

# A Playful Learning Exercise: Kashmir Crisis

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**Abstract.** This paper summarises the development and evaluation of a digital board game on the “Kashmir Crisis” in 2019. It is based on a card-driven board-game design of one of the authors, with the concept of “games as journalism” as one underlying design principle. As such, this is a serious game with the aim of providing information on the context of recent political events in Kashmir. In this paper we focus on the design, implementation, and evaluation of a multi-platform, digital instance of this game. The evaluation results of using the game show significantly increased engagement and slightly better learning effectiveness, compared to a control group using standard learning techniques.

**Keywords:** Serious Games · Playful Learning · Game Design

## 1 Introduction

Playful learning is a powerful approach for engaging learners in the learning process, to convey information, to critically evaluate facts and to engage in discussions. In this sense, serious games, i.e. games with a concrete learning objective, can be seen as a form of “journalism”. The work summarised in this paper focuses on our notion as “games as journalism” [12] in building on a board-game design that explicitly focuses on modelling a concrete diplomatic and military situation. Specifically, we develop a digital implementation for this board game and evaluate its effectiveness as a learning tool.

The concrete board-game is “Kashmir Crisis” [13]. It is a card-driven game with context based in the 2019 border conflict in the Kashmir region between India and Pakistan. Its main themes are the simulation of the various elements that make up modern conflict, including military and political components. The game’s basis in real-world events makes it suitable for evaluating wargames as learning tools, allowing learning about the conflict using the game to be compared to more traditional learning methods.

In order to evaluate this effectiveness, two user groups are tested on their learning about the conflict: one group uses traditional learning tools in the form of reading, while the second group learns exclusively using the game. Both groups then answer the same questionnaire, which includes both a subjective self-report and a quantitative learning test, in order to directly compare the results of each group. These two groups are separate, in order to prevent knowledge crossover between learning methods.

## 2 Background

**Serious Games:** Serious games are characterised as being “used for purposes other than mere entertainment” [11], or “games whose first purpose was not mere entertainment” [1]. Benjamin Sawyer, the founder of ‘The Serious Game Initiative’ in 2002, classified the field as “[...] developers, researchers and industrial people, who are looking at ways to use video games and video game technologies outside entertainment” [1].

A literature survey about the effectiveness of serious games in [2] showed a largely positive or neutral impact on learning effectiveness. The survey, “Educational Games – Are They Worth The Effort?” [2], made a meta-analysis of several studies into the effectiveness of serious games in education, focusing on empirical studies made from 2002 to 2012, in the frame of the EduGameLab in formal school contexts. The studies showed “a fair amount of evidence that serious games have a positive effect on learning” [2], with 29 of the studies showing positive results and 7 showing neutral results. On the other hand, only 2 showed negative results, with the final 2 giving unclear results.

**Conflict Simulation:** One of the key areas studied through serious games is conflict simulation: studying the nature of conflict and its ramifications. This includes the modelling of conflicts to study strengths and weaknesses, as well as gaining insight into the motives and key dynamics in various types of conflict, typically with the goal of conflict resolution in mind.

PAXSims [5] is an online blog focused on the use of games for learning about conflict and peace-building. It discusses many of the topics surrounding conflict simulation and serious games, with the aim of promoting humanitarian and peace development. Another prominent resource on the topic is Philip Sabin’s *Simulating War* [10], a book which discusses the uses of simulating conflict, as well as outlining the various ways in which this knowledge can be used.

Within the area of conflict simulation there are a number of more specific related topics, including war studies, peace studies and wargaming. War and peace studies are more academic topics, focusing on understanding the complexities of war and its prevention respectively, rather than the strategy and logistics of a conflict itself. These topics are often studied in the context of history, with the *Handbook of War Studies II* [7] describing a connection with political science and international relations.

