastern and Western cultures, involving belief systems and social organization. Multiple information resources are provided along the way and the team has several people capable of doing research on the theme. The challenge to the students involved producing the design concept and demo of the game in 10 weeks. Over the next sections we will present a personal perspective through a narrative account of the design case.

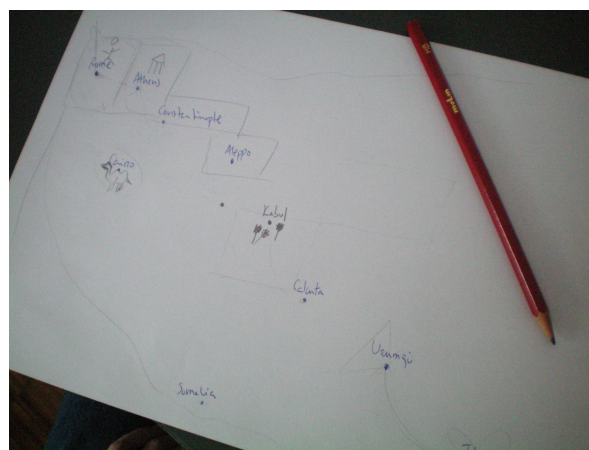


Figure 2. Initial planning steps: deciding on key places



Figure 3. Setting the stage with a map and some initial props

Interpreting the Design Goal

The team split in two groups and begin producing two design statements as a strategy for brainstorming. Two game ideas were generated. One on the genre of graphical adventures, more narrative in style, mostly focused around a journey where a hero would engage in travel across the Silk Road in search for his father, a Merchant that got lost along the way. In the process he would come in contact with historical characters and witness significant events in the History of the region. The second proposal focused on a merchant simulation, much similar to a variant on popular titles such as the Civilization series where the goal for player revolved around achieving control of the Silk Road by controlling several important cities along the way. When questioned, the students assumed that none of the initial proposals were particularly central to the goal of learning about the Silk Road, and in effect any learning outcomes would seem a casual side effect. As such in merging the best of both ideas they would try to refocus on the essence of the concept they want to communicate and come up with a new design.

How We Attempted Design

A new 3 hour session took place one week later where all students worked together to achieve a common design concept. After an intense period of disagreement and misunderstanding that lasted over 2 hours without teacher intervention, the team could not find a way to merge the two ideas. They seemed irreconcilable and several students had difficulties even understanding what their colleagues were proposing. Simple untrained observation would reveal that there were four more active or outspoken students that polarized team activity around a debate the merits of demerits of each idea, with little interest or ability to listen and translate the others' perspective and incorporate it with his/her proposal. No gender issues seemed to surface here, as participation spanned all participants in intensity. Yet there seemed to be some personality and also some cultural issues involved in the manner and intensity in which students from different nationalities engaged in defense of their viewpoints.

After two hours they were pushed by the teacher into thinking more focused on the core concept and if they were being true to the initially proposed design motive or intention, and how. Over the next hour they tried to come up with an integrative solution that one of students tried to sketch as a sort of visual art concept where actual movements of player characters across a web of Silk Road paths would be displayed as pattern traces on a mural or tapestry, as they carried goods, artifacts and information around, thus generating a picture that would be evocative of the flow of knowledge and cultural exchange across geographical space. This idea resonated with almost everyone within the team, generating immediate adherence and relief among the team. Yet, several holes were unexplained, the most evident of which was what each player was trying to achieve and why?

At this point, time was running out and a design document template was set up, with sections organized using wiki pages so that the students could collaboratively edit them. Subsets of the team were given specific tasks to fill in the design document proposal: some would work on the initial narrative giving the player a motive; others would work out detailed player actions and effects and a way to calculate or simulate outcomes; others would research significant art resources (paintings, sculptures, tapestries, sound collections, etc) to be used as inspiration to produce concept art compatible with the team and learning goal. Over the course of two weeks the team blocked with little or no production or dialog either face-to-face, email or through the forum and wiki that was setup as communication support. Some pointers to resources were given but no selection effort or intent was given or explained, a rough sketch of player actions would fit with the adventure genre, but it lacked coherence and purpose. Proposals for the narrative included such curious things as time-travel space-time accidents while delivering pizza.

