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The Impact of Simulation Training on Student Motivation in Health Studies in France

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Abstract

Simulation is a teaching method that has been insistently promoted in France over the recent period, in particular for the training of health students. Simulation training assigns the students an active role which is intended to strengthen their motivation. Thus, the more motivated students would be during the lessons, the more they would engage in their training, take up challenges, persevere, raise their performance level, and pass exams. Motivation therefore represents a powerful driver of learning that training systems cannot afford to ignore. Taking this into account, and reworking training engineering accordingly, is a challenge for training institutions and trainers. This article examines the links between the use of simulation training and student motivation in health studies in France. Scrutinising relevant education literature and health literature databases led to identify 24 relevant research articles. After analysis, the results suggest that indeed, simulation training does increase motivation in health students. Literature in this field mainly covers two complementary aspects, namely the determinants at work in the simulation-motivation process, and the conditions for implementing simulation training. However, the literature is silent on trainers' perspective. The results of this literature review are of particular interest to institutions regarding the place to be given to simulation in training engineering, and to trainers as to how to conduct a simulation session.

Keywords

Learner autonomy, Competence, Health students, Motivation, Self-confidence, Self-efficacy, Simulation training.

Over the past twenty years, health professions have experienced multiple changes linked to the aging of the population, the increase in chronic diseases, as well as the growing demand from patients, health authorities (the World Health Organisation) and other international stakeholders (the United Nations Educational, Scientific and Cultural Organisation – UNESCO, and the Organisation for Economic Cooperation and Development – OECD) regarding the provision of safe and quality care (Coudray & Gay, 2009; SIDIIEF, 2011). Healthcare professionals are faced with increasingly complex situations requiring the delivery to patients of the highest possible quality of care, in complete safety. Training professionals capable of addressing the full range of these expectations and needs is a challenge (Jaeger, 2012). To take this up, public policies in France have changed the training standards, shifting them from their traditional focus on disciplinary contents towards a focus on acquiring and developing competences. These changes in standards entail changes in training engineering, including an increase in the use of reflective practice, in order to develop professionals' ability to act in situations that are at the same time new to them and complex (Coudray & Gay, 2009, p. 39). The new standards and training engineering lead learners to take an active role in their training. The perspective thus moves from teaching to training, which means that "students actively process information through search, critical analysis, problem solving, project management, etc." and that "knowledge is built primarily from authentic (professional) contexts" (Jouquan & Bail, 2003, p. 165). This new paradigm is based on socio-constructivist and constructivist theories (Chauvigné & Lenoir, 2010; Jonnaert, 2009; Wesselink et al., 2010) where learners develop their own abilities in problem

situations (Tchibozo, 2011). This pedagogy, oriented towards the acquisition of competences, requires using work situations (Mayen, 2010) or "families of situations" (Mayen, 1999; Pastré et al., 2006; Perrenoud, 1999; Roegiers, 2011), and involves reflective practice (Beckers, 2009; Perrenoud, 2001; Schön, 1991). Implementing this competence-oriented approach has resulted in the diversification of teaching methods (Chauvigné & Coulet, 2010; Monchatre, 2007) through an extended use of so-called "active" methods. Simulation training is one of these pedagogical methods the use of which has undergone a dramatic increase since the changes in standards.

In France, the High Authority for Health (Haute Autorité de Santé – HAS) has defined simulation as

> "the use of a material (such as a mannequin or a procedural simulator), virtual reality or a standardised patient to reproduce care situations or environments, with the aim of teaching diagnostic and therapeutic procedures and rehearsing processes, medical concepts, or decision-making by a healthcare professional or a team of professionals" (HAS, 2012, p. 7).

This definition can be supplemented by that from Béguin & Weill-Fassina (1997, as cited in Secheresse et al., 2011) which states that simulation is a method for teaching technical gestures and competences in cases where teaching under real conditions turns out to be impossible for ethical (safety and security), economic (cost of equipment) or technical (very low probability of incidents or accidents) reasons.

