Digitalization: Training University Professors and Students with Flashlearns

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Abstract. Microlearning offers an interesting training solution both for professionals and for university students. Short, brief, agile—the contents proposed in micro-learning formats correspond to current learning modes. However, they serve certain types of knowledge better, and learning methods, such as distance learning, are more favorable to this approach. This paper will briefly review the research in the field and will present a practical case of microlearning application at the university level. The University of Applied Sciences Western Switzerland (HES-SO) has indeed designed a digital concept based on micro-learning to train professors and students on issues related to the use of digital means in the classroom. Called *Flashlearns*, these short training units embed video and are structured and organized in a way that promotes learning. The paper describes the project and the instructional design, and it presents the results obtained. The paper concludes with some ideas for extending the project and opening new possibilities.

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Keywords: Micro-learning · Digital competencies · Distant learning

1 Introduction

1.1 Context

Digitalization is impacting the tertiary educational sector by changing or modifying professor teaching methods, organization, coaching, and lecturing. The COVID-19 has forced most Universities worldwide to teach remotely, and revealed shortcomings, difficulties, ineffective habits.

The University of Applied Sciences Western Switzerland (HES-SO), the second largest university in Switzerland, is not different in this respect from any other tertiary institution: the challenges set by the digital technology, their impact on the university system, and career Microlearning offers an interesting training solution both for professionals in the field and for university studies. Short, brief, agile—the contents proposed in micro-learning format correspond to current learning modes. However, they serve certain types of knowledge better than others, and certain learning methods, such as distance learning, are more favorable.

This paper will briefly review the research in the field and will present a practical case of microlearning application at the university level. HES-SO has indeed designed a

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digital concept based on micro-learning to train professors and students on issues related to the use of digital in the classroom.

Called *Flashlearns* (FL), these short training units embed videos and are structured and organized in a way that promotes learning. The paper describes the project and the instructional design, and it presents the results obtained. The paper concludes with some ideas for extending the project and opening new possibilities, which may come unaware to either teachers or students. To modify mindsets and practices, the HES-SO has established in 2019 a Digital Competence Center (CCN). The CCN operationalizes the rectorate digital strategy and, among other objectives, contributes to train students and professors to address the actual impact of digitalization on learning and teaching.

A CCN specific workgroup dedicated to Digital Learning, designed a distant learning concept, based on micro-learning units (ML). FL training modules are based on short videos and animations and provide brief but rich insights on topics such as "student profession in the digital era," "critical approach to conspiracy theory," or "the educational scenario in the digital age."

This paper firstly questions the potential and features of ML, the reasons for which this notion, theorized some years ago, is back in the spotlight to emerge as a strong trend in training. Secondly, we will present a case study, the FL project, along with its institutional and epistemological components.

1.2 Definition and Features

The ML notion was formalized in 2005 [1] in connection with life-long learning approaches, and the growing need to train collaborators quickly and efficiently at their workplace. ML is linked to formal and informal learning, in distant or blended learning situations [2, 3].

Among the numerous definitions of ML, we adopt the Nikou and Economides one [4, 5]: "Micro-learning refers to a learning approach based on small learning units and short, focused learning activities. In micro-learning, learners obtain various micro-contents, including definitions, brief video segments, and micro-assessments so that their knowledge can be evaluated without requiring special testing arrangements."

In 2010, Buchem and Hamelmann [18] completed this definition by adding the notion of micro-content focusing on a single and defined topic.

The key interest with ML lies in its capability of sustaining self-study by letting the learners select their topics, and the moment they feel it is pertinent for them to access these topics [6].

The specific characteristics of ML [18] can be summarized as follows:

- a short duration (5–15 min),
- content divided into knowledge nuggets, chunks,
- dealing with restricted subjects, simple problems,
- generally based on video, and
- sometimes offering an accreditation of ML units to obtain recognition.

