

Chapter 2

Learning objectives and application contexts of business games in management education

A.F. De Toni¹, F. Nonino²

2.1 Introduction

In a globalised world, where competition among firms surpasses national boundaries and markets are constantly changing, the role of managers is becoming increasingly complex. Companies must rapidly deal with the ongoing training needs of their employees. The stakes can be very high: the company's competitiveness but sometimes even its survival. The essential skills of managers and employees are constantly changing and therefore flexibility and the updating of competencies are crucial. However, continuous training through innovative instruments must not become a desperate effort to avoid losing competitiveness but a properly planned and systematic training process in line with the increasing need for specific and polyvalent skills. This process should develop or transfer knowledge and skills useful to the various professional figures within organisations rapidly and economically.

The need for organisations to constantly adapt and react to external stimuli and to identify opportunities and threats requires a constant updating of the skills of the workforce. Organisations, however, do not always have the option of allowing their employees to leave the workplace to participate in courses for long periods of training. The knowledge must be acquired and absorbed to form new competencies as quickly as possible.

¹ University of Udine, The Business Game srl, Udine, Italy

² Sapienza University of Rome, The Business Game srl, Italy

So managerial training requires increasingly effective methodologies and approaches which are innovative both in content and technologies. These methodologies should meet the needs of businesses for rapid learning with the least possible number of constraints in terms of time and location of use.

In recent years internet and the new web-based technologies have contributed to the development of innovative training models that respond to organisations' need to avoid staff having to leave the workplace for extended periods of time and to be able to carry out training at different times of the day.

Scholars and consulting firms have developed innovative approaches and techniques initially viewed with suspicion but ultimately applied with enormous success and benefits both in training and in the evaluation of staff: simulations. Although the simulations relate to many different fields, from video games to military applications, from polls to demand forecasts, in the business environment the simulations assume an atypical value, setting aside, in part or in whole, their mathematical nature and merging with other topics such as economics and psychology. This combination creates complex learning tools whose proper use may be quite complicated, but with enormous potential: business games. These tools are used in the experiential learning process and, thanks to learners' engagement and positive attitudes driven by the games' distinctive characteristics and by their teaching methodology, create the so-called *active learning*.

As reported by Kolb and Kolb (2009), the first management textbook based on experiential learning was named '*Organisational psychology: An experiential approach*' published in 1971 by Kolb, Rubin and McIntyre (now in its 9th Edition and written by Osland and Turner).

In this chapter we discuss the fundamental principles of experiential learning, learning by doing and active learning as the basis of business game based training. Later we describe contexts of application and learning objectives attainable through the use of business games in managerial training.

2.2 Learning by doing and the experiential learning process

According to Kolb (1984:41) learning can be defined as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it."

Experiential learning is the activity of interpreting a meaning from direct experience (Itin, 1999). What is the difference between learning by doing and experiential learning? As highlighted by Gentry (1990: 10): "John Dewey (1915) discussed "learning by doing," while Wolfe and Byrne (1975) used the term "experience-based learning". So, as we will see below, it is possible to consider learning by doing as a further specification of experiential learning.

Kolb (1984), inspired by the works of Kurt Lewin, Dewey, Piaget, Rogers and others, provides one of the most valuable models of *the experiential learning process* based on the combinations of four learning styles that make up a learning cycle. Moreover he identifies a number of learning methods linking them to a particular learning style.

The model is based on the following assumptions about learning:

1. it is best conceived as a process, not in terms of outcomes;
2. it is largely re-learning;
3. it requires the resolution of conflicts between dialectically opposed modes of adaptation to the world;
4. it is a holistic process of adaptation to the world (not just the result of cognition, learning involves the integrated functioning of the total person- thinking, feeling, perceiving, and behaving);
5. it results from synergetic transactions between persons and the environment;
6. it is the process of creating knowledge.

As illustrated in Figure 2-1, the Kolb model considers two approaches of capturing experience:

- the *Concrete Experience* (learning from feeling) in which learning comes prevalently from perceptions and reactions to experiences;
- the *Abstract Conceptualisation* (learning from thinking) in which learning takes shape from thought and from systematic problem analysis;

Moreover there are two ways of transforming experience:

- *Reflective Observation* (learning from watching) in which learning comes prevalently from listening and observing;
- *Active Experimentation* (learning by doing) in which learning comes predominantly from acting, testing and observing outcomes.