Simulation training is on the rise in France as it has been strongly encouraged by the High Authority for Health (HAS), especially since the report by Granry and Moll (2012) which highlighted the importance of having a policy to expand the use of simulation training. This report, which supports the motto "never the first time on a patient", was the starting point for a range of publications on the development of simulation training in France (HAS, 2012; HAS, 2015; HAS, 2019). The use of simulation training for safety purposes in the delivery of care has been recommended by the Ministry of Social Affairs and Health in the national programme for patient safety 2013-2017 (Ministère des affaires sociales et de la santé, 2013). This programme recommended using simulation "in initial and continuing training, to improve safety". This recommendation was transcribed into the training regulations in 2014[1]. In 2017, it was explicitly extended by the Debeaupuis et al. report (2017, p. 56) to paramedical university training. It now also applies to the training of medical and surgical students. The government plan "Ma santé 2022" [My health 2022], initiated in 2018, provides for the "systematisation of simulation training in all training courses" (Ministère des solidarités et de la santé, 2018, p. 10).

The literature on simulation training shows that the benefits of this pedagogical approach are many. Simulation training enables competence development in future medical and paramedical professionals throughout their careers (Cullati & Secheresse, 2017) as simulation is both productive (learners perform tasks they are asked for) and formative (they acquire competences and knowledge through action and reflexive practice) (Béguin, 2006;

[1] Arrêté du 26 septembre 2014 modifiant l'arrêté du 31 juillet 2009 relatif au diplôme d'État d'infirmier [Ministerial order dated 26 September 2014 amending the order of 31 July 2009 concerning the nursing diploma]

Pastré, 2005; Rabardel & Béguin, 2005; Samurcay & Pastré, 1995, as cited in Prost et al., 2009). Simulation goes far beyond simply teaching and learning technical gestures. It enhances reflexivity through debriefing. The learner is immersed in an environment as close as possible to reality and perceives its complexity. Interactions with other participants help the learner make sense of the situation and emotions experienced (Pelaccia & Viau, 2016, p. 250).

Simulation contributes to deepening learning (García-Mayor et al., 2021; Oh et al., 2015). Roh et al. (2014) report that it is perceived by students as having a positive effect on competence acquisition. Simulation training also promotes transfer, namely the ability to reuse (and properly adapt) in a new situation a knowledge or skill that was learnt in a different one, an essential element in the acquisition of competence (Díaz-Agea et al., 2021; Grierson et al., 2019). It improves communication (Guetterman et al., 2019), the sense of the collective (Policard, 2018), the aptitude for interprofessional collaboration (Kukko et al., 2020; Liaw et al., 2014) and plays a leading role in the acquisition of reasoning or clinical judgment (Fawaz & Hamdan-Mansour, 2016; Hoyelle-Pierre, 2020; Jardin, 2015; Lavoie, 2017). In the healthcare sector in particular, simulation training improves patient care by increasing the safety of care (Ballangrud et al., 2014; Grainger et al., 2019; Meurling et al., 2013; Molloy et al., 2018; Tella et al., 2015; Vergnes, 2016).

According to Pelaccia and Jaffrelot (2019), the use of authentic situations reinforces the motivational power of simulation training. But few other articles discuss the effects of simulation training on student motivation. Yet, student motivation is a major concern of trainers and training institutions as not only is motivation a source of academic success (Mäenpää et al., 2019), but it also is a factor of perseverance (Lieury & Fenouillet, 1996), an essential quality for students to stand the long duration of health studies.

The simulation process consists of three stages, i.e., the briefing, the simulation sequence, and the debriefing. Each one of these three stages is likely to be a source of motivation for the learner. According to the sociocognitive theory of learning, motivation depends on the interaction between a person's behaviour, individual characteristics, and environment (Viau, 1994). Three types of perceptions determine a person's motivation to initiate or continue an activity: the perception of the value of the activity, the perception of the controllability of progress, and the perception of the consequences of the activity (Viau, 1994). Motivation can be intrinsic, extrinsic, or non-existent (known as amotivation). Intrinsic motivation, on the one hand, comes from the direct interest that learners have in the activity in which they engage. This type of motivation results from the pleasure provided by the educational activity (Pelaccia et al., 2008, p. 106). Extrinsic motivation, on the other hand, depends on external factors. Although several theories of motivation exist, the present article will only focus on the theory of self-determination (Deci & Ryan, 1985) and the theory of self-efficacy (Bandura, 1997). These two theories highlight particularly well the needs for autonomy, competence, social belonging, and personal effectiveness, which are key to clarify and articulate the links between simulation training and motivation.

