

Research Article

Strengthening of Hybrid Training Systems at the Avicenne-Jean Verdier Nursing Training Institute due to Covid-19-Related Containment

Zintchem R^{1,2*} and Ngono Zintchem MA³

¹Avicenne-Jean Verdier Nursing Training Institute, CFDC, Assistance Publique-Hôpitaux de Paris, F-93000; Nursing Sciences Research Chair, Laboratory Educations and Health Practices, (EA 3412), UFR SMBH, F-93017, Sorbonne Paris Nord University, Bobigny, France

²Animal Physiology Laboratory, Department of Biology and Animal Physiology, Faculty of Science, University of Yaoundé I, Yaoundé, Cameroon

³International Relations Institute of Cameroon, The University of Yaounde II, P.O. Box 1637, Yaounde, Cameroon

*Corresponding author: Roger Zintchem, Avicenne-Jean Verdier Nursing Training Institute, CFDC, Assistance Publique-Hôpitaux de Paris, F-93000; Nursing Sciences Research Chair, Laboratory Educations and Health Practices, (EA 3412), UFR SMBH, F-93017, Sorbonne Paris Nord University, Bobigny, France

Received: December 09, 2021; **Accepted:** January 04, 2022; **Published:** January 11, 2022

Abstract

In order to limit the impact of Covid-19 on people's lives, containment measures were taken in many countries. But various economic, social, cultural, educational and health sectors had to continue to function. In the education and health sectors, hybrid training arrangements were strengthened to ensure continuity of training for learners in paramedical training institutes. The objective of this study is to show that the Covid-19 containment has contributed to the effective implementation and reinforcement of hybrid training devices at the Avicenne Jean-Verdier Nursing Training Institute (IFSI). After a digital documentary research, a participative and observational study allowed us to analyze the implementation and the effectiveness of the hybrid training devices, as well as the debriefings and the satisfaction questionnaires of the main actors of this training, i.e. the students and the trainers. It emerges that these devices have imposed a spatio-temporal reorganization of the training-learning processes, because of their double deadline: face-to-face and distance, synchronous or asynchronous. Hence the feeling of fear, anxiety and sadness of some students, both in theoretical and clinical training, increased by the difficulties for some of them to adapt to this new pedagogical situation. The face-to-face tutorials, although limited, were beneficial for both students and trainers, because of the interactivity. The EffeTheia[®] platform, which is usually used, and the free collaborative platforms Zoom[®] and Teams[®] were very helpful in this hybrid training system, which is gradually moving towards blended-learning.

Keywords: Hybrid training; Nursing; Covid-19; Containment

Introduction

The SARS-CoV-2 it is at the origin of the infectious disease named Covid-19, for Coronavirus Infectious Disease 2019 [1]. The virus is transmitted by aerosol or by human contact with contaminated sprays, present on the skin or on supports such as door cuffs [2,3]. Its high contagiousness and prevalence have a strong impact on health care systems, which are therefore under great pressure. Indeed, as of October 27, 2021, 244,285,733 cases of infection were confirmed and 4,964,666 deaths worldwide, 7,146,755 positive cases and 117,593 deaths in France [4]. In order to limit this contagion and the inherent tense flow in of patients care in hospitals, containment and home care measures for less serious cases have been taken in many countries. Thus, more than 3 billion people have been subjected to containment according to WHO recommendations [5].

France could not be on the sidelines of these recommendations. On March 16, 2020, during his address, the President of the Republic, Emmanuel Macron, decided to take security measures to reduce to the strictest minimum contacts and travel throughout the country as of Tuesday, March 17 [6]. However, it was necessary that activities of human development, and therefore of the nation, should not stop. Indeed, the various economic, social, cultural, educational and health sectors had to continue to function. In the educational and health sectors, the pedagogical systems were reorganized to ensure

the continuity of training for learners. Thus, distance learning has been emphasized in the nursing training institutes (IFSI). It is in this context that we have conducted a reflection on the strengthening of hybrid training systems in a paramedical training institute of the Paris Seine-Saint-Denis University Hospitals Group, Training and Competence Development Center (CFDC) of the Assistance publique - Hôpitaux de Paris (AP-HP): the Avicenne-Jean Verdier Nursing Training Institute.

The objective of this study is to show that the Covid-19 containment has contributed to the effective implementation and strengthening of hybrid training systems in nursing training institutes, such as the Avicenne Jean-Verdier IFSI. More specifically, it is about:

- Define the conceptual elements of E-learning;
- Outline a theoretical foundation for E-learning;
- Describe the effective implementation and strengthening of hybrid training systems at Avicenne-Jean Verdier nursing training institute during and after the containment (March 2020-August 2020);
- To critically analyze this implementation.

