

6 Health and life sciences digital learning for various target audiences within innovative university ecosystems: case studies

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Abstract

The health and life science ecosystem is subject to rapid cycles of technical and procedural innovation, making lifelong learning essential for all sector stakeholders. However, there are major obstacles to the organization of, and access to, continuing education. This chapter illustrates six case studies launched at the sector's request. They reveal how the use of digital learning and a hybrid approach (combining classroom-based and remote learning) boosts learnability, creates more dynamic learning environments by providing a more effective response to expectations, and removes obstacles by streamlining access to training for as many learners as possible.

6.1 Introduction

The health and life science sector is a complex socioeconomic ecosystem as it encompasses a wide range of roles and stakeholders who work as part of a daily effort to improve human health. The research and education taking place within universities contributes to the sector's dynamism. While innovation stems from the results of research, lifelong learning is a powerful tool for transferring knowledge and skills and maintaining the high level of skills required in this sector of activities.

This evolving ecosystem, characterized by rapid cycles of innovation, has a constant need for new skills, and demands that a varied pool of talent profiles is at hand to support it as it grows. To illustrate this

need, a campus that is home to health, biomedical, biopharma, and life sciences departments will also be home to around 300 different professional roles (IFIC 2016; BioWin 2020). These roles are occupied by employees from a varied range of complementary professional backgrounds, with very different educational backgrounds spanning the ISCED levels.

It is not realistic to expect that, today, a lifetime's worth of skills can fit into a single initial qualification, whatever the level of education. The knowledge and skills acquired should be seen as perishable goods that always need to be refreshed. Learnability is a key concept that should be encouraged, and lifelong learning is an effective way to do so.

However, a series of obstacles face continuing education. First, European surveys (Eurostat 2016) describe the barriers encountered when trying to access adult education and training. These include a lack of availability and a lack of time, costs, health problems, the lack of employer support, course content that does not match field realities, geographical distances, entry criteria and, last but not least, a negative opinion associated with initial training that was not stimulating enough.

Second, particular aspects of the health ecosystem complicate the delivery of training programs. Examples of these include the speed with which knowledge and skills become obsolete, the rapid growth of particular activities, the lack of equipment available for training, along with its cost, the diverse range of profiles that require training, and the mobility and geographical locations of attendees.

If learning strategies that remove the obstacles listed above can be developed, continuing education is an essential tool for lifelong career development (Toffler 1974). We present six case studies to illustrate hybrid or 100% online training models that are agile and flexible enough to meet health and life science field expectations and overcome the constraints highlighted above.

6.1.1 Case studies

We ran each case study in response to the field requirements. The course's pedagogical and didactic approaches were developed according to the context of their target audience. For each case study, we will clarify the context, the target audience, the methods used, and the results obtained.

6.2 Training needs that require equipment or environments that are not readily available

6.2.1 Context and target audience

Access to specialist equipment—often expensive and quickly obsolete—is a real obstacle to training. Due to budgetary or technical reasons, initial and continuing education providers do not always have access to this equipment. The development of digital training modules could remove this obstacle by enabling experimentation in an e-laboratory environment, among other things for procedural manipulation (Blumstein *et al.* 2020). Here we present two examples of this, each with its own target audience, namely flow cytometry and cell culture using a laminar flow hood.

6.2.2 Training model and methodology

A flipped classroom to teach flow cytometry

This case study used a flipped classroom model for vocational course teaching staff (undergraduate level) and their students, for training in the theory and practice of flow cytometry. There were two learning phases: independent study for the theory phase, and a laboratory-based practical phase. More specifically, the theory was taught through an online module that presented how the device worked, along with the underlying theory, accompanied by concrete examples to put the theory into context. To consolidate and cement this independent learning, students could complete quizzes to test their understanding of the module as part of a self-assessment process. Once students had completed the theory course, the next phase was live experimentation in a professional environment with supervision from a technical expert.

Teaching cell culture with a virtual reality serious game

This teaching method consisted of using a virtual reality module (VR) to teach cell culture using a laminar air-flow hood. It was developed to train lab technicians and remedy employer anxiety concerning the availability of staff trained to work in aseptic environments. The VR module was then offered to master's students who need to learn this technique during their initial education. The VR activity is presented as a video game. It includes, as an introduction, a reminder of the essential rules to follow when working with a laminar flow hood and in cellular biology procedures. The learning sequence is broken up into six sequential stages, with each building on the last and increasing in difficulty. This means that students can stop playing at any time and later pick up where they left off.