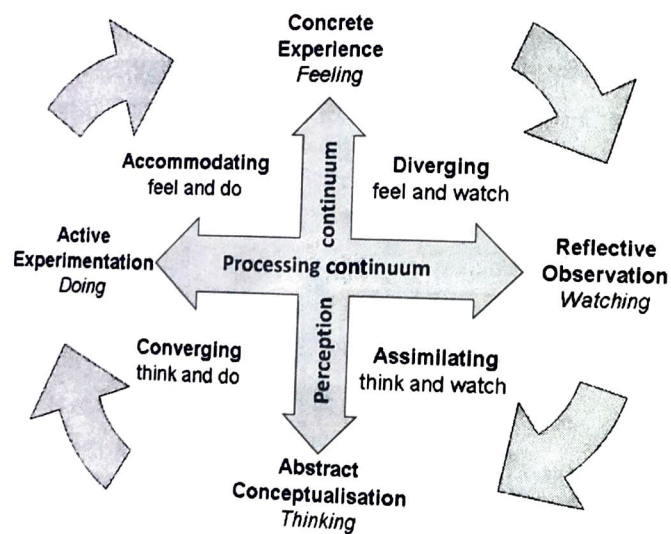


Figure 2-1: The Experiential Learning Cycle and Basic Learning Styles (Source: adapted from Kolb, 1984).

These four modes of learning are the four stages of Kolb's learning cycle. As illustrated in Table 2-1 Kolb suggests a learning cycle which involves all four modes. Any one of the four approaches must be present to obtain an effective learning process but learning can start from any stage of the cycle (Kolb, 1985). The four stage learning process is described by the author as follows: "As a result of our hereditary equipment, our unique past life experience, and the demands of our present environment, most people develop learning

styles that emphasise some learning abilities over others. Through socialisation experiences in the family, at school and at work, we come to resolve the conflicts between being active and reflective and between being immediate and analytical in characteristic ways, thus leading to reliance on one of the four basic forms of gaining knowledge: divergence, achieved by reliance on apprehension transformed by intention; assimilation, achieved by comprehension transformed by intention; convergence, achieved through extensive transformation of comprehension; and accommodation, achieved through extensive transformation of apprehension" (Kolb, 1984: 76-77).

Table 2-1: Kolb's modes of learning and teaching methods.

MODES OF LEARNING	TEACHING METHODS	EXAMPLES – Learning to	
		Drive a car	Manage a project
<i>Concrete Experiences</i>	Laboratories, field activities, simulations and games, readings, direct observation, film/videos, problem setting, examples.	Receiving practical tips and techniques from an expert driver	Having a tutor who guides you in managing a project
<i>Abstract Conceptualisation</i>	Lecture, scientific journals and specialist readings, models building and representation through figures and diagrams, analogies.	Understanding the theory and having a perfect comprehension of the driving concept	Reading articles to compare different methods
<i>Reflective Observation</i>	Scientific journals and specialist readings, thought, questions, discussions, forums, brainstorming.	Thinking about driving and watching another person drive a car	Observing how other people manage a project
<i>Active Experimentation</i>	Simulations and games, laboratories, case studies, project work, field activities.	Getting into the car and trying to drive	Using your skills to achieve your own management style

The predilection for one particular stage brings dissimilar learning styles. Therefore, Kolb defines not only the previous cycle, but also four learning styles corresponding to four learner's attitudes:

- *Diverging*: people with this learning style (divergers) use Concrete Experience (CE) and Reflective Observation (RO) to observe concrete situations from different perspectives. Usually divergers have cultural interests, are imaginative, feeling-oriented and interested in others.

- *Assimilating*: people with this learning style (assimilators) prefer abstract concepts and use Abstract Conceptualization (AC) and Reflective Observation (RO) to comprehend a wide range of observations and integrate and synthesize them in models and theories.
- *Converging*: people with this learning style (convergers) prefer to deal with practical applications, technology and problems rather than interpersonal issues or relationships and use Abstract Conceptualization (AC) and Active Experimentation (AE) to find a concrete use for models and theories.
- *Accommodating*: people with this learning style (accommodators) enjoy involving themselves in new and challenging experiences, have varied abilities and use Concrete Experience (CE) and Active Experimentation (AE) to solve problems in an intuitive, trial-and-error manner also involving other people to gain different perspectives.

Table 2-2 shows a summary of Kolb's learning styles and links them with learners' fundamental questions, preferences and didactic approaches.

Table 2-2 – Kolb's learning styles and didactic approaches.