Methods

A literature search was conducted on different digital databases

such as PubMed, EM Premium, CAIRN, Google scholar, and Web of Science. Our goal was to search for publications related to our specific research objectives. We were therefore interested in publications on the conceptual and theoretical elements of E-learning, and on the implementation of hybrid systems. From the preparatory meetings to the implementation, we had participated in all the steps and articulations of the implementation of this training from March 17, 2020 to the end of the academic year (August 31, 2020). Hence this participatory and observational study where we first took stock of the training devices before the confinement. We analyzed the different reorganizations of the pedagogical devices and the readjustments of the actors of the teaching-learning process (learners, trainers, administrators) related to them. Then, we also analyzed 10 satisfaction questionnaires of the different external contributors and 70 satisfaction questionnaires of the students. The satisfaction questionnaire of the external contributors was essentially made up of closed questions, with a single choice in the form of a LIKERT scale with 4 levels of satisfaction on the reception, the organization of the teaching, the material and pedagogical conditions of intervention, and the collaboration with the pedagogical referents. The one intended for the students was made up of questions of the same satisfaction scale, but on the organization of the teaching sessions and their understanding of the teaching interventions. A debriefing on this hybrid was done with about thirty students whose training path we are in charge of following, as well as during regulation meetings between colleagues and trainers.

Conceptual and Theoretical Framework of Tele-Training

Tele-training: a polysemous concept

Training is the consideration of the globality of the educational act, beyond the disciplines, in order to study the concrete problems of the learners (relational, life experience...) in all their dimensions [7]. In distance learning, this consideration is done by means of information and communication technologies (ICT), connected objects (devices), networks, editorial offers and software to facilitate their use [8]. Various interactions are therefore possible such as wiki, blogs, video conference, platforms, portfolio, forums, through browsers such as Internet, Intranet, Mozilla Firefox, Internet explorer, Microsoft Edge, Google Chrome.

Tele-training is worded and defined in several ways such as E-learning, educational Web, E-training, e-learning... [9]. The General Delegation for the French Language and Languages of France (GDLFL) speaks of E-learning to designate all the solutions and means allowing learning by electronic means [10]. For the European Union, it is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services on the one hand, and exchanges and collaboration at a distance on the other [11]. The term E-learning, more used by experts in training-learning processes, evokes more the action of learning than that of training [12]. But whatever the name used, it is a training that uses the resources available in information and electronic communication techniques [13]. If we refer to the work of Craipeau, Korte et al., tele-training is a derivation of theoretical or practical distance training at the training institute [14,15]. Tele-training can therefore vary according to the place (home, institution), the conditions of the

training-learning process (learners/trainers at home, at the training institute or at the documentation and computer center), the duration (permanent, alternating and occasional tele-training) and according to the status of the student and the pedagogical contributors (trainers, external contributors). Since this study is more concerned with the implementation of E-learning systems, involving all the actors in the training, we will not dwell on this distinction. Thus, the learner who carries out knowledge and skill acquisition activities is in tele-training as is the trainer who carries out remote or immediate preparation of his or her teaching intervention. If both are actors of the training, one, the learner, is in the process of acquiring knowledge while the other, the trainer, is in the facilitation of the acquisition of this knowledge. The trainer creates multimedia digital training devices that he makes available online to learners (asynchronous distance learning), or communicates directly with them (synchronous distance learning). The latter can thus consult or download them and respond, if necessary, to the trainer's requests in terms of self-assessment assignments or to transmit them to the trainer for correction. The link between these two actors is that digitized and often individualized content of learning or tutoring that these two actors deposit on a platform. And the administrator is responsible for the installation as well as the management of the rights granted to these actors of the teaching-learning process.