6.2.3 Solutions to the initial need delivered by the e-laboratory

Via the flipped classroom to teach flow cytometry

It is neither realistic nor desirable for most educational establishments and training centers to own flow cytometer instruments (as many other large or costly instruments) to be used solely for training. This kind of expensive device needs to be used every day by staff with advanced technical skills. Thus, for the practical teaching phase, the school signed a partnership with a lab that used flow cytometry as a matter of routine.

In terms of pedagogy and didactics, the flipped class was initially offered to teaching staff so that they could receive training in or refresh their skills in what has become an essential technique in clinical biology. This enabled knowledge to be passed on, with a multiplier effect, to students studying toward their initial education.

Furthermore, through this integrated and immersive independent learning method, students were immersed in a professional, relevant, and stimulating learning environment.

Via virtual reality to teach cell culture in an aseptic environment

First and foremost, this VR method increases the time each learner can practice by increasing the number of virtual workstations available, while drastically reducing the time needed to complete an experiment by removing the need to wait for extended periods for cell culture incubation.

In terms of pedagogy and didactics, this immersive method enhanced learning quality through genuine experience-based learning in which mistakes are permitted (and sometimes encouraged in case of doubt). The method enabled each student to repeatedly perform the correct actions as many times as they needed, developing the actions and behaviors used when working in aseptic environments until they became second nature. Here, the only consequence of a virtual mistake is to gradually improve the lesson learned, as students came to understand the actions and procedures to avoid. The scenario was divided into episodes, each accompanied by immediate feedback. Lastly, the hardware used (VR headset) and the script, inspired by techniques used in video games, made learning fun.

In addition to this, virtual reality considerably reduces the environmental impact of an experiment (which represents a saving of no less than 12 kg of disposable plastics per student per course, as well as saving the energy consumed to maintain incubation temperature).

6.3 The pressing need for qualified personnel

6.3.1 Context and target audience

When it comes to human resources, the life sciences sector operates on a just-in-time basis. It is becoming increasingly difficult to recruit qualified personnel, as graduates in this sector are quickly snapped up (BioWin 2020). This is why intensive training courses for jobseekers can create a pool of talent to support the sector's growth and keep it competitive. These courses, run as classroom-based courses in our labs, are a real success, with most participants finding a job at the end of a course (the employment rate on completion of these courses varies between 85% and 100%).

However, given the strong appetite of the sector, we have seen a rapid and steady shift in candidate profiles. While applicants hailed from relatively uniform backgrounds the first times the courses were organized (graduates with bachelor's and master's degrees in life sciences), there has been a steady shift to more varied and less qualified backgrounds. Their initial training, if they had any, increasingly lacked a focus on the desired subjects, meaning that many applicants failed the pre-selection test for access to training (>40% failure rate). An analysis of test results revealed that the failures were linked to a lack of prerequisites in laboratory calculations and life sciences. In addition, these failures led to anxiety and stress with regard to the pre-selection test itself, with some candidates no longer daring to sign up for training courses. To remedy this situation, online courses were developed to increase the pool of candidates who could access them.

6.3.2 Training model and methodology

The digital tools that were gradually put into place initially consisted of a battery of online calculation exercises similar to those included in the pre-selection test, and two asynchronous learning modules. The first asynchronous module covered the methods used for laboratory calculations (e.g., concentration and dilution formulae), accompanied by a battery of online tests at which participants could have unlimited attempts and receive detailed corrections. The second asynchronous module used videos and animations to enable participants who were retraining to quickly acquire or refresh the basics of molecular and cellular biology.

6.3.3 Solutions provided by this model to the initial need of qualified personnel

Figure 1 shows how once the online calculation exercises were in place, the ratio between the overall failure rate (in dark blue) and the failure rate for the calculation section of the pre-selection test (in light blue) was inverted, resulting in a lower total failure rate and higher participation in training courses.