		Grasping experience		
		CONCRETE EXPERIENCE	ABSTRACT CONCEPTUALIZATION	
Transforming experience	REFLECTIVE OBSERVATION	DIVERGER	ASSIMILATOR	Learning style
		<i>What is it?</i> Concreteness Cooperative team working and brainstorming receiving personal feedbacks	<i>What does it mean?</i> Abstraction Readings, lectures and analytical model exploration	Fundamental question
			Learner preference	
	Thought questions, Visualizations (video)	Theory, Examples	Didactical approach	
Transforming experience	ACTIVE EXPERIMENTATION	ACCOMODATOR	CONVERGER	Learning style
		<i>How can I do it?</i> Concreteness Team working to reach a goal or completing a project using different approaches	<i>What can I do?</i> Abstraction Deal with technical problems over interpersonal issues in simulations or practical assignment (laboratory)	Fundamental question
			Learner preference	
	Activity based on explorations and guided discovery	Exercises for interactive problem solving	Didactical approach	

Learning styles are not determined by fixed personality traits but by learners' background and experiences. In this sense they can be considered as learning preferences rather than styles. Kolb *et al.* (2002) highlight that five patterns associated with the four basic learning styles have been shown to consistently influence people at various levels of behaviour. These five factors shape and influence learning styles as highlighted in Table 2-3.

In principle experiential learning can be possible through a direct experience without a predefined path in which the teacher (or the tutor) guides the learner, but certain conditions should occur. In fact experiential learning can also lead to failed experiences. First the learner must be willing to be involved in the active experience. Second the learner must possess some fundamental skills: the ability to reflect on the experience, analytical skills to comprehend the experience and decision making and problem solving skills in order to use the new knowledge acquired from the experience. The teacher can be a passive observer or active participant, but should provide the learner with the fundamental skills and tools to deal with the exercise which should lead him/her towards the right experience.

Pedagogies which facilitate experiential learning are, for instance, internships which are a participative and interactive approach allowing the learners contact with the real environment. Other examples are the live case approach and computer-assisted training.

Table 2-3 - Relations between the basic learning styles and the five levels of behaviour (source: Kolb *et al.*, 2002)

BEHAVIOR LEVEL	DIVERGING	ASSIMILATING	CONVERGING	ACCOMODATING
Personality types	Introverted feeling	Introverted Intuition	Extraverted Thinking	Extraverted Sensation
Educational specialization	• Arts • English • History • Psychology	• Economics • Mathematics • Sociology • Chemistry	• Engineering • Physical sciences	• Business • Management
Professional Career	• Social service • Arts • Communication	• Science • Research • Information	• Technology • Economics • Environment	Organizations Business
Current jobs	Personal jobs	Information jobs	Technical jobs	Executive jobs
Adaptive competencies	Valuing skills	Thinking skills	Decision skills	Action skills

2.3 Innovation in teaching methodology

Many authors (e.g. Felder and Brent, 2003) suggest that teachers should innovate by introducing learning by doing into their courses. Experiential learning centers on the individual learning process and is often counterpointed with didactic learning. Generally, in traditional teaching methods, the teacher transfers knowledge to the learner who is routinely exposed to long lectures. By contrast, the business game is a pedagogical and didactic model based on experience: the learner is not passive but active, and he/she collaborates with the teacher and other learners.

As we have seen in the previous section, learning by doing is a fundamental element of the experiential learning process, but the effectiveness of this teaching methodology is inhibited or enhanced by the level of engagement of the learner. In fact the learner should be *active*.

Active learning is generally defined as any instructional method that engages students in the learning process. In short, active learning requires learners to do meaningful learning activities and think about what they are doing and the core elements are student activity and engagement in the learning process. (Prince, 2004).

Problem-based learning (PBL) is an emerging pedagogical approach and didactic method based on using problems as the starting point for the acquisition and integration of new knowledge (Barrows, 1986). PBL is a methodology for active learning (Figure 2-2) and can also be collaborative and cooperative (see section 2.4.2). Moreover this didactical approach promotes positive learner attitudes. In fact, "... the pleasure experienced in solving a problem arbitrarily designed for this purpose motivates the learner, so that reaching a solution has no other goal than personal satisfaction for its own sake." (Callois, 2001: 29).

A pragmatic experience and the use of simulation tools provide the students with an understanding of the general nature of the activity, whatever context it may concern. Therefore, it is crucial to use learning-by-doing activities in active learning not only for professionals, but also for students both in secondary schools and universities. Innovative learning should be student-centered and flexible enough to accommodate different learning styles.