Some theoretical milestones in telelearning

The following theories, which will be briefly studied, are not pedagogical currents and methods, but epistemological paradigms of reference and organization of knowledge that will enable us to give the theoretical orientation that we conceive of tele-training. This is an educational system (virtual pedagogy and didactics) that uses digital technologies (platform for tele-training) and the learning theories are also applicable in the digital field [16]. The teaching-learning processes have been nourished by two opposing epistemological currents: the rationalism of Socrates and Plato, which advocates the maieutics of existing knowledge, and the empiricism of Aristotle, which defends learning through experience [17]. The art of distance learning builds on both of these currents as the trainer can use both maieutics and experience to facilitate the acquisition of knowledge in learners. However, nursing training, which is based on the competence approach, emphasizes all the theoretical knowledge that the student applies in a care situation for competent action [18,19]. Competencies are therefore built on experiential experience (not necessarily transmitted), which is reflective, dynamic and linked to established practices. The empirical current therefore seems to be more suitable for tele-training in nursing. It gave rise to behaviourism (Pavlov, Watson, Thorndike and Skinner), according to which learning occurs through stimulus-response association. In nursing tele-training, digital content is a learning stimulus [20] that will be returned (responses) during formative and then normative evaluations, and for which the trainers' encouragement will be a reinforcement. Cognitivism (Gagné, Bruner, Tardif), which defends that learning is the acquisition or reorganization of cognitive structures, stems from behaviorism and constructivism (Piaget, Bruner). The latter postulates that learning is an active process of acquiring knowledge based on experiential experience in relation to adaptation.

The conjunction of these three learning theories (behaviorism

cognitivism and constructivism) is at the origin of socioconstructivism (Perret-Clemond, Bruner Vygotsky), which adds a social component to constructivism in the sense that the construction of knowledge and the development of skills are also done through contact with others. According to this theory, learning is an active process, based on experience, culture and social interactions (individual or group collaborative actions, between peers and/or with the trainer). Through the management of its cognitive system, the reorganization of representations and its metacognitive practices [21] and learning contributes to the emergence of the zone of proximal development. Indeed, in the framework of nursing training in France, and according to the competency-based approach, the student mobilizes knowledge from interactions with various resources (human, material...) to implement them in care situations, first supervised, then in full autonomy. Distance learning is also based on socioconstructivism in that it improves, through previous experiential experiences, tutorials, communication processes to the learner's socio-cultural training environment [22]. These communication processes are represented by the contents and resources of the virtual space which allow interactions, on the one hand between peers, and on the other hand with the trainers, but which contribute to the process of construction of their theoretical and practical knowledge. Socio-constructivism is therefore the most appropriate approach to distance learning.

Implementation of Hybrid Training

Steps

One of the dimensions of the crisis caused by Covid-19 is the way digital technology has accelerated in our lifestyles. For example, in a few weeks, the use of digital products and services has spread throughout the world in general and in France in particular. But, the implementation of hybrid training as in, telework is based on some cognitive operations as the spatiotemporal conjunction of place, time and action [23]. According to Walrave's work [24], we can break down the implementation of hybrid training at nursing institute into 5 steps:

- Reflection on this system in order to establish a dialogue with the stakeholders, taking into account the prerequisites for success, such as the activity or location of the training, the personal characteristics of the actors, the characteristics of the IFSI;
- Definition of the objectives and composition of the project teams as well as the establishment of a charter or policy for hybrid training;
- Preparation of the project, by conducting surveys of the institution's stakeholders (administrators, students, trainers, managers, etc.), defining of the rules of eligibility for the training and clear communication of these rules;
- Launching the project by offering online or telephone assistance to stakeholders and taking initiatives to prevent the social isolation of learners;
- Make an interim assessment of the project.

Hybrid training system

The hybrid training system is a combination of two training modalities, distance and face-to-face [25]. In the distance component,

tele-training, like telework, is based on a few cognitive operations such as the spatiotemporal conjunction that can be broken down into 3 units adapted from Taskin's telework [23]:

- The unit of place where trainers, from the place where they are, deliver training contents while controlling the presence and participation or not of students wherever they are. Interactions are set up within the framework of active methods, especially during tutorials. For this purpose, the trainer can subdivide his tutorial group into subgroups, with specific tasks and instructions.
- The unit of time, which allows the assimilation of the students' connection time online and their interactive responses;
- The unit of action, which defines in advance the procedures to be followed, the methods, the rules, the instructions and responses to be given for each situation.

This fundamental assumption of time geography theory is that students' daily activity plans are limited by spatio-temporal restrictions imposed by participation in certain mandatory activities in a fixed, predetermined location [26,27]. Thus, one cannot do directed assignment or lecture while conducting other activities. The place and time of the students' hybrid training are therefore anchors of their daily life activities, which, as a result, require a certain organization.