The online asynchronous learning module on laboratory calculation subsequently implemented was well received by students (n=38): 76% found it useful, 89% learned something new, 74% felt better prepared, and 63% were more confident in passing the admissions test.

More recently, an online course in molecular and cellular biology was offered in addition to the calculation module. Today, it helps prospective candidates with no life science background (>50% of students every training session) to pass the pre-selection test. As an example, an applicant with a master's in speech therapy, and with 10 years' experience as a speech therapist, was able to successfully retrain thanks to the online support available to her. After passing the admission tests and passing the course with flying colors, she found work as a biotechnologist.

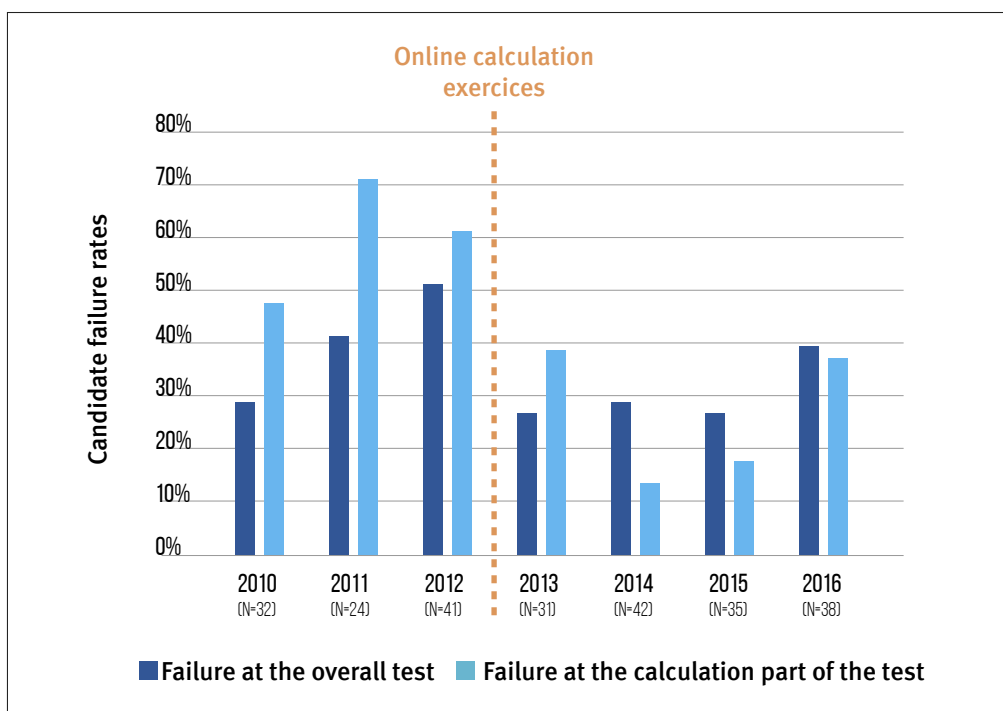


Figure 1. Changes to the failure rates in pre-selection test for specialist training courses for jobseekers between 2010 and 2016. The test contained two main parts: one part on calculation exercises (data shown) and a second section testing knowledge of life sciences (data not shown). N = number of people who passed the test. The information provided to participants in 2013 was inadequate and unsuitable, resulting in limited uptake of the online calculation exercises the first time they were available. Communication was improved in subsequent years, mainly regarding the purpose of the initiative, to enable as many students as possible to prepare for and pass the calculation section of the test.

6.4 The need for career-long continuing professional development

6.4.1 Context and target audience

Some healthcare professionals have a legal obligation to take continuing professional development (CPD) (Moniteur belge 2015). These CPD courses enable them to maintain and develop the specialized skills required in their professions. However, very often these courses are extremely time-consuming, demanding not only an investment in terms of attending the course itself, but also to earn or refresh the prerequisites for the course, or sit an admission test where one is required.

This is the case, for example, with a postgraduate certificate in improved teamwork for healthcare staff working in oncology. It takes the form of a long CPD course (15 ECTS credits), catering to the current trend of outsourcing treatments away from the hospital, arising in part from the increasing oral administration of cancer treatments. This course demands a long list of prerequisites in which attendees must be competent before they can access it.

