

# Interactive “boardgame-based” learning environments for decision-makers’ training in managerial education

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## 1. Rationale

Managers and policymakers at all levels have to take decisions in complex dynamic environments and to face grand challenges on a daily basis (Forrester, 1961). The speed at which our world is faring increases at every moment. The need to adopt long term horizons, as well as the necessity of involving many stakeholders into decision processes are only a few of the factors that increase decision complexity in such a contingency (Vennix, 1996). As a consequence, a wide range of approaches and techniques to support decision-makers have appeared over time. Such approaches include a continuum that spans from meeting facilitation techniques to formal simulation models, from internal organisational learning to external consultancy assistance. Now the ground is also pretty fertile for bringing back into professional education the practice and culture of board games as learning tools for decision-makers and managers, at the same time also improving it.

## 2. Games: an already serious learning environment

Among countless techniques to support managers and decision-makers, the last 30 years saw an incredible development of IT capabilities that ultimately allowed to build computer-aided training environments. However, the history has also seen non-digital tools, such as chess, to learn about making strategic decisions. Initially, these tools were named according to a rich nomenclature: microworlds, business simulations and serious games. The latter was borrowed mainly from the defence sector, where it had been primarily developed to train specialized troops for quicker reactions in rapidly changing environments. “Serious games” soon became a very popular way of calling most kinds of professional training environments.

According to the scientific literature on this topic, a “serious game” pursues a *serious* purpose; it is developed with a primary focus other than entertainment (Barnabé, Giorgino, Guercini & Bianciardi, 2017). Other authors closely follow this perspective as well (e.g., Crookall, 2010; Neill, 2009).

We have been challenging the use of the term “serious game” already multiple times. In order to delve into the rationale details for such a criticism, it is worth noting that the English noun “game” does not probably help in making justice to this concept, whereas the adjective “ludic” (i.e. playful) instead does. “Ludic” is in fact an adjective associated to the Latin word “ludus”, a name of a place that was used by gladiators and legionaries in ancient Rome for exercising when preparing for a fight. More specifically, this was the place where battle simulations were held. Consequently, the



Figure 1: Marble dice-set from Ancient Rome.

“ludus” had a very serious connotation, because the success of the training that Gladiators were undergoing depended on how realistic (and possibly harmless) the “simulations” were going to be. And the success in staying alive depended greatly on the learning process in those simulations, too!

Therefore, we believe that putting the word “serious” close to “game” would not be entirely correct. The main argument for such a criticism is based on the fact that the term “game” in itself underlines a very serious idea. Hence, “serious game” uses twice the same concept of “seriousness”, which ultimately makes for a dittology (we could even say a tautology). We argue that the use of “serious” undermines (some could even say that it

“offends”) the already very serious nature of gaming. Instead, we have proposed the use of *Interactive Learning Environments (ILEs)*, as also shown in a number of previous works on this subject (e.g., Armenia, Barnabè, Pompei & Scolozzi, 2019).

In brief, Interactive Learning Environments are learning laboratories that help to sustain processes of learning not achievable in real life. Providing free risk and safe environments where the participants (i.e., the players) users interact each with other and all of them together with the underlying business game (Kolb, 1984), ILES allow facing complex business problems, developing shared policies, revealing and testing mental models and, last but not least, speeding up knowledge sharing and knowledge acquisition (Ford and Sterman, 1998).

### 3. The renaissance of Board Games

A board game is an example of an ILE. It belongs to the class of games that are played on a flat surface, as is the case of the well-known game of chess. In this context, for the sake of simplicity and to mimic common terminology usage, *boardgame* is used as a broad term that includes all table-top games. Boardgames involve counters (or “pieces”) moved or placed on a pre-marked surface (or “board”) according to a set of rules. However, a boardgame does not necessarily need to be based on a physical board, as it happens with card-driven games, for example. Some games are based on pure strategy, some may contain an element of chance, while some others are driven by chance alone, requiring no skills at all. What they all have in common is the idea of a goal that players aim to achieve. Early boardgames represented a battle between two armies, and most modern boardgames are still based on trying to defeat the opponent(s) in terms of counters: winning position(s) or accruing points. Those involving strategic or tactical combat are named “wargames”.