Hybrid training thus appeared as a palliative to the geo-temporal constraints of travel in connection with Covid-19, due to its possibility of offering several alternatives in connection with the spatiotemporal variations and the contents of training-learning. In fact, one is no longer obliged to travel, but can stay at home or in a chosen place and enroll in the training-learning process, which thus becomes flexible [28]. The asynchronous nature of the distance learning device [29] allows some students, such as those in professional promotion, to complete certain stages of their training while carrying out family life activities. Others can also take advantage of it to alternate certain income-generating survival activities with their training. However, the confinement that imposed staying at home because of the pandemic linked to the Corona virus was a brutal inducing factor of this hybrid training that upset the usual rhythms of higher education. The particularity of nursing education lies in its competency-based approach [30], which allows students to mobilize the knowledge of theoretical training in practical clinical care situations. Hence a certain particular implementation in nursing training institute such as Avicenne-Jean Verdier.

III.2 Implementation of the hybrid system at the IFSI Avicenne-Jean Verdier

As in all educational sectors in the world, the IFSI Avicenne-Jean Verdier has undergone an abrupt change in its training system. The singularity in this field of paramedical training lies in the competency-based approach and the integrative alternation linked to Kolb's experiential learning [31], which guides students towards autonomy [32]. Thus, learners acquire their skills through theoretical knowledge at school, which can be used in various clinical situations, according to the decree of 31 July 2009 concerning the state diploma of nursing. Nursing schools had already implemented digital devices to facilitate the acquisition of skills by our students. Indeed, for several years,

the teaching team of the institute has been using a digital teaching platform in order to diversify the teaching devices and methods. Thus, the IFSI had:

- PowerPoint lectures, sometimes with sound;
- Self-assessment tests (quizzes) and various teaching aids for certain teaching units;
- Evaluations in different forms and the results of these evaluations;
- Satisfaction reports on students learning conditions as well as on the pedagogical services of the trainers, external contributors and on the evaluation of student knowledge;
- A mailing system for digital letter exchanges between the various actors of the training which are the students, the trainers and the administration;
- A digital library offering to students, the alternation of the different training courses by semester, their schedule, the online training documents (procedures, training allowances, transport costs, blood exposure accident, semester guides, articles, books, resources related to their quality of life such as accommodation, the psychological support cell, scholarships);
- Digitized procedures, linked to the quality approach such as the declaration of undesirable events.

With the competency-based approach to training, and this diversification of teaching methods, the all-digital or distance learning approach was practically impossible during the containment. The hybrid system, with less face-to-face training, was therefore more appropriate, as our students are trained to provide care in general, and are therefore on the front line in the management of patients with Covid-19. Before the implementation and reinforcement of these crisis hybrid systems, the training health executives, multimedia referents and those in charge of the EffeTheia® digital platform first defined the objectives of implementing these emergency educational systems in relation to the health crisis. For these managers, the objectives of these systems were to:

- Ensure the continuity of training by respecting barrier measures and physical distancing;
- Avoid a blank year in the training of our students;
- Remotivate the learners and offer them knowledge of general culture and methodology of university work [25];
- Reduce as much as possible, the contamination of students and trainers and therefore the incidence of Covid-19.

These objectives were followed by the conditions of realization. Thus, laptop computer equipment as well as VIP Access® applications was provided to the trainers by the general management of the AP-HP, so that they could connect at home. Four training actors were involved in these devices in accordance with the recommendations of the High Health care authority (HAS) and the Regional Health Agency (ARS) of the Île de France [33].

- The administrators of the Assistance Publique- Hôpitaux de Paris whose technical role was the installation and maintenance

of the system. In addition, they ensured the rules and proper use of this platform;

- The health executives and multimedia trainers who had the software or tutorials for connection, creation and management of educational content as well as for the evaluation of this content. They created tutorials for trainers and students after short training sessions and then created accounts and rights to use the Zoom® or Teams® applications;
- The trainers and external contributors who created teaching aids and adapted evaluation tests;
- The learners who consulted or downloaded the documents posted online or submitted their own documents requested by the trainers, while respecting the instructions. A listening and support system was set up for these learners.

The training systems were:

- Synchronous distance learning (at the same time) or asynchronous distance learning (chronologically shifted) for lectures and some tutorials. The students support in their theoretical and clinical training course as well as the pedagogical follow-ups were done by synchronous distance learning. The pedagogical follow-ups and guidance of the end of training thesis were carried out by this device. Within the framework of the decree n° 2020-290 of March 23, 2020 prescribing the general measures necessary to face the epidemic of covid-19 [34] and of the ministerial decree May 29, 2020 [35], a regional adjustment was made for the evaluation of the teaching unit "Initiation to research" with, among other things, the suppression of the exploratory investigation and of the oral argumentation. Many teaching units have been evaluated in this way.
- Face-to-face for practical work such as simulation or nursing sciences and techniques, interventions such as "therapeutics and contribution to nursing diagnosis" (preparation and injections of therapeutics, placement of a Huber needle: skill 4). The evaluations of these teaching units also took place in person.