6.4.2 Training model and methodology

An online module to prepare for the certifying course, taking the varied applicant backgrounds into account (doctors, nurses, pharmacists, physiotherapists, psychologists, etc.) has been created. Learners can choose to study the module at their own pace and according to their own working hours, so that they can refresh their knowledge of the basic concepts. In an effort to take the varied prerequisites into account, students can join the course at different points, for a tailored learning experience (see Figure 2). Students can begin the target course itself only once they have successfully passed the admission test to the certifying course at the end of the online module.

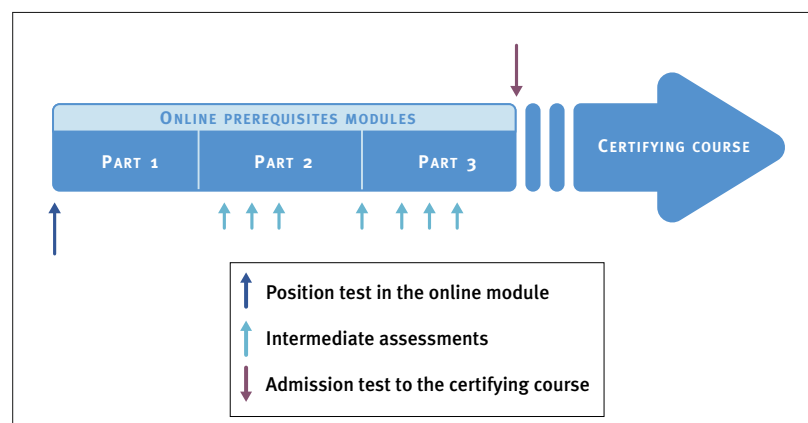


Figure 2. The horizontal arrow is split into two main sections: the online prerequisites module and the certifying course accessible following completion of the online module. Students can join the online module at part 1 or at the beginning of part 2 following a position test (dark blue arrow) that evaluates the student’s current knowledge. During parts 2 and 3, students can take assessments at the start of each chapter (light blue arrows), the results of which can help them decide whether they need to study this module, or whether they already know its content and can proceed to the next chapter. Students can access the certifying course following an assessment at the end of the online module (red arrow).

6.4.3 Solutions provided by this system to the initial need for career-long CPD

A total of 80% of participants in the first session (n=17) found the online module in preparation for the admission test to be useful, relevant, and a practical way to revise the essential prerequisites, as well as to refresh theoretical concepts that they had not encountered since their initial training. They also noted the importance of structuring knowledge acquired through informal learning on the job. In addition to this, 86% of them thought that this kind of approach would save them time.

6.5 The need for remote learning in an international context

6.5.1 Context and target audience

A biotech start-up was selling high-tech products and services based on polymorphic genetic markers for certain forms of cancer. To accelerate its entry onto the international market, it was vital that the company could quickly, and remotely, train its customers in using its innovative technology and procedures. Opportunities for classroom-based training were limited due to the geographical area involved, and the time window was limited by international competition. The company had to establish itself everywhere and at once as soon as it had trained its customers in a disruptive technology.

6.5.2 Training model and methodology

The method we developed was a small private online course (SPOC) to train new customers in the basics of genetic oncology while also covering ethical and technological aspects. The online module included videos from experts and short sequences of online training in relevant concepts, accompanied by tests with automatic corrections (multiple-choice and multiple-answer questions). The structure was modular and progressive, and each stage of the course had to be passed before moving on to the next. Customers had to pass a final test to earn the certification required to purchase the product from the company.

6.5.3 Solutions provided by this system to the initial need for remote learning

Thanks to the SPOC format, learners could sit the course at a time and place of their choosing. After just six weeks, 106 attendees had taken the course, from 37 countries on every continent; 26% of attendees studied the course to completion and passed all of the tests. However, it was necessary to modify the 100% asynchronous online course with (i) synchronous assessments to prevent cheating in the final assessment, and (ii) synchronous meetings to cement trust between the company and its potential customers, and to create an interactive student community.

6.6 The need for training for patients

6.6.1 Context and target audience

Patients with chronic illnesses are faced with professional and personal challenges (finances, family, mental health, etc.) in addition to their medical problems. In parallel, a growing number of them want to play an active role in their care pathway (i.e., patient empowerment).