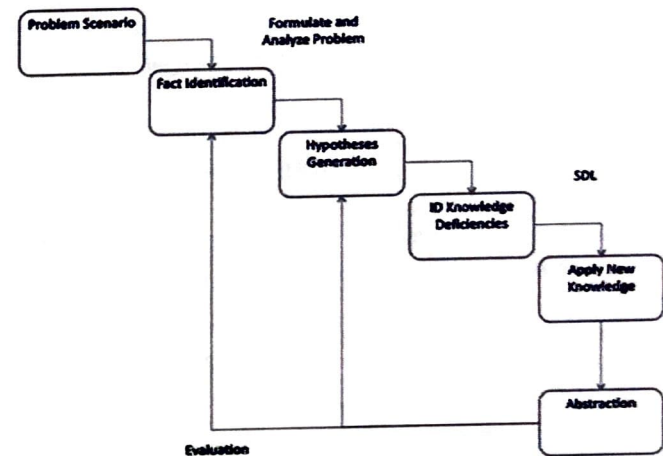


Figure 2-2: The Problem Based Learning cycle (Source: Hmleo-Silver, 2004).

Another crucial factor is the evolution of technology. Today's students think and process information fundamentally differently from their predecessors. Primary and secondary school students in advanced countries are embedded in environments pervaded by highly technological devices and software applications that shape their approach to information and knowledge and the way they interact with each other. These technologies are a big opportunity for learning in real-life contexts. Recent advancements in information and communication technology - including the emergence of ubiquitous computing, social networking, and digital representations of vast amounts of information - have altered the way students interact with content and with each other (Lee and Spiers, 2009).

The competencies of the so called "digital natives" have sometimes been overrated (Bennet *et al.*, 2008), but the fact that the necessities, interests and skills of the students are rapidly changing is undoubted. Teachers are "digital immigrants" and now have to adapt to the language and learning styles of "digital natives" (Prensky, 2001a).

Broadband internet and smart mobile devices allow the use of blogs, social networks, open source tools for open education, file sharing (texts,

photos, videos and music), instant messaging, cloud computing, web storage, virtual worlds... The rapid growth of the so-called web 2.0 applications (i.e. blogs, podcasts, wikis, social networking and social tagging sites) and web apps will affect education as these applications are being used progressively more in schools, universities and companies. Consequently teachers should adapt to this evolution by proposing new pedagogical approaches that should be based not only on active engagement, but also on social learning: from "student-centered" to "community-centered" approaches.

In social communities new practices and concepts emerge from the interaction and socialisation of individuals engaged in a joint initiative (Lave & Wenger, 1991; Wenger, 1998). Learning happens through social relations and "learning and innovation processes take place inside informal social networks" (Wenger *et al.*, 2002: 5). Learning is enhanced in firms through what Lave and Wenger (1991) call "situated learning" that relies upon "legitimate peripheral participation in communities of practice" which is based on the combination of identity, knowledge and social membership.

Technology will be a fundamental part of the global educational environment because it enables teachers to offer innovative teaching methodologies. Technology enables different types of learning and teaching settings (formal, non-formal and informal) and digital game-based learning (see section 1.2.1) based on new technologies has the potential to engage and motivate students and offer custom learning experiences while promoting long-term memory and providing practical experience. Moreover it is useful in the development of vocabulary skills and the enhancement of mental agility (Deubel, 2006). Nevertheless teachers should also take into account the amount of technology available to them in the school setting. If there is not enough technology to support a digital game-based learning program, students may not all have equal access to this type of instructional tool.

Learners tend to react more positively to training methods based on simulation compared to other methods. (Slotte and Herbert, 2007). Moreover the interactive nature of digital games stimulates learning and encourages participants to challenge new topics or knowledge (Griffiths, 2002).

Business games are the most important and effective simulation tools for active learning of management skills. One of the most important aspects

is that business games can set up a virtual laboratory for students. Students can practise and are able to deal with active learning activities. Therefore simulations bring cognition, games evoke emotions, laboratories provide social involvement and the mix of these three features is linked to the four points of the Kolb learning cycle.

Furthermore, business games are constantly being upgraded and their ongoing evolution (see paragraph 1.5) now allows their use together with social networks and web 2.0 applications (also inside virtual world) for creating communities to be used in *community-centered learning*.

2.4 Business game-based learning

The literature suggests that the use of business games enhances the effectiveness of educational processes (Lainema *et al.*, 2003).

As mentioned before, the use of the business game aims at teaching or, better, at training in management techniques and skills. The notions used to design the model of a business game are mostly technical and related to economic and management areas. This means that the player learns concepts which are also in manuals and explained through traditional lessons (*ex-cathedra*). The business game, however, compared to other approaches, proposes a teaching model based on learning by acting and doing (*active learning*) as it places the student at the centre of the educational process and he/she must face decisional problems directly rather than studying them from a book.