In the case of the IFSI Avicenne-Jean Verdier, the confinement measures that imposed working at home did not exclude travel by student trainers and administrative staff, who were therefore granted a travel waiver for these training actors with proof of professional travel. Thus, travel between home and the place of work was essential when the activities could not be organized remotely or when business travel could not be postponed. At the beginning of the crisis, Covid-19 ad hoc remote training was at home at first and with the differential deconfinement measures; it became alternating, remote and face-to-face as needed.

Critical Analysis of the Implementation and Strengthening of Distance Learning: Development of Blended Learning

Among students

According to the debriefing on hybrid training carried out with 30 students during the pedagogical follow-up meetings on their training path, it emerges that these systems imposed a spatio-temporal reorganization of learning because of their double deadline, face-to-face and distance, synchronous or asynchronous. The students,

like their trainers, were anxious about two unknowns: the outcome of the health crisis and the adaptation of these new hybrid training devices. According to some students, as if the morbid information about Covid-19 was not enough, the trainers added other sources of anxiety related to their training. Hence, the feeling of fear, anxiety, and sadness those other students experienced in both theoretical and clinical training [36]. Nevertheless, the majority of students (55 out of 70 or about 79%) were comfortable with these devices because they were familiar with the use of digital tools as well as their adaptation in the online training-learning process. Documentation of student satisfaction with E-learning focuses on convenience, engagement, ability to work at their own pace, and voicing their opinions [37]. According to Paechter and Maier, there are 5 factors associated with this student satisfaction with hybrid training devices: clarity, structuring, knowledge acquisition, online expertise of digital referees, coaching and support from instructors, and support for collaborative learning [38]. Others (2 out of 70, i.e., 3%) recognized that these tools were paradoxically unable to be easily linked to online training. This could be explained by G. Simondon's symbolic halo effect mentioned by Anne-Françoise Garçon [39], where the use of these technological tools for other purposes escapes students because they are unaware of their functionalities. However, the trainers made sure that all the students had the same level of integration of these digital technologies, in terms of acquisition of pedagogical content and online evaluations. 1 or 2 students who were not able to log in during certain assessments and this were due to their inability to acquire basic numerical knowledge which was remedied during the make-up sessions.

Among the trainers

Face-to-face training: With the face-to-face system, the logistical management had been alleviated by the constraints of the capacity of less than 50% of the students on the campuses [40]. The management committee of the IFSI had therefore decided to alternate the presence of students, with the 1st years on Monday and Tuesday, the 2nd years on Wednesday and Thursday and the 3rd years on Thursday and Friday. The management of the premises was thus facilitated and despite the insufficient number of trainers, this reorganization went well. However, probably because of the limitation of travel or the fear of contamination, some external contributors did not honor their commitment. This resulted in the posting of their teaching from the previous year, with an explanation of the contents by the referent trainers of the teaching unit after the agreement or readjustment of the said lecturers. The presence of the trainers was also limited in the offices, and a table for monitoring their activities as distance learning was set up by the administration, under the recommendations of the AP-HP general management. Furthermore, the face-to-face tutorials, although limited, were beneficial for both students and trainers; and the 10 external speakers confirmed this in the satisfaction questionnaire. The 10 external speakers confirmed this in the satisfaction questionnaire, as they allowed for interaction, group dynamics, improved knowledge between peers, and pleasant and interactive communication between the two actors, with the possibility for the trainer to vary the teaching methods.

Distance learning: The Elffe Theia[®] platform, usually used, was a great help in this hybrid training system. Indeed, not only did it ensure the continuity of training as in the past, because

the pedagogical contents, the instructions and the results of the evaluations were deposited there, but also almost all the evaluations, although reorganized, were done online by this platform during this period of confinement. The digital referent trainers ensured the integration of this tool through formative evaluations before moving on to normative ones. The collaborative platforms Zoom[®] and Teams[®], which are free of charge, were available to the training actors; But Zoom[®] in this free form limited the number of students to 100, while the number of students in each cohort of nursing students was 200. This led some of the lecturers to organize their pedagogical intervention in two stages, thus increasing the additional costs. The use of Teams[®] was complex, even improbable, due to a Wifi connection or insufficient bandwidth, which was the cause of some students' computer screens going blank. The external lecturers, some of whom were used to the Teams[®] platform, have massively adhered to these new remote teaching methods. Some courses given by university lecturers were not adapted to distance learning and the image and intellectual property rights of these lecturers were raised by these providers. However, new "contracts for online teaching services and assignment of intellectual property rights" were drawn up.