Wargaming is less academically focused than war and peace studies, having two main connotations: an entertainment hobby consisting of simulating either historical or fictional battles, as well as an official training tool for the military to improve combat strategy and tactics, for example the UK MOD Defence *Wargaming Handbook* [14]. The book, “Zones of Control” [6] discusses both of these definitions and their histories, and Peter Perla’s “The Art of Wargaming” [8] also discusses wargaming as a whole, including its history, connotations and its usefulness as part of military training.

As an official training tool, wargaming is a similar, more specific area within conflict simulation, focusing on the gaming aspect of conflict simulation, with the

same aim of training and learning. As stated in Peter Perla’s “Why Wargaming Works”, wargaming has been a longstanding “tool used for military training, education and research” [9], with varied success based on the specific circumstances. Many of wargaming’s benefits come from its ability to integrate learning experiences with a narrative: wargames are most effective when linked with real-world context, allowing players to make connections more easily [9]. As opposed to other forms of media, the interactive element of wargames make players engage “in ways more similar to acting in the real world” [9], namely with greater emotional and intellectual engagement, improving the learning benefit.

### 3 Design of the Board-game “Kashmir Crisis”

#### 3.1 Motivation and Background

The word “*news-game*” is a fairly recent invention, first used in 2003 by the video game designer and academic researcher Gonzalo Frasca, then much more widely used when Ian Bogost, Simon Ferrari and Bobby Schweizer published “Newsgames: Journalism at Play” in 2011 [3]. Bogost wrote about how video-games, produced by journalists and distributed through the Internet, could fulfil the basic objectives of journalism: to inform, educate, criticise and persuade.

While the success of video-games in this role was limited, analogue games that perform the same function constitute a substantial body of work that not only predates video-games themselves, it continues today. Analogue news-games offer concerned and motivated individual citizens a platform to interpret the world around them, and to share that interpretation. *Kashmir Crisis* is a rather simple demonstration of this, born of the fortunate meeting of a wargame designer (Brian Train) and an experienced photo-journalist (Nathaniel Brunt), after the former’s presentation about “Games as Journalism”, given at the annual Connections-UK conference on professional wargaming [12].

#### 3.2 Game Design and Mechanics

The original game design looked abstractly at the 30 year insurgency in Kashmir, but soon it became clear that a focus on events subsequent to the February 2019 suicide bomber attack at Pulwama would make for a more engaging topic. The analogue result, Kashmir Crisis, is a simple card-based game for two players that takes about 15 minutes to play, using a deck of ordinary playing cards and a short set of rules (see [13] for rules).

The main concept and mechanic of the game involves players choosing cards representing resources and playing them on different “fronts” during play (see the game board in Figure 1). This abstractly shows the scale of effort a country is investing in obtaining a favourable result in that sphere of activity. For example, the *Diplomatic Front* concerns a country’s efforts to get international support and assistance for its viewpoint or to condemn its adversary’s, or to pursue legal and economic threats and harassment against the enemy. “*Information*” relates

to message dominance and ability to control the narrative on the conflict. Finally, the “*Military Front*” is a more straightforward application of covert and overt military forces and assistance to pursue insurgent/counter-insurgent warfare, or to prepare for large-scale conventional conflict. This three-front game design concept has been used in another attempt at an analogue news-game, Ukrainian Crisis — designed during the very weekend in March 2014 that the inhabitants of the Crimea voted in a referendum, and a Russian overt invasion seemed likely.