Yet patients and caregivers are often overlooked when it comes to training. At the time of writing, there are few Belgian training centers that deliver structured courses for this target audience. There is, however, a positive correlation between how much a patient knows about their illness and greater adherence to their treatment (Foulon *et al.* 2011; Fondation ARC 2016), thereby leading to longer life expectancy and a better quality of life. In this context, it becomes critical to offer patients tailored learning tools so that they can not only learn about their illness, but also learn *how to live with it*. This becomes all the more pressing given the increase in intermediate care (e.g., home care with oral cancer treatments) that requires the patient's active participation.

6.6.2 Training model and methodology

A project for cancer patients and their caregivers has been initiated. The initiative was based on the results of a Fondation contre le Cancer survey of cancer patients (pers. comm., data not published) that inventoried their training and empowerment needs. This initial stage identified a few key themes to be developed as a priority. In the next stage, research has been conducted to determine patients' preferred format for receiving this information. A needs analysis through patient associations and, in parallel, focus groups with current and former cancer patients and their caregivers were carried out. In the focus groups, participants debated the ideal format that the project should take in terms of both structure and design. The conclusion was that patients want (i) straightforward, flexible access to key information in terms of the times and locations it is available, (ii) information presented in a tailored, centralized, and educational format, (iii) to feel they play an active role in their treatment and are free to make decisions, (iv) classroom-based sessions where they can talk with other patients and professionals, and (v) an intuitive, social learning environment.

This bottom-up methodology was used to design a structured learning experience, tailored to the needs of cancer patients and their caregivers. It was decided that the project should be developed in French and Dutch (Belgium's official languages), and should ideally be accompanied by an information website with interactive Q&A sessions (in partnership with hospitals), with special training available for patients eager to learn more (e.g., to become patient partners). Indeed, the Université libre de Bruxelles is developing a patient partnership model that recognizes the "expertise of living with the illness" and that will enable trained patients to become an integral part of the care team. It should be noted that in order to ensure this model is optimally supported, a certifying training course for healthcare professionals and teaching staff is also available.

6.7 Discussion and conclusion

6.7.1 Digital learning makes it easier to access training

The challenges involved in lifelong learning in the health sector present a dual nature: on the one hand, intrinsic aspects of the ecosystem must be taken into account, while on the other, obstacles that make it difficult for learners to access training must be removed. Table 1 contains a summary of the teaching tools we suggest for different target audiences to overcome this dual challenge.

Some intrinsic aspects of the healthcare environment make it more difficult to organize training: (i) the technical nature of the equipment or the environment, which makes training expensive, dangerous, or difficult; (ii) the astounding boom in particular fields, which rapidly exhausts the natural talent pool (i.e., fresh graduates entering the jobs market); (iii) short innovation cycles, which mean that knowledge and skills quickly become obsolete; (iv) the huge diversity in stakeholders and job descriptions; (v) the sector's competitiveness, accentuated by international competition.

Some obstacles encountered by learners must also be removed: (i) training schedules that are incompatible with family and working life; (ii) boring teaching methods and a lack of employer support; (iii) a negative learning experience from initial training, seen as too rigid; (iv) a lack of confidence in the prerequisites.

To overcome these obstacles, training developers have at their disposal an arsenal of digital and hybrid solutions, such as those described in our case studies (e-laboratories, virtual reality serious games, online content and exercises, asynchronous online courses, and blended learning). Learning outcomes should be used to structure these teaching methods, in order to maximize independent learning and its enjoyment. Flexibility, in particular, encourages an individual training path, which seems vital if learners are to commit to their CPD, thereby promoting attendance and completion.