Some students were tired or fatigued during certain lectures or tutorials, which became soporific as a result. And the right to the image did not allow the trainers to demand their image during the teaching interventions in distance learning. Hence these "voluntary black screens" to whom we were teaching, thus limiting interactivity. To get around this, I had at my disposal a list of students that I named at random and asked them questions about the course or the directed work in order to know if they were present and if they were actively following the teachings. This led to the sidelining of their video and the attempt to answer the question, thus making the lessons active. Some of these students had even admitted that they had fallen asleep during the lecture or were doing other activities. One student declared during a pedagogical follow-up that he was driving in his car, which led to an immediate stop of the conversation by his pedagogical follow-up referent and a reframing. Moreover, the audiovisual pedagogical contents were deposited on the Elffe Theia[®] platform, thus allowing the students to access them at their own pace, at the desired moment, thus illustrating certain flexibility in the learning of a certain student profile [41]. However, some content was not downloadable or accessible due to the lack of appropriate software, which was a double penalty for students with limited digital skills. However, 2.4% of students were unable to use the Internet and 2.1% had no equipment. The problem with distance learning was thus more related to the quality of connections and the availability of computer equipment, both of which were sometimes shared in students' families or living quarters [40].

Assessments

Training sessions on the construction of evaluations were carried out by digital referents who then made available tutorials for trainers. The tests were reorganized in accordance with the order of 27 March [42], the order of 20 May 2020 [35] and the recommendations of the Regional Health Agency (ARS) of the Île de France [43]. Overall, the tests have been lightened in 2019, in terms of wording and number of questions. However, in 2020, the number of questions was the same as in the tabletop paper assessments. Looking at the pass percentages, there was a strong increase, especially in the biological and medical

sciences, which are contributory to the nursing profession. It is difficult at this time to attribute this increase to the online assessment because the predictors of these performances (psychosocial factors, cognitive skills) [44] are difficult to assess. However, evaluators, especially academic experts, have pointed out the limitations of these assessment devices and recommend a return to traditional paper-based assessments.

Perspective

Besides ElffeTheia[®], the Teams[®] and Zoom[®] platforms are now part of our educational devices, especially for synchronous pedagogical activities. The digital platform Mischool completes this device for English language learning. For future training, we suggest blended-learning, which is a pedagogical device combining online and face-to-face courses, with a substantial part of the content delivered online, and using discussions and a number of face-to-face meetings that combine face-to-face and distance learning [45]. This method is part of a socioconstructivist approach and promotes flexibility, autonomy and student motivation. Indeed, it has provided effective preliminary evidence in the field of telehealth learning [46]. Furthermore, to improve the training-learning process, discussion forums and playful tools (serious, escape games) are included in teaching units such as UE 3.1: Reasoning and clinical approach and in the pedagogical project "Reflexivity" [47,48]. Comodal lectures with synchronous teaching and learning activities offered simultaneously in face-to-face and distance learning [49] will be an added value to improve the training of our students. Formative evaluations, in the form of online quizzes on the ElffeTheia[®] platform, will also be a great contribution to this blended learning. All these systems require, on the one hand, adapted equipment and digital skills for both the trainer and the learner, and on the other hand, an improvement of the materials to make them attractive. Satisfaction or feedback questionnaires from learners, trainers and external contributors would be part of a training quality approach.

Conclusion

In spite of the accelerated implementation of hybrid training systems, we have come to the conclusion that it will be impossible to return to the pre-crisis systems because the reorganizations and regulations no longer allow it. On the other hand, hybrid training would have made a great contribution to the training-learning process, even without the social distancing measures. It is therefore important, for a quality training, to retain the quintessence of the two systems of before and during the confinement, for devices adapted to a future individualized training. But upstream, an appropriation of digital technologies is necessary before a real implementation of the hybridization (blended learning) of teaching-learning processes. This implementation is in line with the Digital Health Acceleration Strategy (SASN) on at least two of its five axes which are : developing training, the confidence of players and the attractiveness of the health profession, preparing the future generation of technologies, key in digital health, and facilitating the rapid transfer of research results. Indeed, this strategy "is aimed at the greatest number of people, from students to entrepreneurs, while ensuring that it is accessible to the general public". We are already behind the ministerial roadmap for digital health (MSS-DNS) 2018-2022 [50] where training appears as a means to accompany the acceleration of the digital shift. Hence the

need for a rethinking of the initial training repositories, in particular, work methods, teaching units of the nursing training, where we could introduce learning modules in digital technologies.