The theory of self-determination is particularly suited to help understand the differences between intrinsic and extrinsic motivations. It points to the degree of intentionality, known as the self-determination of human behaviour. This is about defining "the extent to which people take responsibility for their own actions when having felt free to choose rather than pressured by internal or external constraints" (Carré & Fenouillet, 2009, p. 65). Learning by simulation meets the three needs highlighted by the theory of self-

determination. The need for competence refers to the sensation that learners may experience when interacting effectively with their environment. This need is met when the learner receives positive feedback upon completion of the task. This can be the case during the debriefing stage, in the presence of the trainer and peers. The need for autonomy is met when learners feel that they are at the initiative of the activity. This is the case when learners are given a role in the process of choosing the scenario of the simulation sequence. The need for social belonging is met when learners can build with one another satisfying, reassuring and mutually respectful relationships. Simulation sessions allow for building such relationships.

The theory of self-efficacy (Bandura, 1997) sheds light on the link between individuals' perception of their ability to perform tasks, and the motivation to engage and complete these tasks. Learners make their mind about their self-efficacy based on the results of their previous experiences, observing how others proceed, and their responsiveness to others' verbal and non-verbal feedback (Bandura, 1997). Trainers may provide non-verbal feedback (e.g., the attention shown to students, or the way trainers look at students or talk to them) as well as verbal feedback (i.e., oral comments intended to improve future student performance). The more receptive learners are to positive feedback from the trainer, the more they increase their sense of competence and self-confidence. Simulation sequences can also increase the feeling of self-efficacy, especially when the learner successfully addresses the proposed scenario. The stronger the feeling of self-efficacy, the more inclined learners are to engage in their role, make efforts, take up challenges, and finally be motivated.

The remainder of the article reviews the international research literature that analyses the links between simulation training and health students' motivation. The following two sections successively present the method and then the results of this literature review. The last section concludes.

Method

The Education Resources Information Center (ERIC), PubMed, ScienceDirect and Google Scholar databases were searched. The search was carried out using the following keywords: simulation, health students, and motivation. To refine search, the Boolean operator AND was used, as well as the search phrases "simulation training AND health students AND motivation", and "simulation training nursing OR simulation training medical AND health students AND motivation".

A filter of less than 10 years was applied to this search. Only articles from 2012 to 2021 were ultimately retained. It was important to start this research from 2012 which is the year in which, in France, the first HAS recommendations in the field were issued.

After carefully reading the articles obtained, it appeared that many of these articles were not really falling in the scope of the research question. Several articles dealt with health students and simulation, but without addressing the motivational component. Other articles dealt with a quite different topic, namely simulated motivational interviewing. These articles were therefore discarded. In the end, a set of 24 articles published between 2012 and 2021 was kept for this literature review.

Results

The articles selected mainly deal with two aspects, i.e., the positive effects of simulation training on the motivation of health students, and the implementation conditions conducive to these positive effects.

Positive Effects of Simulation Training on Health Students' Motivation

Literature shows that simulation training is a source of motivation on three crucial and closely linked points. Firstly, simulation training promotes learners' self-confidence. Lee Wiggins et al. (2018), Fawaz and Hamdan-Mansour (2016), Pai (2016), Guerrero-Martinez et al. (2020), Ardic et al. (2016), Codeço et al. (2020), show that simulation may reinforce the mastery of technical gestures and competences, and hence increase students' self-confidence. Sarikoc et al. (2017), Kukko et al. (2020), Pai (2016), Ardic et al. (2016), and Cabañero-Martínez et al. (2021) underline the increase in self-confidence to handle relationships with others and manage emotions in care, including for stress management, team communication and patient communication. Only Brannan et al. (2016) found that simulation and traditional classroom methods do not significantly differ in terms of their impact on self-confidence.

Secondly, simulation training promotes the feeling of competence. Brannan et al. (2016) show that through simulation training, students become aware of their strengths and weaknesses, which increases their sense of competence. After having experienced simulation training, students feel better trained (Codeço et al., 2020).

Thirdly, simulation training may promote the sense of autonomy. Learners placed in the position of decision-makers increase their feeling of autonomy (Fawaz & Hamdan-Mansour, 2016) and have a more active and more motivating learning experience.