Figure 2: The ancient Royal Game of Ur, known also as the Game of Twenty Squares<sup>2</sup>.

Board games have been played, have travelled throughout history and evolved in most cultures and societies. A number of important historical sites revealed artefacts and documents that today shed light on such early board games, as **Jiroft**<sup>1 2</sup> civilization game boards in ancient Mesopotamia (nowadays Iran and Iraq), or **Senet**<sup>3</sup> - found both in Predynastic and First Dynasty burials of Egypt, c. 3500 BC and 3100 BC respectively. The latter is the oldest boardgame known to have existed (Crist & Vaturi, 2014).

The late 1990s (and onwards) have seen a substantial growth in the reach and market share of board games (see Figure 3). This has been attributed, among other factors, to the growth of the internet, which has made it easier for people to find out about games and to find opponents to play against. At the same time, Internet has also limited their growth to some extent, due to the incredible success of online PC gaming and consoles. Nevertheless, the board gaming industry witnessed significant growth around the year 2000, with companies producing an ever-increasing number of new games sold to a growing worldwide audience (Figure 3).

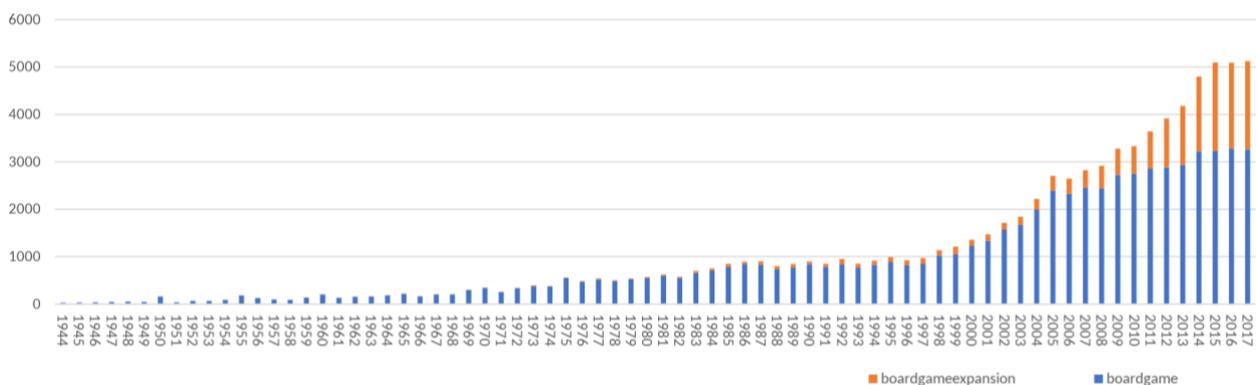


Figure 3: The number of board games published by year (1944–2017), as listed on BoardGameGeek. Expansion sets for existing games are marked in orange (Source: BoardgameGeek).

<sup>1</sup> [https://en.wikipedia.org/wiki/Jiroft\\_civilization](https://en.wikipedia.org/wiki/Jiroft_civilization)

<sup>2</sup> <https://www.ancient-origins.net/artifacts-other-artifacts/royal-game-ur-0011202>

<sup>3</sup> <https://en.wikipedia.org/wiki/Senet>

In the 2010s, a number of publications referred to board games as having a new Golden Age or a “renaissance” (Smith, 2012), stating also that boardgames have seen a growth rate as high as 40% year over year. Since then, the phenomenon has quickly become one of Kickstarter’s most funded project categories (Peter Attia, 2016, from Dicey Goblin<sup>4</sup>). Boardgame venues are also growing in popularity: in 2016, over 5,000 board games opened in the U.S. alone (WTTW News).

#### **4. Interactive Learning Environments are tools to learn about complex issues and to support decision-making**

When talking about Managerial Education, it is pretty straightforward to include in the conversation the added value coming from Interactive Learning Environments (ILEs). These are generally developed in an attempt to make learning “more fun” through the use of media-based learning settings, such as digital games, board games, etc. When thinking of any other potential and more practical benefit in using these tools, we think such benefits are manifold, and cited research is only a part of the literature and experience confirming that.