References

1. World Health Organization. World Health Organization Best Practices for the Naming of New Human Infectious Diseases.
2. Paules CI, Marston HD, Fauci AS. Coronavirus infections-more than just the common cold. *JAMA*. 2020.
3. Bai Y, Yao L, Wei T, Tian D-Y, Jin F, et al. Presumed Asymptomatic Carrier Transmission of COVID-19. 2020.
4. Santé publique France.
5. OMS Soins à domicile pour les patients présumés infectés par le nouveau coronavirus (virus de la COVID-19) qui présentent des symptômes bénins, et prise en charge des contacts. Lignes directrices provisoires 4 février. 2020.
6. Décret n° 2020-260 du 16 mars 2020 portant réglementation des déplacements dans le cadre de la lutte contre la propagation du virus covid-19.
7. Allouche-Benayoun J, Pariat M. La fonction de formateur. Paris: Dunod. 2000.
8. Las Vergnas O, Macedo-Rouet M, Salméron L, Rouet J-F, Gaudry-Muller A, et al. Le e-learning informel? des apprentissages diffus, noyés dans la participation en ligne. Paris: Archives contemporaines. 2017.
9. Gaudry-Muller A. Le recours au E-Learning informel par les infirmiers en situation de travail: dépannage ou formation professionnelle. In *Le e-learning informel? des apprentissages diffus, noyés dans la participation en ligne*. Paris: Archives contemporaines. 2017.
10. Journal officiel du 14/05/2005, Délégation générale à la langue française de France (DGLFLF).
11. Hall B. E-Learning: le guide de référence: former vos salariés par l'Internet. Paris: Maxima. 2002.
12. Ngu Leubou R, Crespín B, Trestini M, Zintchem MA. A web-based collaborative virtual reality environment for distance learning. *International Journal of Scientific and Research Publications*, IJSRP Inc. 2021; 11: 182-188.
13. Raynal F, Rieunier, A. Pédagogie, dictionnaire des concepts clés: apprentissages, formation, psychologie cognitive. Paris: ESF Sciences Humaines. 2018.
14. Craipeau S. Le télétravail: quelle alternative? In *Stratégies de communication et territoires*, Musso P & Rallet A. Paris: L'Harmattan. 1995: 201-229.
15. Korte WB, R Wynne. *Telework. Penetration, Potential and Practice in Europe*, Amsterdam: IOS Press. 1996.
16. Capacho J. Validation of learning theories in their relationship with information and communications technology. *Turkish Online Journal of Distance Education*. 2018; 19: 166-188.
17. Ertmer A and Newby TJ. "Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective." *Performance improvement quarterly*. 2013; 26: 43-71.
18. Le Boterf G. Agir en professionnel compétent et avec éthique. *Éthique publique [En ligne]*. 2017; 19.
19. Nagels M. *L'approche par les compétences INFAS*. 2015.
20. Klačnja-Milićević A, Vesin B, Ivanović M, Budimac Z & Jain LC. Agents in E-Learning Environments. En *E-Learning Systems*. New York: Springer. 2017: 43-49.
21. Boissart M. Le mémoire en formation infirmière en France: exemple d'un dispositif à visée socioconstructiviste. *Recherches en éducation*. 2014.
22. Kuo Y-C, Belland BR, Kuo Y-T. Learning through Blogging: Students' Perspectives in Collaborative Blog-Enhanced Learning Communities. *Journal of Educational Technology & Society*. 2017; 20: 37-50.