During the next week a specialist in theme was asked to deliver a talk where he introduced the students to many research resources available as Google Earth layers they could explore to gain a better understanding of the political, military, religious and cultural



Figure 4. Drafting the first encounters



Figure 5. Moving along the Silk Route

movements over the region across the centuries and how they appeared interrelated. After this talk, some students produced a selection of geographical points of interest, mostly cities that were main passages on some of the route.

The Unlocking Role of Paper Prototyping

After three weeks of low productivity, the teacher proposed a three hour session of paper prototyping, explaining how he hoped it could be used to support game rehearsal and help them make some design decisions. Some students engage reluctantly with a seemingly non-serious and childish exercise especially when they see the set of colored pencils and paper. Several try to excuse themselves as not having adequate drawing abilities to participate.

The teacher assures them it does not matter, as long as they draw something recognizable or write what it is. After approximately 15 minutes of some initial uncertainty, the teacher leads the way making inquires and drawing himself what was being proposed. They decided on a starting point for the journey and on an initial encounter that sets the stage and motive for the hero to begin a journey, students follow the lead and a set of drawings portraying the cityscape and some characters begin to emerge, along with some objects the characters will be carrying.

How We Rehearsed Game Play

Characters were quickly assigned to “player-designers” and several encounters and movements between cities are discussed along with the plausible outcomes, risks and rewards. Along the way, scenarios get sketched with increasing intentionality as the students begin to master they role in storytelling and dialog. E.g. buildings, doors, streets prepare the stage for specific player actions and sense-making. Over the course of two hours students, couched by the teacher draft a network of 10 possible locations with events, assets and narrative or action dependencies that would take place between Bagdad and Beijing, considering alternative routes. Re-energized by the exercise, the team takes a break and makes a commitment to produce a detailed account of the emergent design from this session on the wiki pages.



Figure 6. More advanced stage of prototyping and rehearsal

Over the next two hour session students learned to use more formal languages, in the case they learned to use Petri Nets to specify networks of action dependencies by specifying transitions and tokens that carried specific meanings within the game, e.g. the player will have to reach a location and carry a token (specific object) to enable an action possibility. These diagrams are easily incorporated in the game design specification.

Over the course of this exercise it is noticeable that the initial design of the game while entering the paper prototyping is not especially determinant of the Paper Prototyping outcome. In effect much of the opposite happens as the designers engage as players in a collective rehearsal and end up doing an activity that merges quick design, sketching and evaluation, as if they were cycling through the 3 stages of the Recycle model at rhythm of five minute cycles. In fact, due to the collective nature of their dialog, and citing from memory as there is no textual documentation that would enable a detailed speech analysis, this was a production process where several dialogs intertwined.

The Recycle, as framework of activity types and their relationship is a lens to try to understand what is going on in this case, but it is also plausible that, since we did not enforce any specific synchronicity other than the specific location or game event under debate, in their own minds, each of the workshop participants could have been involved in her own design-prototyping-evaluation quick cycle, occasionally reverting to a mode of public speech, contributing and re-synchronizing with the rest of team’s ongoing context and dialog.

4.1 The Sagres Experience

The Sagres case involved a collaboration between two people on the design of a game inspired in the age of maritime discoveries that tried to promote a behavior of systematic discovery and documentation, e.g. by mapping the terrain, as part of a strategy to gain control or establish commerce over specific fictional or actual geographies.

The Way of Design Documents

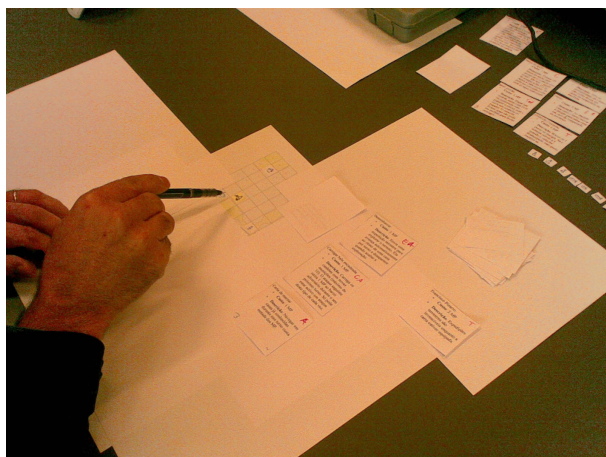


Figure 7. Beginning a Sagres game with obfuscated map and complete card deck

Most of the design proposals were made in written documented form. Several iterations were made on the basis of 2 page document where game goals, elements and roles, player actions and constraints, were proposed and discussed in abstract before any game trial.