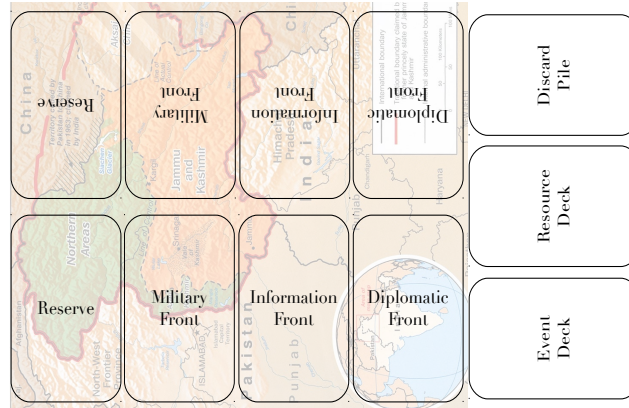


Fig. 1: Kashmir Crisis Analogue Game Board [13]

Resource cards (standard playing cards) are dealt to players based on their colour (red to one side and black to the other) and the card number dictates its point value in winning a front. Eight cards are dealt each turn, so the number of cards each player receives each turn is not necessarily equal.

The core game loop is made up of a number of turns, each with a number of stages within them:

1. Event Card Draw and Resolution
2. Resource Card Draw
3. Play of Resource Cards
4. Scoring

Turns are continually played until the joker is drawn. At this point, the deck is reshuffled and play begins again, where a second joker ends the game. Each player has a victory point tracker and if, by the end of the game, one player has a significant enough lead over the other (11 or more), that player wins.

The event card drawn each turn denotes the primary front and any special effects on the turn. This, therefore, affects *scoring*: if the total value of cards played to both players’ fronts this turn is 40 or more, the players’ scores on the primary front are compared, and the winning player gains victory points

equal to the difference. The other 2 fronts are then resolved: the loser’s cards are permanently removed from the game and they lose 1 victory point. If the total card values don’t reach 40, the primary front is resolved the same way.

A full description of the game rules can be found at the game’s webpage [13].

## 4 A Digital Version of “Kashmir Crisis”

**Overview:** A primary aspect of this project was the multi-platform focus for the implementation, which therefore factored into the choice of development environment and framework/engine. This major decision came down to two main choices: using a pre-made (board) game platform to create a game implementation on (e.g. Vassal Engine or Tabletop Simulator), or create the implementation from scratch using a game engine or framework (e.g. Unity). As the game was intended to be released on Android, a multi-platform or Android-based development environment was needed, leading to the decision to use **LibGDX**.

LibGDX is a Java-based, Apache 2 licensed open source game development framework designed with cross-platform development in mind: it supports all major platforms in mobile, desktop and web environments. It is relatively lightweight, having no core engine, instead providing flexible libraries suited to the development of small-scale projects such as this. A practical advantage of using Java and developing for Android is the good support and ample documentation for these technologies.

**Interface:** As shown in Figure 2 below, the game interface has a number of key components mirroring those found in the original board game:

- Score counter (top)
- 8 card fronts, in which each player can play their cards (centre)
- 3 decks which cards are either drawn from or discarded to (centre right)
- The game log, which shows a history of game events and moves (right)
- Player hand, which is used to play cards to the board (bottom)

There are two main types of cards in Kashmir crisis, which have been abstracted from the original game.

The resource (number) card is played by players to fronts, with the number denoting the strength of the card. The event (text) card shows and explains the event for the current turn, including its effects and any flavour text.

**Design of the AI:** The game contains a simple AI opponent for players to play against, based on a minimax-style heuristic search. Instead of generating a search tree and best choice move simultaneously, these functions are split into two parts: first the full move tree is generated, with each state holding its heuristic score, and then all of the terminal states are searched through to find the best set of moves to reach that end state. The AI has the general overall structure:

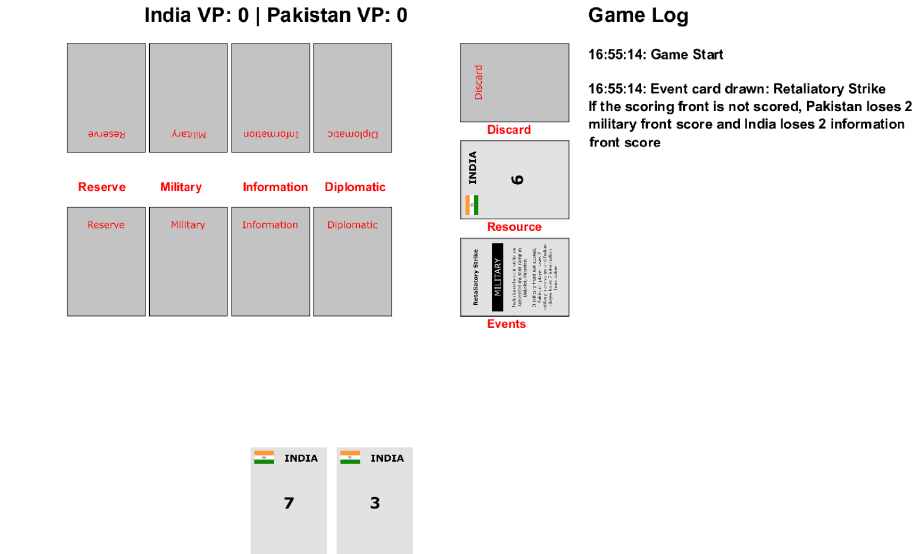


Fig. 2: Main (Digital) Game Interface

1. A tree of possible moves from the current board state is generated, during each child state generation, its heuristic score is calculated.
2. The terminal states from this tree are selected.
3. The terminal state with the highest heuristic score from this list is selected.
4. The AI plays its cards so as to reach this end state.

The *heuristic calculation* (scoring) can be tuned by biasing the variables used to calculate it. These are:

- The difference in number of cards in each of the scoring fronts.
- The difference in number of cards in reserve.
- The player scores at the end of the previous turn.

## 5 Evaluation

The goal of the user evaluation was to compare the learning effectiveness and experience in using a digital game as opposed to more traditional methods.

**Experimental Setup:** The experiment was designed so participants would answer the same set of questions having either played the game (game-testing group) or having read a couple of articles about the 2019 border conflict (control group). After studying respective materials for a short time, participants

would answer the learning experiences and knowledge test. This provided a direct comparison of learning effectiveness between groups, without knowledge crossover between groups. Additionally, the game-testing group answered questionnaires about the usability of the game specifically, including a standard SUS questionnaire.

In total 10 participants were recruited, where participants for the game group were chosen for higher technical capability. Participants were a selection of adults with a wide range of ages, including both students and non-students. 6 of these participants learned using the game and 4 learned using traditional methods, with 7 of these participants giving feedback on the usability of the game.

### 5.1 Usability

For the game testing group, the usability evaluation was composed of 2 parts: a qualitative survey of participants’ perceived usability of the game, as well as a standard SUS survey, to provide a standardised, reliable quantitative metric of perceived usability [4]. The majority of the surveys about the game’s usability were done in a likert-format, with available responses including: very poor, poor, average, good and very good.

**Game Feedback:** All of the participants testing the game used the desktop PC version of the game. Results from the experiences portion of the survey in Figure 3a showed a generally weak positive response to the functionality and usability of the game, with more negative responses for the visual aspects of the game and the understanding of the game’s mechanics. This reflects the fairly basic nature of the graphical assets provided by LibGDX, compared to larger game engines, and limited familiarity of the testers with modern, card-driven games. The response to the AI component of the game was universally perceived as ‘good’, which indicates that the AI is a plausible opponent in this game.