2.4.1 Active learning using business games

The cognitive learning theory, developed by Piaget, Vygotsky, Bloom, Bruner and Ausebel) identifies two types of knowledge: (1) the "knowledge about something" called *declarative knowledge* and (2) the "knowledge of how" or know-how (and especially how to best perform a task) called *procedural knowledge*. The difference between the two typologies corresponds approximately to the difference between knowledge and skills (Anderson, 1995; Anderson & Lebrerie, 1998; Eysenck and Keane, 2005).

In management training, the declarative knowledge is the knowledge of management techniques, while the procedural knowledge is knowing how to apply the techniques in practice. In organizations procedural knowledge remains largely implicit whereas declarative knowledge can be expressed explicitly. Consequently the best way to learn procedural knowledge is to perform related activities (through action learning). However, as the two types of knowledge can hardly be separated from each other, very often there is a first phase of acquisition of the explicit knowledge concerning a topic followed by activities requiring the application of the declarative knowledge through the development of the procedural one.

Business game-based training is not only oriented to the learning of knowledge, but goes further by integrating it within the operating processes typical of business functions, while creating an overall view (the so-called *systemic perspective*) and giving persons or teams the opportunity to make their own choices. The business game-based training provides awareness of the complexity of the reality of business and a *direct perception that different decisions lead to different scenarios*.

The simulation allows the player to perceive and understand the relationships that exist between the different variables step by step. As the game progresses, the more the player understands that the company is a complex system: each department must maintain a balance within itself and with respect to all other functions (Goold e Campbell, 1998). In the real business context *time is a crucial variable* and business games can provide *awareness of its key role in business decisions* (Thavikulwat, 2004) and of chronological relationships of cause-effect in the company's processes.

The *rapid feedback* on players' decisions (typical of digital games) together with the motivation provided by the competitiveness of a business game can improve the learning experience (Larreche, 1987).

Competition is an element embedded in business games and a strong mechanism to incentivise learning. Consequently, the individual is stimulated to take decisions and to make his/her own observations and perform research (also on the world wide web) about the issues involved in the game; at the same time, however, the continuous action required enhances the absorption of the concepts necessary for the achievement of success in the competition. Moreover competition encourages the learning of all

the interrelationships between the decision variables in the simulated model of the game in order to make decisions fairly and if possible more effectively than competitors.

If, as claimed by Kolb, experiential learning is a process of constructing knowledge involving a creative tension between experiencing, reflecting, thinking, and acting then learning will be best facilitated if the four phases (design, conduct, evaluation, and feedback) are present and repeated over time (Wolfe and Byrne, 1975).

The use of business games as a tool for active learning should employ the whole PDCA learning circle (Plan, Do, Check, Act): from the planning of the objectives (*design*), to doing/experiencing (*conduct*) and observing results (*evaluation*), to reviewing and checking them (*feedback*), and finally action planning (design). This process can lead students to learn new notions and acquire new skills in an effective way only if the teaching methodology used can enhance his/her self-initiative and provide self-evaluation. In business game-based learning, teachers become the facilitators of a learning process that is basically self-directed. Teachers help learners to experience these phenomena in their field of specialisation, provide alternative theories and concepts to discuss different concepts of reality and assist in deducing the implications of choices by analysing and discussing results. In Chapter 6 the PDCA process and this teaching methodology will be described in depth.

2.4.2 Collaborative and cooperative learning using business games

Collaborative learning can refer to any instructional method in which students work together in small groups toward a common goal (Prince, 2004) trying to improve their own knowledge reciprocally thanks to a positive interdependence among members.

Following the suggestion from the five elements of the circles of learning model by Johnson *et al.* (1984), the use of a business game for collaborative learning should be based on the following elements: (1) positive interdependence, (2) constructive direct interaction, (3) social skills, (4) individual responsibility and (5) group work evaluation. So the teaching methodology should be properly organised by the forming of groups of three to five students, assignment of individual responsibility, provision of

moments for face-to-face interaction among team members in order that they might share their skills and socialise and the provision of working evaluation for the whole group.

Many authors (e.g. Bean, 1996; Cusea, 1992) see collaborative learning as a box containing all the group-based methods. Some authors disagree and consider the distinct historical developments of the different methods such as cooperative learning. *Cooperative learning* can be defined as a structured form of group work where students pursue common goals while being assessed individually (Feden and Vogel, 2003).