In general, in comparison to traditional education approaches, ILEs aim at improving participants’ engagement, and thus facilitate learning (Gee, 2003; Shaffer, Halverson, Squire & Gee, 2005). For instance, ILEs aim to reduce the boredom in students at school by stimulating their participation in a playful manner, and hence providing a deeper understanding of the subject. Moreover, the use of ILEs has been recognised to deliver several additional positive effects, such as behavioural changes in participants, longer knowledge retention, and development of soft skills (Connolly et al., 2012; Wouters et al., 2013). These are considered more and more as being particularly useful in a world that demands well-developed horizontal competencies. Interestingly, as argued by Davidsen (2000), one peculiar use of ILEs is for research and validation. In this specific case, the purpose of ILE-based research and validation is “to identify the mental models governing human decision making and action in complex, dynamic domains. Consequently, we are using ILEs to find out what kind of information is being used and how that information is being applied when people make decisions and take action. Having done so, we may form hypotheses as to why people fail to succeed when operating in such domains” (Davidsen, 2000, p. 171). In this regard, evidence is still limited, and more research is advocated within the academic community.

Subsequently, given their ever more popular use, interactive learning environments have started to be developed in a wide variety of forms, including games as well: role-playing games, videogames, card-games, immersive virtual environments, etc. Hence, one of the forms in which ILEs have been developed takes the shape of the boardgame setting, which makes for a new class of *interactive “boardgame-based” learning environments*.

#### **5. Board Games: a particularly attractive type of ILE**

Looking at board games specifically, they are used for many purposes: teaching, training, experimentation, research validation, education, operations management, physical and/or psychological therapy. The scientific evidence available so far highlights the effectiveness of this type of interventions for various purposes and environments (De Freitas & Jarvis, 2007) (Meya & Eisenack, 2017) (Rumore et al, 2016) Notably, ILEs are effective learning environments if and when designed according to some fundamental learning principles, such as: learning from experience is considered very relevant for human development (Lewin, 1951; Kolb, 1984); learning occurs more

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<sup>4</sup> <https://diceygoblin.com/blogs/board-game-news/the-full-history-of-board-games>

easily when players are mentally active and challenged during the learning process (Barnabè, 2009 and 2016); deep learning (also named double loop learning, see Argyris and Schön, 1978) is more likely to occur through experimentation in a virtual world (Sterman, 2000); interacting with business games and models, players usually use their tacit knowledge and improve their skills and abilities; thereby obtaining new knowledge quickly and for conditions not observable in real life (Vennix, 1996).

Certainly, the usage of this type of learning tools in research, as well as for educational purposes in various types of public/private organisations (e.g. business, governments, therapy, etc.) is continuously increasing (Ritterfeld, Cody & Vorderer, 2009).

The success of these games is due to their ability to showcase innovative and unusual activities for engaging participants, as well as to promote learning among them. In fact, an added value of board games contrasting with video gamers' "loneliness" is that the former usually involve group sessions, which literature indicates as further improving learning outcomes (Lou, Abrami & d'Apollonia 2001).

Compared to other forms of interactive learning tools, board games offer easy and versatile settings for group learning activities though cooperative or competitive experiences. We use the word "easy" here to convey that it might be more time/costs-convenient to develop a board game than an elaborated video-game, without giving up important aspects of the game experience itself (e.g. shared activities, face to face interactions with peers, decreased boredom, etc.). "Versatile" means that they can be used in various sessions by diverse groups in different moments without increased costs or without losing their "learning" power.

The physical elements are also very important aspect of the board games. They make players feel more in control of their own actions in the rules-bound environment. Players can explore the presented world with their own hands discovering and trying out different solutions to the in-game problems. With the tangible elements, players have an easier time in grasping the process observed in the game, as well as the relation between what happened in the game with the real-life world (Bogost, 2008).

As mentioned above, the learning outcomes of using board games can be manifold: promoting shared learning experiences, development or strengthening of skills (e.g. negotiation, adaptability, cognitive in general), acquisition of specific knowledge, etc. Moreover, this innovative approach can also increase participants long-term engagement with an organisation. In this regard, the integration between simulation and gaming is today very advanced and the results that emerge from such an integration are very effective tools for, though not limited to, managerial education (Davidsen, 2000). More and more often, their development is based on formal models and scientific algorithms, which ultimately also drive the rules of the games. This contributes to the realism of the engine as well as to a new and different, but reliable and engaging, way of sharing the ideas and concepts behind such models with non-experts (Papathanasiou et al., 2019a) (Papathanasiou et al., 2019b).