By its variety, its small scale, and the use of rich media, ML is engaging, and it allows the learner to keep up to date on notions proposed with a rapid flow. ML is

motivating because the learner can choose the subject of his interest instead of remaining passive. However, ML has its limits. It is not suitable for acquiring and learning complex skills, processes, or behaviors. Reading something or even following steps listed in a micro-lesson is different from the process of "learning" complex knowledge [6].

1.3 New Habits Regarding Information Consumption

In recent years, the use of ML has extended to the academic training field, as societal habits are modifying teaching and learning.

In fact, the daily use of smartphones and tablets have impacted consumption patterns for knowledge, in two main ways.

First, people are used to get immediate gratification, through notifications from mobile applications, and with the massive use of social networks, users expect instant answers to their questions or concerns [23]. Second, consumption patterns for accessing information, have gradually changed. News, newspaper articles, television series, and 6-s "bumper ads" on YouTube-type videos are structured into brief units of information intended to keep the users' attention. This has an impact on the quantity, form, volume, and mediatization of the information, and therefore shapes the knowledge to be taught.

Thus, steadily, the continuous attention span has been declining in the last decade, in addition to the fact that the human brain shows a natural propensity for distraction [22].

For students belonging to the Z generation, mostly attending undergraduate courses at university level, the concurrent use of several screens (watching a series and chatting on their mobile) is natural, although the effectiveness of this approach for memorizing facts has not been proved.

These new habits of split attention have an impact on how knowledge is consumed. The use of ML, organized in small fractions of knowledge, which can be mobilized quickly and at the desired time, meets both the expectations and the observed behavior of the learners.

1.4 Cognitive Effectiveness of Microlearning

Is learning in small batches effective from a learning perspective? Two questions arise: Can knowledge be broken down into units so small that they can be learned without effort? Furthermore, can the content learnt in this way, be integrated, and be transferable to other situations, or does retention remain superficial, reducing the content to be learned to a mere noise among others emitted by social networks, news, applications?

We will distinguish two aspects: pedagogical engineering and assimilation.

Kerres [21] notes that ML constitutes a challenge for instructional design. In traditional instructional design, knowledge is organized vertically from the curriculum to the lesson or sequence and is broken down into rigorously organized knowledge elements. ML flattens this verticality and reduces this organization to its smallest element, to "assets." The author concludes, in this context, that instructional design is not dispensable but even becomes more complex, since the task of instructional design would imply to provide an arrangement of contents and tools that can be interwoven with the

personal workspace of the learner. It is therefore important to consider not only the units of knowledge and the tools used to disseminate them, but also their fluidity of use, since learners will use them freely without following a path strictly prepared for them.

Can we learn with ML? Stohr et al. [19] indicate that ML has a positive influence on learning and implies an overall satisfaction for the learner with the learning object. Zhang [20] notes that the use of small chunks of resources offers the learner the opportunity to make effective use of his fragmented time to engage in learning. Hug et al. [1] indicate that learning takes place in micro-steps, the ML corresponds well to the micro-steps that form the basis of successful learning with an important level of sustainability. Furthermore, these microlearning steps facilitate the process of deep understanding and creation of profound knowledge, if the microlearning process is embedded in an appropriate learning design/setting [17].

However, several authors note that the integration of knowledge does not take place if it is not embedded in a broader, well-defined learning concept. Hug [1] notes that "microlearning does not consist in transferring knowledge nuggets from A to B," and that the challenge of learning consists in the construction of knowledge. Peschl [17] proposes a theoretical framework that starts from observation, to build relationships between knowledge to create new realities and to question MLs to make sense.

The ML facilitates the process of deep understanding and creation of profound knowledge, if the microlearning process is embedded in an appropriate learning design/setting. Peschl [17] also points out that it is not a particular feature that causes the learning process, but the explicit combination of these features related to the learning typology that makes the paradigm powerful. In other words, the ML must be conceived in a broader perspective, which can be divided into small units, each with its own and combined utility.

We have thus seen that the term ML covers a brief resource that enables rapid learning, close to the field, corresponding to current information consumption habits, that ML is effective when integrated in a general training concept, and that it can be deployed in university curricula, with the aim of clarifying theoretical knowledge. We present, in the following point, how this concept has been implemented at the HES-SO.