Suggested method (click here for more details)	Target audience	Challenges presented by health ecosystem	Main obstacle removed for learners
1. Flipped classroom	(i) Teaching staff and (ii) their students	Equipment not (often) available	Disengagement caused by learning stripped of context
2. Virtual reality	(i) Professional technicians and (ii) master's students	Equipment not (often) available	Negative experience of initial training (joy- less training or inability to make mistakes)
3. Asynchronous online exercises	Jobseekers	Talent pool too small to support growth and stay competitive	Disengagement caused by a loss of confi- dence in prerequisites (i.e., feeling of being poorly prepared)
4. Asynchronous online courses	Health professionals	Variety of target audiences and job descriptions Continuing education for active health professionals	Course schedule incompatible with work and home lives
5. SPOC	Clients of red biotech companies	International competitiveness	Difficulty accessing training due to geograph- ical distance
6. Hybrid approach (online + classroom training)	Patients	Position patients at heart of the healthcare eco- system	Health problems and course schedule incom- patible with work, health treatment, and home lives

Table 1. Teaching tools suggested for different target audiences.

Legend: The **flipped classroom model (1)** was offered to CPD teaching staff and their students, to enable them to learn to use expensive equipment (flow cytometry) that is not often available for training purposes. Learner engagement is facilitated through training tailored to real industry needs, and which can therefore quickly be applied to real-world situations. **Virtual reality (2)** was offered to lab technicians in the biopharmaceutical industry, and then to master's students, to learn how to work in an aseptic environment (working with a laminar flow hood) that is not often available in training. The gamified training facilitated learner engagement and the structure permitted procedures to be learned through making mistakes. **Online exercises and refresher content for basic concepts (3)** encourage vulnerable target audiences with low self-confidence to take part in admissions tests for courses in cutting-edge fields, even if they are lacking the correct initial training. **Asynchronous online courses (4)** for active health professionals help them to optimize their training schedule through flexible learning for better time management. **Small private online courses (SPOCs) (5)** make it possible to standardize training on an international level to ensure proper use of products and services with very high added value, and to further an organization's international reach. **A hybrid approach (6)** that takes patient particularities into account facilitates access to training for patients.

6.7.2 Versatile methodology accommodating learner diversity

Continuing education represents one way for the university to better deliver on its commitment to maintaining and developing innovative ecosystems, characterized by the rapid evolution of knowledge and practices. This means it is important to provide versatile training tools for the full range of stakeholders working in this environment, even those who are not part of the traditional university audience (e.g., job-seekers, trainers, and patients). The unique criteria and challenges of different learner profiles should be taken into account when designing and organizing training programs.

Collaboration with regional employment agencies (Forem, Bruxelles Formation) can increase jobseeker employability by giving them an opportunity to retrain in professional biomedical roles, which are flourishing and creating many jobs. In light of the fact that some health and biotechnology sectors are facing major difficulties in recruiting qualified talent, the industry can no longer rely on its natural recruitment pool: there simply aren't enough young graduates. Foundation and prerequisite modules can then help potential candidates from more generalist backgrounds, or with less training, to access training programs that lead the vast majority of them (85% to 100% in the examples cited here) to find stable employment in these sectors. These asynchronous online modules contain micro-sequences of taught classes, and an extensive selection of practice exercises (with unlimited attempts). They tend to be open to all, and the user experience is streamlined and collegial, to help learners train at their own pace, building the confidence they need to register for the course pre-selection test.

Hybrid methods, like flipped classrooms, facilitate the updating of skills for teaching staff at professional schools. The digital component makes it easier for teaching staff to access the course, and the practical component (which takes place in a lab) provides an opportunity for contact with technicians and researchers who are immersed in real-world applications.

When the training session targets a mixed audience simultaneously (multidisciplinary or transversal courses, for example), the challenge is to ensure that all learners reach the same standard, and it is vital to check that applicants meet the prerequisites. In this context, a number of educational tools are available to us to tailor the training experience (e.g., access via different entry points to the course, separate prerequisite modules, remediation, an active learner community within a SPOC, blended learning containing online theory modules (synchronous or asynchronous) accompanied by classroom-based sessions and workshops).

6.7.3 Lifelong learning plays a structural role within innovative university ecosystems

University education is no longer limited to young people coming straight from mandatory secondary education. Lifelong learning is becoming a firmly rooted custom. This kind of training builds on knowledge and competences acquired during initial training or professional experience. It is complementary training that supports learners in the personal and professional challenges they encounter throughout their lifetime. Universities play a pivotal role in the innovative ecosystems that drive research and education. With their hospital, industrial, and institutional partners, they are particularly well placed to identify skills gaps and propose training courses tailored to maintaining the dynamism of the innovative, primarily research-based, ecosystems they are part of.