When a 20 page document was ready, there was clear idea of the game design mechanics, and several ideas or expectations on how the game would attract new players by promoting and exploring networking among friends. Yet, no clear idea of how the game would look like or how it would be played from a desirable web interface.

At this point it became critical to start drawing how the game would look like and how it would be played in practice. We knew the game would involve a significant amount of visual elements and that the mapping theme would probably require a visual representation akin to actual maps for an easier interpretation, or at least for an easier transition from the point of view of players acquired knowledge and culture. The proposed design involved composing and using card decks during game play which needed a quick way to select cards from a range of possibilities, under a budget, as well as be able to identify and use them during game play. Other elements included

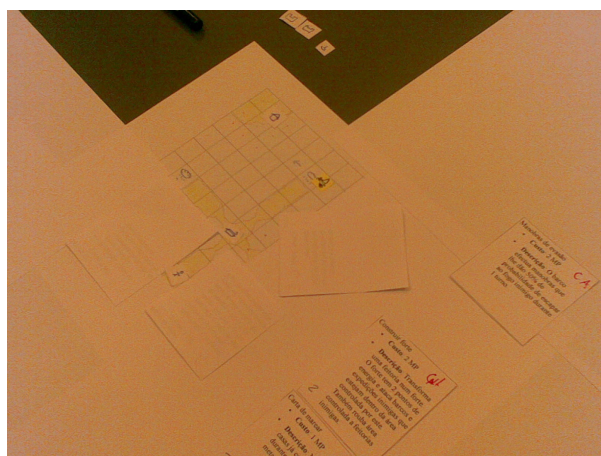


Figure 8. Middle of the game, mapping the game scenario

representations of significant aspects for navigation such as winds and currents, ports or docking spots, as well as other player's representations.

Prototyping Just For Rehearsal Purposes

With an inventory of game elements, we made three complete sets of player decks and other playing objects by drawing them on paper and a map for running a trial. All elements were specifically produced to run the trial after the game design was stabilized. So, in the process of producing these elements not significant design decisions were made.

Sagres Rehearsal

The rehearsal of Sagres was tricky. A fundamental aspect of the game play is that the player enter the game stage or map in obscurity, seeing only what's around her port and ships. All other areas are obscured and need to be mapped before the player can engage in a more strategic approach to game play. As such a game master or manager had to play the role of the actual software, calculating and managing the presentation of the game for each of the participants individually. This implied accepting or refusing each players actions in turn, managing turn-taking, and updating every map based on the action outcomes.

Additionally, according to the proposed game design each player had to be kept unaware of the others' movements when they were not in the vicinity of his "pieces", which occasionally caused some awkward hide and seek maneuvers, as the game master run around updating game views as board mockups on paper. It proved manageable for the case at hand which involved less than 10 moving elements, but this can become a practical limitation when the play space is being represented by dozens of animated elements. In such a case, animation should probably be left outside the scope of the rehearsal, focusing only on the critical aspects of the representation that interfere more directly with strategy formulation. Questions of attention management and focus as supported or interfered by aesthetics would consequently also be left out of the game play evaluation.

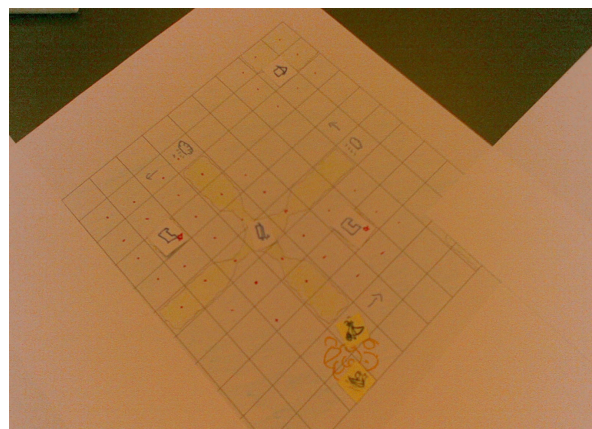


Figure 9. End of the game in final sea battle, red dots signal areas under control