It is also worth mentioning that the use of such realistic board games as learning environments for purposes beyond entertainment has been documented since the nineteenth century. Back then, "Sketches of the Rebellion" was produced to facilitate the Union cause during the civil war, and "Pank--Squit" game was used to promote democratic rights of women (Hidayatno et al., 2013). Since then, boardgames have been used for training, education and experimentation in many contexts:

- Military (e.g. wargames<sup>5</sup> to teach tactics, intelligence issues<sup>6</sup>),
- Schools and academia, research (e.g. the SUSTAIN Project, Harmoonia<sup>7</sup>, Red Vs Blue<sup>8</sup>, and others),
- Communities (e.g. the RURITAGE<sup>9</sup>, the EDUCEN<sup>10</sup> and others)
- Business and management (e.g. Beer game aimed at understanding how to govern and anticipate problems in a supply chain (Sterman, 1992), and many others.

More recently, because board games have been successfully used for training and supporting policymaking in complex environments (e.g. for the management of sustainable cities<sup>11</sup>, for promoting innovation policymaker to be more cooperative<sup>12</sup>, for cybersecurity, etc.), and board game-based learning has been spreading in other decision-making environments, as well.<sup>13,14</sup>

## 6. Conclusions: bring back the fun into education in order to be more effective?

Learning can be both serious and fun, and playing can result in learning. This was known at the times when kings-to-be played Senet or Chess, and this is known by aviation trainees in flight simulators, players of wargames, and students that are given to play the SUSTAIN board game by their university professors in class.

In a manner similar to every other simulation environment, board games offer practical, convenient, consequence-free environments, in which it is possible to make decisions, experience their consequences, and explore different scenarios. In many cases, such as in that of SUSTAIN, board games are or can be based on robust scientific models.

An important outcome likely to emerge from the experience of playing such board games is the translation of complex notions into more concrete, tangible ones, which are easier for the game players to grasp. This can enhance learning, clarity of thoughts, communication abilities, critical thinking, and ultimately help the players understand complex issues pertaining to a specific field of knowledge or topic. Stated differently, boardgames can effectively support learners to acquire not only *declarative knowledge* -also named “knowledge-that”, i.e., knowledge about how the world or a part of it works in practice, but also *procedural knowledge* - also named knowledge-how”, i.e., the knowledge of how it is best to do something, such as performing a specific task (Nickols, 2000)

Furthermore, such game playing experience allows participants to explore and analyse situations that would be hard to experience in real life because of costs, time, and safety constraints (Squire, 2002).

For all the reasons enumerated above, and potentially for some others not covered in this paper, boardgames nowadays have the strong potential to be a relevant tool in all fields of learning and

<sup>5</sup> <https://apps.dtic.mil/dtic/tr/fulltext/u2/a550307.pdf>

<sup>6</sup> <https://arstechnica.com/gaming/2017/03/the-cia-uses-board-games-to-train-officers-and-i-got-to-play-them/>

<sup>7</sup> <https://dasic.unilink.it/harmoonia/>

<sup>8</sup> <https://twitter.com/zeijlemakers/status/1134034914670759936>

<sup>9</sup> <https://www.ruritage.eu>

<sup>10</sup> <https://cultureanddisaster.eu>

<sup>11</sup> <http://www.sustainerasmus.eu/wp/>

<sup>12</sup> <https://www.nesta.org.uk/feature/innovate-policymakers-board-game/>

<sup>13</sup> See:

<https://www.skillsconverged.com/FreeTrainingMaterials/tabid/258/articleType/ArticleView/articleId/1196/Board-Games-for-Team-Building-and-Icebreakers.aspx>

<https://boardgamegeek.com/boardgame/213052/pm-galaxy-project-management-board-game>

<sup>14</sup> <https://venturebean.com/management-board-games/>

education. We also anticipate that they will be an increasingly important training tools, in particular for decision-makers and managers.

We therefore encourage the reader interested in adopting innovative training tools for their students, employees or colleagues to look through an exploratory lens into how such an approach can be adapted to their specific needs and context.

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