As for collaborative learning, the literature suggests that the learners' activities should be properly designed. Following the suggestions from the model of Johnson *et al.* (1998) the use of a business game in cooperative learning should take into account the following five elements: (1) individual accountability, (2) mutual interdependence, (3) face to face interaction, (4) appropriate practice of interpersonal skills and (5) regular self-assessment of team functioning.

2.4.3 Contexts of application

A primary context of application for business games is *the training of students in school and universities*.

Traditional training does not prepare students to face and understand the ambiguities and uncertainties of the real working environment (Gosling and Mintzberg, 2006). The reason is that the disciplines taught during courses of study available at different levels (secondary schools, bachelor, master degree, ..) are permeated by deterministic or probabilistic models which reflect stable and balanced realities (Salas *et al.*, 2009) in which the unexpected is unconsidered (Aram and Noble, 1999; Taleb, 2007).

In addition, the academic curricula rarely offer study programs that train the students to correctly perceive the firm as a dynamic system in which there is a continuous interaction between the different business functions (e.g. competition for/sharing of resources, the effect of a choice in the R&D function on production and marketing etc.) and their integration is required through a systemic approach that also takes into account the external environment. The excessive linearity in business management education leads students to learn about and manage the various business

functions distinctly instead of a more systemic approach (Walker and Black, 2000).

The use of marketing simulation games in university marketing courses has frequently been compared to other teaching approaches. Some authors (e.g. Sindre *et al.*, 2009) have shown that students using a business game learn better than those who study only by reading. A study by Faria (2001) reports on 79 comparisons between the use of a simulation game versus other approaches, most notably case studies, lectures and readings. End of course final exams were used to determine whether students in the simulation sections of the same course scored better than students in the non-simulation section.

Another context of application is *management training for company employees*. In fact research on learning styles has shown that managers typically possess strong active experimentation skills (and weaker reflective observation skills) so business games are the correct tools for managerial training. In 1998 Faria reported that in the U.S. alone BGs have been used by 7,808 business firms in employee training programs.

The review of strategies and business routines requires a continuous updating and learning by top and assistant managers, but also by employees belonging to lower levels of the organisational hierarchy. In addition to a real workout on "decision-maker" issues similar to those that the learner will face in his working life, he/she will understand all the company's mechanisms which are difficult to understand in depth during traditional courses and require substantial experience in a real business context.

One of the biggest obstacles to training is the time necessary for participation in refresher courses in a classroom, requiring the interruption of work activities. An initial solution is represented by so-called "training on the job" that allows learning by doing during work activities. However, this methodology engages the employee during working hours and the effect is efficiency reduction while the risk of errors during the execution of a job is augmented. Another constraint is that managers spend a large amount of their time away from the workplace but recent ICT developments now enable them to be connected in any place and at any time. One solution is the use of learning methods in simulated environments, such as business games.

A third context of application for business games is the *training of employees to new roles*. In all those cases in which the company wants to train a junior manager in specific areas and managerial skills it is useful to adopt a business game suited to the context and the learning objectives and developed on a model that contains all the information and knowledge needed both from a technical and a decision-making point of view. The individuals will have to make decisions in some situations typical of the role they will undertake in the near future and can be guided in their choices by a supervisor or senior manager.

Another application context is the *evaluation of employees' skills*. There are numerous examples of business game applications for this purpose although their use in this context is more limited than in training. The business game can be used in order to verify the actual knowledge and decision-making skills of candidates for job positions or in an assessment oriented to career progression. In the selection of a candidate for a given role, the simulation allows an analysis not only of the technical knowledge possessed, but also the way in which individuals apply it and the evaluation of its effectiveness through the business game results.

2.4.4 Learning outcomes

Although individual skills remain fundamental, the activities of a business game allow the development of explicit (declarative) and implicit (procedural) knowledge. The learning of pieces of information logically connected to each other gives individuals the opportunity to understand and act on certain issues effectively and systematically.

Business game-based training is not oriented only to the learning of knowledge, but it goes further by integrating this within the operating processes typical of business functions, while creating an overall view (the so-called systemic perspective) and giving persons or teams the chance to make their own choices. In particular individuals can attain the following general skills:

- Being able to use specialised knowledge in a specific situation. The business game develops procedural knowledge because, when facing particular and specific problems, individuals are encouraged to use the appropriate concepts. These notions can come from individuals' knowledge (declarative knowledge) or are

developed during the activity. Through the repetition of a particular task they "absorb" the procedure and therefore learn not only the concepts, but also when and how they should be applied.