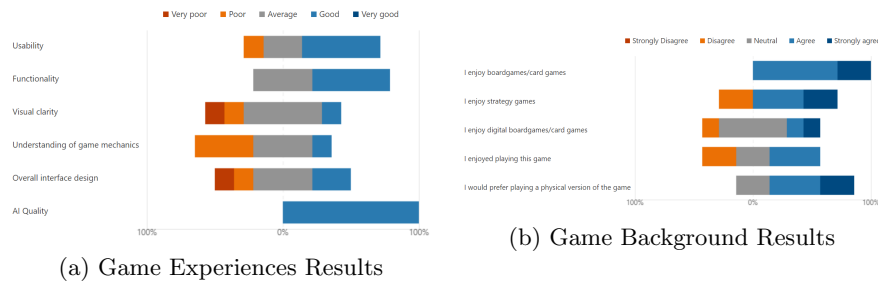


Fig. 3: Game Group Results

The second part of this survey asked participants background questions about their enjoyment of each category of game that Kashmir Crisis falls under. Responses to this in Figure 3b showed that participants generally enjoyed games in

the surrounding genres, with a more neutral response to digital card games and this game in particular. Most likely the testers are more familiar with designed-for-digital games, as opposed to digital versions of existing (card-driven) games.

The final sections of the survey asked for an overall score and any further comments on the game. The average score given was 6/10, and the comments made were focused on UI elements, such as the game buttons and event log.

**SUS Results:** The SUS results for usability in Figure 4 were found to be generally positive and in line with the responses to the game feedback survey. Responses indicated that the game wasn't too complex or difficult to use, but would require more knowledge to effectively use than was given, with a low confidence in the first use of the game. Although this is expected with a strategy game, this could have been alleviated with a more in-depth tutorial system.

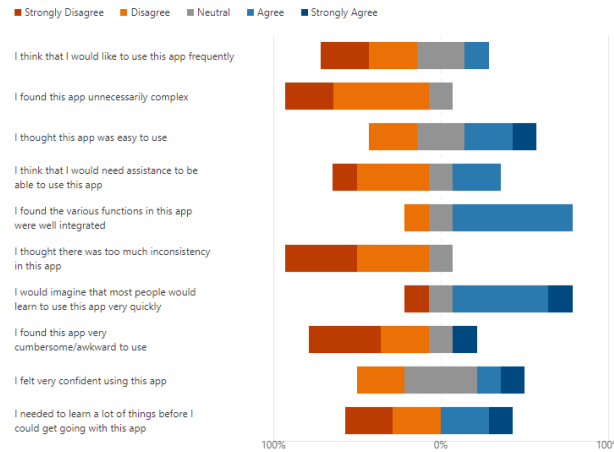


Fig. 4: SUS Results

The SUS responses were converted to scores as per [4], giving an average SUS score of 66.1 and a standard deviation of 17.8. Translating this into a grade, based on a graph of over 3,500 SUS survey results [4], this resulted in a D (high marginal).

## 5.2 Learning Effectiveness

The learning evaluation survey asked a number of self-evaluation questions related to the participants' learning experiences, as well as performing a short knowledge recall test. Two groups were used: a control group which learned by reading given material and a game group which used the implemented game to



learn with. Both groups performed the same evaluation, providing the ability to directly compare the two group in terms of learning effectiveness.

The self evaluation section was performed in a likert scale format, where strong disagreement was codified as a 1, up to strong agreement which was codified as a 5. Some key areas within this evaluation were:

- In questions asking participants to self-evaluate the *effectiveness of their learning* method, the traditional group gave an average response of 3.69/5, while the game group gave a slightly higher average of 3.83/5. Both results represent a weak positive response.
- In questions asking participants about the *enjoyment and engagement of the learning* method, the traditional group participants gave an average of 2/5 (negative), while those in the game group reported an average of 3.58/5 (weak positive).
- Both groups reported little prior knowledge of the 2019 event, with only the game group having an average score above 1 (with 1.67/5).
- Both groups reported a neutral *ease of learning*, with the game group’s average response being slightly higher, 3.25/5 as opposed to 3/5 from the traditional group.

The final part of this survey was the *knowledge test*, in which 8 questions related to the event were asked. The answers to these questions could be found in both the game’s content, as well as the provided articles for the traditional learning group. Participants from both groups scored the same average value, 56.25%, indicating that neither method is meaningfully better than the other for knowledge recall. This value was calculated for each user group by first finding the percentage of correct answers for all participants on each individual question. These percentages were then averaged across all of the questions to find the average number of correct answers for the user group.