The theory of self-efficacy explains the linkage between the feelings of self-confidence, competence, and autonomy. Self-confidence increases the feeling of competence: the more self-confident learners are, the more they feel competent. A competent player sees it as legitimate to play a role in decision-making. Self-confidence thus promotes autonomy. In that sense, the interaction between the feelings of self-confidence, competence and autonomy is *per se* a source of motivation.

The works by Díaz-Agea et al. (2021) and Roh & Kim (2015) underline the fact that simulation training impacts intrinsic motivation much more than extrinsic motivation. All the research cited above points in the same direction since feelings of self-confidence, competence and autonomy are indicators of intrinsic motivation.

The Importance of the Implementation Conditions for Successful Simulation Training

The conditions for implementing simulation training depend to a large extent on the trainer. The trainer controls the atmosphere of the session, the statement of teaching objectives, the choice of scenario, and the style of verbal feedback.

The trainer is involved in implementing a climate of trust during simulation sessions (Dennis et al., 2020; Díaz-Agea et al., 2021). Díaz-Agea et al. (2021) and Sarikoc et al. (2017) show that an environment of trust, mutual respect and symmetrical relationships between participants allows learners to feel safe and build connections among each other. An environment of trust promotes a sense of social belonging, the importance of which self-determination theory emphasises for learner motivation. An inappropriate attitude on the part of the trainer may become a source of frustration and fear (Mano et al., 2019). Learning can

only take place in a confident atmosphere. When not under stress, students become more involved (Zorn et al., 2019). In addition, an atmosphere in which the learner feels safe allows the trainer to work on the emotions of the participants. Emotions can be either a motivational drag or a motivational driver. Positive emotions such as pride and pleasure generate positive motivation for learning while negative emotions such as shame are detrimental to motivation and learning because they negatively impact self-esteem (Behrens et al., 2019).

It is also up to the trainer to announce the learning objectives of the simulation. The trainer can draw attention to how useful the simulation is for the functions that the students will have to perform in the future (Zorn et al., 2019). Thus, the students can perceive the value of the task, which is one of the motivational components described by Viau (1994).

The choice of the scenario should retain the full attention of the trainer. First, an important condition for implementing a successful simulation training is the realism of the scenario. Díaz-Agea et al. (2021) show that the more the scenario reflects reality, the more motivated students are. Then the scenario must be of medium difficulty so that the challenge of achieving it can be met. Scenarios that are too difficult would be a source of demotivation. Learners who succeed in implementing the scenario increase their feeling of self-efficacy (Bandura, 1997). Finally, some leeway can be given to learners as to the choice of the scenario (Zorn, 2020). For example, the learners may be given some room to choose their game partner. Such decisional latitude increases their sense that the task is controllable, which is another source of motivation (Viau, 1994).

The wording of verbal feedback can also be a source of motivation. Saying "areas for improvement" instead of "mistakes" is a good example. Not fearing to make mistakes is the main source of motivation for some students (Díaz-Agea et al., 2021). Positive remarks and constructive comments from trainers also help to strengthen the sense of competence (Zorn et al., 2019).

So, literature shows that the trainer has a prominent role in the simulation process. However, as Dennis et al. (2020) point out, not only trainers but also "peers" can conduct a simulation session. In their research, "peers" are students belonging to the same training programme but enrolled in a higher year. Two groups of students underwent simulation training, one with a trainer and the other with peers. The results show that while there was no difference in terms of self-confidence, learner satisfaction was higher in the peer-led session.

Conclusion

The reviewed literature clarifies the underlying mechanisms and the conditions under which simulation training improves motivation in health students. It stresses the extensive involvement required from trainers for the simulation to achieve all its positive effects. Still, literature is silent about trainers' perspectives over simulation training and its implementation. Future research could usefully explore the views, expectations, and apprehensions of trainers in relation to simulation training.

Also, the work by Dennis et al. (2020) showed that learner satisfaction can be higher if the simulation session is conducted by peers rather than trainers. This research result suggests ways for practice to duplicate simulation sessions when there are not enough trainers. Peers themselves would benefit from piloting simulation sequences since they would thus develop training skills, which are also necessary to supervise internship students as well as

future colleagues. Trainers would train, tutor and mentor peers, and retain the major role of supervising the training and guaranteeing its pedagogical consistence.

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