- Being able to put together pieces of knowledge acquired separately in order to obtain a systematic sequence of actions. Carrying out independent activities in complex problem-solving processes can lead to the development of the so-called cognitive schemas. These are units of knowledge based on general experiences representing typical situations and interactions to be found in reality. The business game empirical approach leads to the identification of links between personal skills and problems that the learner is facing, allowing the individual to create his/her own sequence of actions to solve an issue. The ability to correlate their own pieces of knowledge in different situations in order to address problems in a timely manner is as fundamental for managers as it is difficult to acquire, as it is usually obtained through a long experience.
- Being able to reconstruct fundamental interactions and processes. The interaction between elements of an organisational system must be understood thoroughly. The business game forces the learner to perform repetitive tasks and to identify mechanisms which work properly. Traditional study allows the collection of information on the links between the variables of a problem, but the combination with the practical approach allowed in the business game leads to a different process: knowledge is acquired within procedural schemes (which we discussed previously) in which the learner can understand the correlations between variables allowing him/her to store very complex situations in the mind.
- Being able to evaluate the interactions and consequences of individual or third party performances. The assessment and contextualisation of the choices made within the scope is a very important skill. The use of a business game allows learners to comprehend the context in which they operate and creates very complex cognitive schemata. At the end of a competition the final stage of analysis and evaluation of their choices through group

discussions and a final feedback (debriefing) can develop the learners' ability to identify errors and possible improvements.

As regards training in management skills, the wide number of learning outcomes of business games recognised by many scholars and practitioners are:

- learning the basic and advanced elements for analysis of a business and evaluation of corporate performance;
- learning of basic and advanced management techniques;
- training in team-working in order to improve the ability to work in a group and by objectives;
- training in strategic orientation;
- enhancement and refinement of decision-making and problem-solving skills in terms of timeliness and effectiveness of choices;
- awareness of whole company complexity (company as a system in relation to its environment);
- awareness of the impact of a single choice on the whole company and of relationships among different company functions;
- confidence in situations of risk and uncertainty;
- comprehension of the entrepreneurial and managerial culture.

References

- Anderson, J. (1995), *Learning and memory*, New York: John Wiley.
- Anderson, J. and Leberiere, C. (1998), "Knowledge Representation", in J. Anderson and C. Leberiere (Eds.), *The Atomic Components of Thought*. Mahwah, NJ: Lawrence Erlbaum.
- Aram, E. and Noble, D. (1999), "Educating prospective managers in the complexity of organizational life", *Management learning*, 30(3): 321-342.
- Barrows, H.S. (1986), "A taxonomy of problem-based learning methods", *Medical Education*, 20: 481-486.
- Bean, J. (1996), *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom*, San Francisco: Jossey-Bass.
- Bennett, S., Maton, K. and Kervin, L. (2008), "The 'digital natives' debate: A critical review of the evidence", *British Journal of Educational Technology*, 39(5): 775-786.
- Caillois, R. (2001), *Man, Play and Games*, First Illinois paperback, The Free Press (1st edition in 1958, *Lex jeux et les homes*, Paris: Librairie Gallimard – 1st English translation in 1961, *Man, Play and Games*, New York: The Free Press of Glencoe).
- Cusea, J. (1992), "Collaborative & Cooperative Learning in Higher Education: A Proposed Taxonomy," *Cooperative Learning and College Teaching*, 2(2): 2-4.
- Deubel, P. (2006), "Game on!", *Technological Horizons in Education Journal*, 33(6): 30-35.
- Eysenck, M.W. and Keane, M. (2005), *Cognitive psychology: A student's handbook*. New York: Psychology Press.
- Faria A.J. (1998), "Business Simulation Games: Current Usage Levels – An Update," *Simulation & Gaming*, 29(2): 295-308.
- Faria A.J. (2001), "The Changing Nature of Business Simulation/Gaming Research," *Simulation & Gaming*, 32(1): 97-110.
- Feden, P. and Vogel, R. (2003), *Methods of Teaching: Applying Cognitive Science to Promote Student Learning*, McGraw Hill Higher Education.
- Felder, R.M and Brent, R., (2003), "Random Thoughts...Learning by doing", *Chemical Engineering Education*, 37(4): 282-283.
- Gentry, J.W. (1990), "What is experiential learning?", in J. Gentry (Ed.), *Guide to business gaining and experiential learning* (pp. 9-20). London: Kogan Page.
- Goold, M. and Campbell A. (1998), "Desperately seeking synergies", *Harvard Business Review*, 76(5): 130-143.
- Gosling, J. and Mintzberg, H. (2006), "Management Education as if Both Matter", *Management Learning*, 37(4): 419-428.
- Griffiths, M. (2002), "The educational benefits of videogames", *Education and Health*, 20(3): 47-51.