The training methods described here demonstrate these close partnerships between different stakeholders in the health sector. Some of the courses, which were initially designed for working professionals, have formed a feedback loop into university education (e.g., the virtual reality aseptic environment course initially designed for biomedical companies is now available to master's students, in an effort to improve an aspect of their education that will be essential in their future career). By encouraging the joint creation of open partnerships and programs, we create an educational continuum that makes the sector more competitive, and boosts the employability of students and those working in the sector. Furthermore, in doing so, the lack of employer support—a major obstacle—is immediately remedied, as employers play an active role in the design and content of lifelong learning courses, and adapting, if necessary, initial training programs.

6.7.4 Digital learning encourages learnability and makes learning fun

Learnability (i.e., the desire and ability to grow and adapt to new circumstances and challenges over the long term through learning (Manpower 2020)) is a major challenge in keeping up with an evolving, sometimes disruptive environment. To develop this skill, however, access to lifelong learning needs to be streamlined. Making people want to learn, offering a quality learning experience, boosting learner and employer engagement, and delivering quality content are all major challenges in creating a society that likes to learn.

Once created, digital pedagogy tools can easily be reused many times. However, a considerable investment of time and resources is needed to develop digital pedagogy tools (which involve input from wide range of professions, such as scientific illustrators, UX/UI designers, writers, IT managers, coordinators, content experts, to name but a few). It is therefore important to carefully weigh the benefit–cost ratio of this kind of strategy. In addition to the budget, other criteria to take into account include updating courses to remove obsolete knowledge and techniques, the robustness of the script, modification following assessment of both learners and content, the technological maturity of learners, more open access for all, and the considerable, often underestimated, environmental cost of implementing digital tools. These important criteria are beyond the scope of this chapter but are worthy of further study.

Based on the pedagogical experiments proposed in this chapter, the authors believe that courses that include digital learning help to streamline access to lifelong learning for the different target audiences that make up the health and life sciences ecosystem. While this observation is true by necessity during the Covid-19 lockdowns (as part of the “coronasolidarity” program initiated by ULB Engagée, i.e., a series of actions to support partners and the living areas where the university is located during the Covid pandemic, HeLSci's digital catalog was given for all, free of charge), it was true in the days before Covid and it will remain true when Covid is in the past.

While the sector targeted here is the health sector, we firmly believe that this training model will be just as relevant to other innovative sectors.

6.7.5 Discover the case studies

The case studies described in this chapter can be viewed on our YouTube channel (text in French): <https://youtube.com/playlist?list=PLxUZwhc1Qa6Usa8h2zrrYxhrd4plkOwnF>

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References

1. BioWin (2020) Etude stratégique. Développement de talents en Wallonie. Etude coordonnée par le Pôle de compétitivité BioWin.
2. Blumstein, G., Zukotynski, B., Cevallos, N., Ishmael, C., Zoller, S., Burke, Z., SooHoo, N. (2020) Randomized trial of a virtual reality tool to teach surgical technique for tibial shaft fracture intramedullary nailing. *Journal of Surgical Education*, 77(4), July, 969–77, doi:10.1016/j.jsurg.2020.01.002.
3. Eurostat (2016) Adult Education Survey (AES).
4. Fondation ARC (2016) Adhérer au traitement, premier enjeu des thérapies orales?
5. Foulon, V., Schöffski, P., and Wolter, P. (2011) Patient adherence to oral anticancer drugs: an emerging issue in modern oncology. *Acta Clinica Belgica*, March–April, 66(2), 85–96, doi:10.2143/ACB.66.2.2062525.
6. IFIC (2016) Retrieved from <https://www.if-ic.org/fr>.
7. Manpower (2020) Career development advice for remote workers. Retrieved from <https://www.manpowergroup.co.uk/the-word-on-work/career-development-advice-remote-workers/>.
8. Moniteur belge (2015) Loi coordonnée du 10 mai 2015 relative à l'exercice des professions des soins de santé. Retrieved from https://www.ejustice.just.fgov.be/mopdf/2015/06/18_1.pdf#Page2.
9. Toffler, A. (1974) *Learning for Tomorrow: The Role of the Future in Education*. New York: Random House.