2 Case Study

2.1 Introduction

The CCN of the HES-SO, in its effort to kick-start the digitalization of the institution, would have had to train more than 30,000 people (professors, students, and administrative staff) spread over 28 campuses. It was clear from the start that setting up face-to-face training would be a logistical and human challenge. The choice was therefore made to offer a distance learning program. Although the concept of Massive Open Online Courses (MOOCs) was initially discussed, this approach was abandoned for three reasons.

First, the time factor was considered an impediment. As the Centre's activities are subsidized for a period of four years, and the production of several MOOCs covering different topics related to digitalization, would have taken several months or even years, it was difficult to implement the concept during the time available. Second, while the

subject of digital technology is of wide interest, it was unclear what level of involvement would arise for long and demanding courses. Third, the Center was interested in developing a more agile, flexible approach without prejudicing the quality of the content.

Microlearning was therefore chosen. In this first period of the Center's existence, with the support of the HES-SO's Educational Department, the training effort was focused on the global topic of "teaching in the digital age," with the aim of explaining to teachers and students how digitization impacts both teaching and learning. Moreover, we intended to provide teachers and students with the key concepts of a notion, the vital minimum to know. We estimated that, as professional of their field, and of learning and teaching, they would be able to make rich and numerous links between their practice and these new concepts.

2.2 Approach

We decided to develop, in a first phase, a batch of 16 topics such as, for the teachers, "learning spaces," "scripting your digital course," or "using your smartphone to make an educational video" and, for the students, "the student profession in the digital era," "learning independently," or "social media addiction." The objective was to entrust the realization of these topics to experts specialized in the digital field. The project took place between February 2020 and September 2021.

Expert. From the start, we wanted to involve members of the HES-SO who could bring their experience and knowledge to the project. The experts chose the subject of which they considered to be the specialists and developed it from the pedagogical conception to the mediatization of the content. We estimated the time required to implement a FL to 40 h, which is equivalent to one week of full-time work, which corresponds to a cost of $4,300 ($75,000 for the 16 FLs).

We trained these experts, supported them when they were designing the instructional scenario, helped them to elaborate pedagogical objectives, as well as train them to realize the technical aspects. We then accompanied them throughout the realization by answering their questions and to follow the planning of the project.

Diffusion. once the resources were created, they were organized and distributed by a technical team on the platform dedicated to digital training at the HES-SO (https://numerique.hes-so.ch). Technically, this is a fork of Moodle, where some processes were automated, and new ones implemented. resources were then aggregated by using H5P/Moodle.

Each completed topic was assessed by a few final users, modified according to their remarks and propositions, and finally published on the platform. The summary of the topic, its pedagogical objectives, syllabus, and a teaser are then proposed to the learner, as shown in the image below (Fig. 1).

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Instructional Design. The global duration of a microlearning resource varies according to their authors. For some authors, an FL should last seconds [24], for others less than 15 min [12], or between 5 and 10 min [1]. We found it difficult to produce learning units of such a short duration while guaranteeing the comprehension of the subject. We therefore applied an identical structure to each topic: four themes, each illustrated by four resources—i.e., 16 resources in all per FL (Fig. 2). The consumption of each topic lasts about 30 min in total, or an average of 5 min per resource. We called these training