23. Taskin L. Télétravail: Les enjeux de la déspatialisation pour le management human. In: Télétravail, travail nomade, e-work et travail à domicile les enjeux actuels. Revue Interventions économiques. 2006: 34.
24. Walrave M. Comment introduire le télétravail. *Gestion*. 2010; 1: 76-87.
25. Boelens R, Van Laer S, De Wever B, Elen J. Blended learning in adult education: towards a definition of blended learning. Université de Gent, Belgique.
26. Craipeau S. L'entreprise commutante ou travailler ensemble séparément. Paris: Lavoisier. 2001.
27. Ngono Zintchem MA. Higher education in the face of the Covid-19 crisis: critical analysis of the incomplete use of distance learning in Cameroonian state universities. *IRESPUB Journal of Engineering & Computer Sciences, IRESPUB*. 2021; 1: 1-14.
28. Al-Qahtani AAY, Higgins SE. Effects of traditional, blended and e-learning on students' achievement in higher education. *Journal of Computer Assisted Learning*. 2013; 29: 220-234.
29. McCutcheon K, O'Halloran P, Lohan M. Online learning versus blended learning of clinical supervisee skills with pre-registration nursing students: A randomised controlled trial. *International Journal of Nursing Studies*. 2018; 82: 30-39.
30. Sacré M, Toczec MC, Policard F, Serres G, Paulet C, et al. L'efficacité d'un dispositif d'enseignement hybride en fonction des caractéristiques des étudiants. *Revue Internationale des Technologies en Pédagogie Universitaire, Conférence des recteurs et principaux des universités du Québec [CREPUQ], Le numérique et l'enseignement au temps de la COVID-19: entre défis et perspectives - Partie 1*. 2020; 17: 9-29.
31. Kolb DA. *Experiential Learning: Experience as the source of learning and development*. Englewood Cliffs, N.J: Financial Times/Prentice Hall. 1983.
32. Adinda D, Marquet P. Les stratégies d'accompagnement vers l'autonomie: le cas d'une formation hybride de réorientation des néo-bacheliers à l'université. *Revue internationale de pédagogie de l'enseignement supérieur*. 2017; 33.
33. Application du plan organisationnel en Ile-de-France pour les étudiants en santé pendant la crise sanitaire Covid-19 Recommandations: Etudiants1 en formation paramédicale. Dernière actualisation du 30 mars 2020.
34. Décret n° 2020-293 du 23 mars 2020 prescrivant les mesures générales nécessaires pour faire face à l'épidémie de covid-19 dans le cadre de l'état d'urgence sanitaire.
35. Arrêté du 29 mai 2020 relatif aux aménagements de la formation en soins infirmiers et aux modalités de délivrance du diplôme d'Etat d'infirmier dans le cadre de la lutte contre la propagation du virus covid-19.
36. Chandler-JS, Nohra R, Loizeau V, Lartigue-Malgouyres C, Zintchem R, Naudin D, et al. Perceptions and experiences of the coronavirus pandemic amongst frontline nurses and their relatives in France in 6 paradoxes: a qualitative study. *Int. J. Environ. Res. Public Health*. 2021; 18.
37. Paechter M, Maier B, Macher D. Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers & Education*. 2010; 54: 222-229.
38. Hall S, Villareal D. The hybrid advantage: Graduate student perspectives of hybrid education courses. *Int. J. of Teaching and Learning in Higher Education*. 2015; 27: 69-80.
39. Garçon AF. Pour un humanisme technologique. Culture, technique et société dans la philosophie de Gilbert Simondon, Xavier Guchet, PUF, collection. *Pratiques théoriques*. 2010: 280. e-Phaïstos. *Revue d'histoire des techniques/Journal of the history of technology*.
40. Rouet G, Raytcheva S, Côme T. La Covid-19 et l'organisation des études universitaires: injonctions et adaptations. *Revue Gestion & Management public, numéro spécial*. On line. 2021.
41. Fernandes E, Kramar N, Lanarès J, Paschoud P. Flexibilisation de l'enseignement: utilisation des technologies et approches complémentaires. Riset, Université de Lausanne. 2011.
42. Ordonnance no 2020-351 du 27 mars 2020 relative à l'organisation des examens et concours pendant la crise sanitaire née de l'épidémie de covid-19.
43. Application du plan organisationnel en Ile-de-France pour les étudiants en santé pendant la crise sanitaire Covid-19 Recommandations: Etudiants en formation paramédicale.
44. Dupont S, De Clercq M, Galand B. Les prédicteurs de la réussite dans l'enseignement supérieur. *Revue française de pédagogie. Recherches en éducation*. 2015; 191: 105-136.
45. Allen IE, Seaman J. *Class Differences: Education in the United States*. Sloan Consortium.
46. Guiberson M, Rodríguez BL, Zajacova A. Accuracy of telehealth-administered measures to screen language in Spanish-speaking preschoolers. *Telemedicine and e-Health*. 2015; 21: 714-720.
47. Zintchem R, Grasset A, Khelifi L, Braccagni C. Entre créativité, identité et réflexivité: l'expérience du CV imagé en IFSI. Being published. *Objectif Soins et Management*. 2021.
48. Khelifi L, Grasset A, Zintchem R, Braccagni C. Initiation à la posture réflexive en IFSI par une activité inspirée des escapes games. Being published. *Revue de l'infirmière*. 2021.
49. Sawsen L, Heilporn G, Mukamurera J, Bédard M-E. Choisir le cours comodal: conditions pédagogiques, technologiques et organisationnelles favorable. 2021.
50. Stratégie d'accélération. *Santé numérique*. 2021.