In 2005, the French research association ECRIN\(^1\) suggested the book entitled “Apprendre par la simulation” (Learning through simulation), resulting from the long collaborative work between researchers and practitioners, directed by Professor Pierre Pastré. From the analysis of learning activities, it was suggested to the reader a reflection about the conception of simulation situations improving learning. This first book, situated within the occupational didactic theory, has shown the broad diversity of professional training through simulation, and has permitted to point out the importance of methodological questions linked to training practices with these new tools, such as re-contextualization of the task, the evaluation, and the debriefing…

In 2010, in view of these considerations both theoretical and practical, it appeared useful to extend the reflection by investigating the most actual usages of simulation within different professional environment.

The present book is thus proposed as the following of the first one, centered on the training method rather than on the learning situation. Furthermore, we have written from the standpoint of the trainer, the engineer, or the trainee, so that methods related to simulation training practices could be presented in a concrete manner and resorts could be emphasized. Everyone will be able to use it according to one’s own expectations and needs: to enhance the management of simulation situations or to improve one’s professional practice, to optimize one’s reliability or performance, for maintenance or operating activities …

For each described situation, the reader will be given both pragmatic advices for the practice and theoretical complements on which rely these propositions.

Philippe Fauquet-Alekhine and Nane Pehuet, both at the origin of this project, have constituted a work group in the frame of ECRIN association, gathering experts of the simulation training practicing in a broad range of professional activities such

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\(^1\)Exchange and Coordination Research-Industry, ECRIN was created in 1900 by the French national research center (CNRS) in the aim to favor exchanges between public research laboratories and industries and to promote innovations.
as aircraft pilots, anesthetists, surgeons, metal-rolling mill operators, and nuclear reactor pilots. All these experts, from the operating or training world, had all in common a trainer’s experience. Each of them has taken in charge one chapter according to the same frame: the professional context description, the pedagogical methods, weaknesses and strengths, teaching formalism, and pragmatic advices.

In the book, authors present their own experience and give evidence of their own constraints regarding their profession, the organization, or the company in which they work. We wish readers will find in this book solutions that will permit to solve some difficulties encountered, and some advices useful to make their own professional practice to evolve regarding simulation training methods and more specifically the articulation between the simulator and the simulated situation.

There are several usages of the simulation for occupational training. We have chosen to investigate initial training (anesthetists, surgeons) as well as training designed for experienced professionals (rolling mill operators, aircraft pilots, reactor pilots) for whom the simulation training is a mean to maintain, to make reliable, or to improve their professional practices. It has become fundamental for the companies to maintain competencies and skills of the teams, at least for security, safety, or reliability reasons.

We would like to highlight now that for each training context, a specific method exists which fidelity degree compared to the professional reference situation is variable. Some simulators presented thereafter are said “full scale” or “full scope” in the sense they fulfill a complete transposition of the real operating facilities, while others, rather targeting specific learning (professional gesture for example), will be limited to a partial transposition of the real operating situation.

The first chapter suggests a general reflection shedding light on the pedagogical methods applied through the five following chapters. It aims to clarify and to emphasize the theoretical hypotheses which underlie pedagogical practices through selected examples in the following chapters.

The next chapters are ordered with regard to the type of simulator use for training: The two first ones concern the aircraft pilots and the nuclear reactor pilots, two activities that require full-scale simulators for which the likeness is remarkable. Then, a chapter comes addressing anesthetist training. Here, again we have a full-scale simulator, but with a major difference regarding the relationship between the simulator and the trainees: Anesthetist training takes place “around” the simulator, while for the two first cases, training takes place inside the simulator. And finally, the last two chapters present a hybrid simulator for the surgeons’ training and rolling mill simulator. The hybrid simulator for the surgeons’ training combines virtual reality and situation close to the reality, with surgeons trained with the help of imagery software over organs from which they can feel the “matter” due to feedback effort systems. The rolling mill simulator is a kind of full-scale simulator tending to a virtual simulation.

All along the book, inserts have been added to specify technical points and some lines are highlighted to emphasize pragmatic advices. A thematic table is put at the end of the book and helps the reader to find out easily the main items.
With this book adapted in 2015 from the French 2011 version and updated with recent bibliographic references, we wish the reader to feel the great possibilities offered by the simulation tools toward occupational learning and training, keeping in mind that the tool alone is not sufficient and must be necessarily inscribed inside a structured and coherent pedagogical whole.

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