## 6 Conclusions

We have presented the development and evaluation of a digital, card-driven board-game, modelling the conflict in Kashmir between India and Pakistan. The design of the board-game follows the principle of “games as journalism” with the key objectives to inform, educate, criticise and persuade. Our evaluation of the game, through user surveys, underlines the effectiveness of the game in these aspects: testers using the game rated the engagement in the learning process as significantly higher compared to a control group (3.58/5 vs 2/5); in terms of direct learning effectiveness the games group rated the outcome slightly higher than the control group (3.83/5 vs 3.69/5). This indicates that, in this context, the playful learning approach improves the process of learning, but only marginally improves the knowledge transfer. However, the knowledge recall part of the evaluation didn’t show a concrete benefit of the games-based approach over the traditional approach of learning.

From a technical point of view, advantages of the digital game are: accessibility (it is online available on several platforms, without the need for physical components or physical presence), linkage with ample background information through the internet, and interaction with an AI to explore the game in the user’s own time. The use of an open-source platform-independent library for games development (LibGDX), rather than a closed game engine, added flexibility, but also programmer effort, in the development of the digital game.

Due to the narrow focus of the evaluation, our results don’t provide a conclusive answer to the comparison of traditional and game-based learning methods, however it does provide a useful case study when combined with similar work.

Future improvements could be made on the technical level (AI improvements, 2-player mode) or on the usage of the game in a learning context. While this is just one short term case study of playful learning, with a limited users group, our long term plan is to embed playful learning components, like this game, into an educational course on conflict studies or history. In this way, segments of traditional learning can be evaluated and compared with segments of playful learning on the same target audience. We are working with colleagues in a history department to realise this vision and to provide longer term insights.

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## References

1. Alvarez, J., et al.: An Introduction to Serious Game Definitions and Concepts. *Serious Games & Simulation for Risks Management* **11**(1), 11–15 (2011)
2. Backlund, P., Hendrix, M.: Educational Games — Are they Worth the Effort? A Literature Survey of the Effectiveness of Serious Games. In: *Intl Conf on Games and Virtual Worlds for Serious Applications (VS-GAMES)*. pp. 1–8. IEEE (2013)
3. Bogost, I., Ferrari, S.: *Journalism at Play*. MIT Press (2010)
4. Brooke, J.: SUS: a Retrospective. *Journal of Usability Studies* **8**(2), 29–40 (2013)
5. Brynen, R.: About PAXsims, <https://paxsims.wordpress.com/about/>
6. Harrigan, P., G. Kirschenbaum, M., F. Dunnigan, J., Peterson, J., Curry, J.: *Zones of Control: Perspectives on Wargaming*. MIT Press (2016)
7. Midlarsky, M.I.: *Handbook of War Studies II*. University of Michigan Press (2000)
8. Perla, P., Curry, J.: *The Art of Wargaming: A Guide for Professionals and Hobbyists*. lulu.com (2012)
9. Perla, P., McGrady, E.: Why Wargaming Works. *Naval War College Review* **64**(3), 111–130 (2011)
10. Sabin, P.: *Simulating War: Studying Conflict through Simulation Games*. Bloomsbury Academic (2014)
11. Susi, T., Johannesson, M., Backlund, P.: *Serious games: An overview*. Tech. rep., University of Skövde, Sweden (2007)
12. Train, B.: *Games as Journalism*, <https://www.professionalwargaming.co.uk/2018-Journalism-Train.pdf>
13. Train, B.: *New Game: Kashmir Crisis*, <https://brtrain.wordpress.com/2019/08/29/new-game-kashmir-crisis/>
14. UK Ministry of Defence: *Defence Wargaming Handbook*, <https://www.gov.uk/government/publications/defence-wargaming-handbook>