During rehearsal players engaged fully and strategically with the game concept, reporting no difficulty special difficulty abstracting from the actual paper representation of the game. Several specific tactics could be identified and commented upon, such as exploiting terrain accidents and configuration to trap opponents' movements, using or being affected by wind and currents to move faster or slower in a specific direction. As an example of the effectiveness of the rehearsal approach, design sensitivity was noticeable when it became apparent that specific card choices would hinder the ability to engage a more lively game play: a player would have to choose a significant amount of ammunition cards even if not planning to win the game by pursuing battle. This was revealed at the last turn as player in apparent supremacy is surprised by a miss-interpretation of the canon loading card and is defeated at the last firing round.

4. Lessons Learned

The experiences with Paper Prototyping and Game Rehearsal in the context of designing original games here presented reveal two extreme cases in what could be understood as a methodological continuum. On one hand, paper prototyping is produced just in time, as the design is being collectively originated, and immediately becomes part of the groups discourse and subject to criticism and reformulation, as game play rehearsal is also taking place enabling immediate sense-making and criticism. On the other, paper prototyping results from a planned activity with a clearly defined and delimited timing and has a validation purpose: to support post-design game play rehearsal. In the first case design, prototyping and rehearsal almost appear simultaneous. In the second case all phases are clearly delimited, and any design implications for the second round follow the evaluation and analysis of the data gathered during game play.

In both cases Game Rehearsal proved to be a potentially valuable technique for early stage game design evaluation. Depending on the actual game design Game Rehearsal can be focused of the actual experience of playing the game, and enable an appreciation of its qualities, timing, complexity and interest, beyond the actual media supporting game play. Arguably, that experience will be influenced by the aesthetics of the media being used, in this case the paper mockups and the ongoing speech framework or dialog supporting the experiment. Yet, apart from the specific sensitivity some game have on being able to represent animation or live action flow, we think games that involve decision making and social interaction can rehearsed with paper mockups.

In any case, the value of early game play rehearsal seems to rely achieving timely and reliable information that:

- a) Enables fast paced collaborative and creative dialogs;
- b) Permits avoiding effort allocation in building game demos with design flaws that could have been caught.
- c) Enables an appreciation of the actual game play experience, beyond the game object

As a final lesson, when specific conditions hinder the practical exploration of these techniques, such as due to design complexity or dependency on the aesthetics of specific interaction devices, the practitioner needs to ponder and focus only on what the techniques might help experiment instead of blindly persist in trying to fit these techniques with an unfit context.

4. Conclusion

In this paper we briefly discussed the importance of early game play experience evaluation to inform game design activities. We presented a general prototyping framework and reported on two design cases where early game rehearsal was used with paper prototyping to support design decisions. Main lessons learned point towards a valuable use of the proposed techniques as part of enabling fast paced collaborative creative dialogs, enabling a variable degree of design inspections and validations and a focus on the game experience beyond the game artifacts supporting the concept.

References

- BERNHaupt, R., (Ed.) *Evaluating User Experience in Games*, Springer, 2010.
- BLYTHE, M. E., MONK, A. F., OVERBEEKE, K., WRIGHT, P. (Eds). *Funology*. Springer, 2003.
- BRATHWAITE, B, AND SCHREIBER, I., *Challenges for Game Designers – non-digital exercises for video game designers*, Charles River Media, 2009.
- BROWN, E., *the life and Tools of a Games Designer* in BERNHaupt, R., (Ed.) *Evaluating User Experience in Games*, Springer, 2010.
- BUXTON, B., *Sketching User Experiences*, Elsevier, 2007.
- DESUVIRE, H., CAPLAN, M., AND TOGHT, J. A. *Using Heuristics to Evaluate the Playability of Games*. *Proceedings of the SIGCHI conference on Human factors in computing systems (CHI 2004)*, (Vienna, Austria). 1509-1512, 2004.
- FULLERTON, T., *Game Design Workshop – A Playcentric Approach to Creating Innovative Games*, Morgan Kaufman, 2008.
- ISBISTER, K., SCHAFFER, N., (Eds). *Game Usability*, Morgan Kaufman, 2008.
- SHELL, J., *The Art of Game Design – A Book of Lenses*, Morgan Kaufman, 2008.