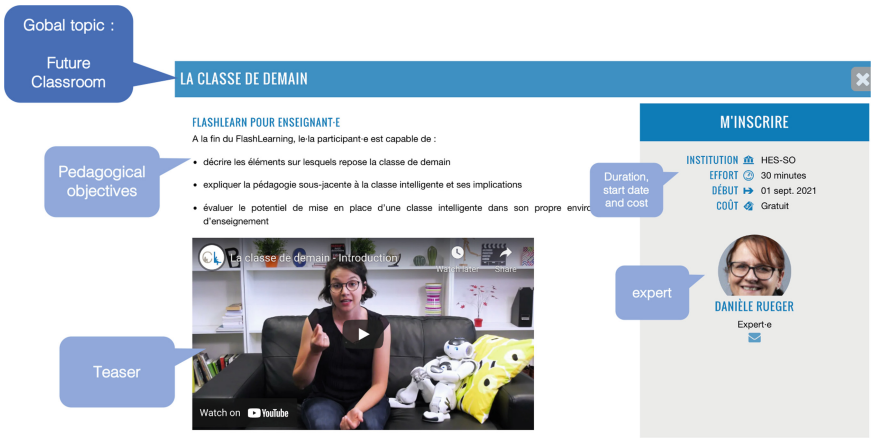

Fig. 1. Access to a specific topic.

entities FL, a term we believed to be engaging for our audience. We paired these FLs with a tagline: "30 min at the heart of training in the digital age."

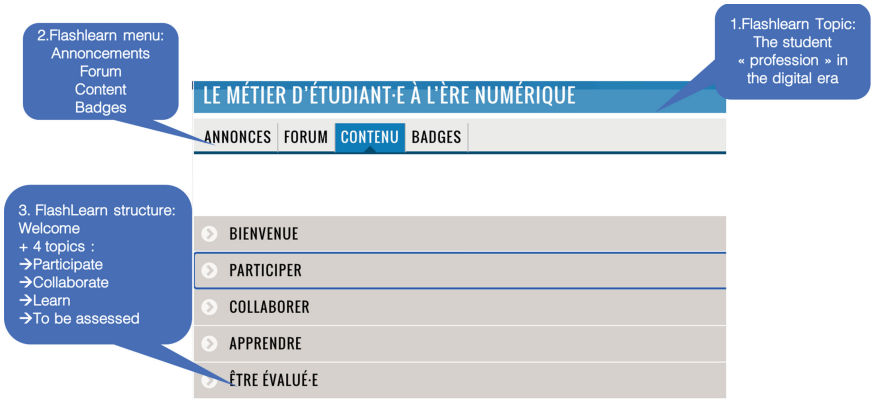

Fig. 2. FL global structure.

Moreover, as Glahn [24] points out, "Self-regulated learning means that learners use provided information to assess and control their learning processes." The aim was therefore to propose at least one self-assessment for the knowledge acquired on a given subject.

Each topic of the subject thus includes three video resources and one quiz, as shown in the image below (Fig. 3).

The first type of resource provided is a PowerPoint integrating the expert's voice. This resource offers a clear and illustrated review of the topic. The second type shows an animation including tips and tricks, which enhances or summarizes the theme. The third type of resource features an actor roleplaying the FL learner. She formulates questions

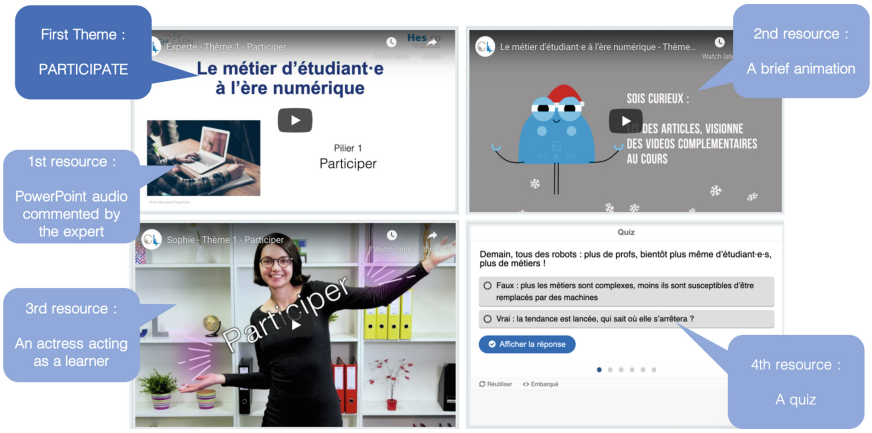

Fig. 3. Four types of resources.

that the learner might have about the theme, and summarizes the content of the other two resources, while adding a few "field" complements. Finally, the fourth type of resource consists in a short self-evaluation quiz on the three previous resources.