- Hmelo-Silver, C.E. (2004), "Problem-based learning: What and how do students learn?", *Educational Psychology Review*, 16(3): 235-266.
- Itin, C.M. (1999), "Reasserting the Philosophy of Experiential Education as a Vehicle for Change in the 21st Century", *The Journal of Experiential Education*, 22(2): 91-98.
- Johnson, D.W., Johnson, R.T., Holubec, E.J. and Roy, P. (1984), *Circles of learning: Cooperation in the classroom*, Alexandria, VA: Association for Supervision and Curriculum Development.
- Johnson, D., Johnson, R. and Smith, K. (1998), *Active Learning: Cooperation in the College Classroom* (2nd ed.), Edina, MN: Interaction Book Co.
- Kolb, D.A. (1984), *Experiential Learning: Experience as the Source of Learning and Development*, Englewood Cliffs, New Jersey: Prentice Hall.
- Kolb, D.A. (1985), *Learning Style Inventory: Technical Manual*, Boston: TRG Hay/McB Training Resources Group.
- Kolb, D.A., Boyatzis, R.E. and Mainemelis, C. (2002), "Experiential learning theory: Previous research and new directions", in Sternberg R.J. and Zhang L.F. (Eds.), *Perspectives on cognitive, learning, and thinking styles*, Mahwah, New Jersey: Lawrence Erlbaum.
- Kolb, D.A., Rubin, I.M. and McIntyre, J. (1971). *Organizational psychology: An experiential approach*, Englewood Cliffs, New Jersey: Prentice Hall.
- Kolb, A.Y., Kolb, D.A. (2009), "Experiential learning theory: A dynamic, holistic approach to management learning, education and development", in Armstrong, S. J. & Fukami, C. (Eds.), *Handbook of Management Learning, Education and Development*, London: Sage Publications.
- Lainema, T. and Makkonen, P. (2003), "Applying constructivist approach to educational business games: case REALGAME", *Simulation & Gaming*, 34(1): 131-149.
- Larrece, J.C. (1987), "On Simulations in business education and research", *Journal of Business Research*, 15(6): 559-571.
- Lave, J. and Wenger E. (1991), *Situated Learning: Legitimate Peripheral Participation*, Cambridge University Press.
- Lee J. and Spires H. (2009), "What Students Think About Technology and Academic Engagement in School: Implications for Middle Grades Teaching and Learning", *AACE Journal*, 17(2), 61-81.
- Osland, J.S. and Turner, M.E. (2013), *Organizational Behavior: An Experiential Approach* (9th Ed.), Upper Saddle River, N. J.: Pearson Prentice Hall
- Prensky, M. (2001a), "Digital Natives, digital immigrants", *On the Horizon*, 9(5): 1.
- Prince, M. (2004), "Does Active Learning Work? A Review of the Research", *Journal of Engineering Education*, 93(3): 223-231.
- Salas, E., Wildman, J.L. and Piccolo, R.F. (2009), "Using Simulation-Based Training to Enhance Management Education", *Academy of Management Learning and Education*, Vol. 8, No. 4, 559-573.
- Sindre, G., Natvig, L and Jahre M. (2009), "Experimental validation of the learning effect for a pedagogical game on computer fundamentals," *IEEE Transactions on Education*, 52(1): 10-18.
- Slotte, V. and Herbert, A. (2007), "Engaging workers in simulation-based e-learning", *Journal of Workplace Learning*, 20(3): 165-180.
- Thavikulwat, P. (2004) "The Architecture of Computerized Business Gaming Simulations", *Simulation & Gaming*, 35(2): 242-269.
- Walker, K.B. and Black, E.L. (2000) Reengineering the undergraduate business core curriculum: aligning business school with business for improved performance, *Business Process Management Journal*, 6(3): 194-213.
- Wolfe, D.E. and Byrne E.T. (1975), "Research on Experiential Learning: Enhancing the Process", *Business Games and Experiential Learning in Action*, 2: 325-336.
- Taleb, N.N. (2007), *The Black Swan: The Impact of the Highly Improbable*, Random House.
- Wenger, E. (1998), *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press.
- Wenger, E., McDermott, R. and Snyder, W. (2002), *Cultivating communities of practice: a guide to managing knowledge*, Cambridge: Harvard Business School Press.