It is therefore both a precise subdivision of knowledge, and an organization which, for each theme, sheds light on the knowledge to be acquired in a variety of means, while avoiding pure repetition. Indeed, as Glahn [24] summarizes, "if learners repeat learning activities after their initial attempt, then forgetting takes longer and retention is improved." Regarding FLs, instead of watching the same resource several times, the knowledge to be acquired is displayed in several various means, each viewing dealing with the same topic from a slightly different angle.

2.3 Validation Concept

To encourage the use of FLs and thus support the process of digital transformation of teaching in the institution, a validation concept has been developed with the help of the Professional Development Center of the HES-SO (Devpro). This Center trains teachers on various aspects (technological, pedagogical) to support their career evolution and their teaching practice. After 15 days of training, either face-to-face or at distance depending on the courses, the teacher obtains a didactic certificate.

We have considered that 10 FLs are equivalent to one day of Devpro training. Each completed FL earns a digital badge; showing ten badges to Devpro validates 1/15 day of training for the didactic certificate. Regarding students, the recognition for their learning takes place through the integration of the FL into one of the courses they attend.

3 Discussion

The main difficulties faced in this project were threefold. First, the time availability of the experts, often involved in a number of projects and committees: they were often

overwhelmed and had difficulty keeping to the schedule. Secondly, the exercise of simplification of the selected topic, while retaining a certain richness, proved difficult for some experts, who tended either to oversimplify the content or to produce resources over the time limit. Finally, special attention was given to the communication of the project to reach the right audience.

To date, 202 people have registered for the published FLs, and 74 badges have been awarded. This is a promising start for a project which nevertheless needs to be better embraced by its future users. Some Devpro courses in the flipped-class format use the FL as a resource for browsing before the course, as a starting point for further discussions in class. The feedback from the participants is positive regarding this resource: 67% found it totally appropriate, and 33% appropriate.

The FL concept has since spread to other entities of the HES-SO apart from the CCN, for example to develop micro-courses on ecology in the classroom, or to integrate the idea of sustainability in the teaching.

As we can see, the beginnings are small but progressive. With busy faculty members, it will take time for the project to reach everyone on the ground. The HES-SO spread over seven states, 28 campuses in western Switzerland, providing various cursus, with various culture approaches, ranging from Social Work, to Health, Engineering or Music, slows *de facto* the diffusion and adoption of the FL. Nevertheless, previous experiences have shown that it takes time for new training approaches to be integrated in the institution, and this project will certainly follow the same course of acceptance and use.

4 Conclusion

According to Glahn [24]: "The concepts of micro learning are useful to enrich the learning experiences and broaden the learning environment where conventional macro learning solutions are unsuitable." The needs of the HES-SO fit perfectly into this framework. The production of FL thus proved its interest and feasibility.

We have seen above how the format is interesting for presenting new concepts, not so well-known by learners. Thanks to its brevity and the use of rich media resources, microlearning acts on both the engagement and the motivation of learners [5], a major concern when the proposed courses are not compulsory. We have also shown how these formats, used for professional training, are appreciated by teachers.

The next step of the project consists in integrating some of these resources into the regular courses attended by undergraduate students in a bachelor's degree program, for example the FL "student's profession in the digital era" and to measure the retention rate of the information presented in this way.

The CCN is entering its second period of existence (2021–2024). A budget of $65,000 per year has been allocated to the FL project. The objective of this second phase is to deploy the system on a larger scale, while developing other digital topics. The CCN's Digital Learning working group has been renewed and is currently considering the expansion of the concept. It should be considered to better involve learners in the FL process right from the start, to avoid an excessive vertical approach from experts to users. For instance, users could participate in focus groups and ask questions about the given topics, or even design some FLs themselves: from the learner to the learner, according to a peer-teaching logic, since "teaching is learning twice" [25].

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Chapter 30

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