



2018-1-BG01-KA202-047919 Erasmus+ project  
IoT security nuggets

## **Internet of Things Security Nuggets (IoT Nuggets)**

**Project number: 2018-1-BG01-KA202-047919**

**Funding programme: ERASMUS+ Key Action 2: Strategic Partnership,  
Horizontal priority of Open Education and innovative practices in a  
digital era.**

# **METHODOLOGY**



ULSIT

## 1. Introduction

Microlearning responds to the need for personal/professional development of people who devote part of their daily activities (formal and informal) to the acquisition of new skills or an update of their knowledge, motivated by changes in the conditions or circumstances of life. In this context, according to Gabrielli et al. (2006) informal learning is generally based on task-specific activities, where students are more interested in accessing very specific pieces of information rather than a full body of knowledge, in order to support decision-making or the acquisition of specific skills.

Microlearning is an approach that affects different aspects of learning, particularly in the field of m-learning (Hug, 2010). As a practice, microlearning can be very connected to learning in the digital, ubiquitous age, associated with increasingly mobile devices, and preferably in the non-formal within the framework of the lifelong learning and practice communities (Lifelong Learning – LLL). It has been chosen as a methodology within the IoT-nuggets project, as it fits perfectly into the objectives pursued in the project.

Micro-learning emerges from micro-content, from small fragments of digital information. It is usually, as in this case, a specific theme, limited in its dimensions, which is consumed quickly and often limited by the device for display (screen size, bandwidth, navigation, user attention span,).

It is therefore based on the use of small units of learning content and flexible technologies that allow people to access them more easily at specific everyday times and conditions (e.g., during rest time or while traveling).

It is based on brief interactions of the apprentice with a learning topic broken down into very small pieces of content. Learning processes called "microlearning" can cover a period of a few seconds (e.g., in mobile learning) up to 15 minutes (e.g., learning objects sent as e-mail messages). In our case the elements are designed for a duration of 3 minutes.

Microlearning gives us the possibility to "move learning out of the classroom, both in the case of students and professionals and bring it closer to different environments of daily life supported by a flexible, invisible and ubiquitous technology that provides us with the information we need at all times" (Morfi, 2011).

Some of the specific features of microlearning are as follows:

The learning is done in micro steps.

These micro steps have proven to be the basis for learning success with a high level of sustainability.

These steps facilitate the process of deep understanding and the creation of a deep knowledge and understanding if the microlearning process is incorporated into an appropriate learning design.

It offers the possibility of ubiquitous learning and visualization through mobile technologies, a possibility that provides the basis for microlearning to become focused learning, involving learning direct interaction with reality.

Supports a continuous learning process over a long period of time.

In any case, the term microlearning describes a phenomenon of knowledge acquisition in an IT context, describing how people acquire knowledge by learning in small steps and consuming information in small pieces that form a broader and deeper connected knowledge to

(Schafer & Kranzlmuller, 2007). It therefore responds to an emerging reality of increasing fragmentation, whether in terms of sources of information, or the units of information used for learning, especially if experiences occur in ever-moving areas that experience rapid development and a wide range of possibilities (Langreiter & bolka, 2006: 79, quoted in hug & friesen, 2009: 3).

The notion of microlearning raises the question of adequate pedagogy and teaching. In a broader sense of the term, it can be used to describe how more and more people are learning and gaining informal knowledge in micro-content and micromedia environments.

The way users learn to work and play with computers is much more related to the practice of microlearning than to the learning process in educational institutions, as they learn mostly without manuals and do not follow a methodology formalized or resumed. From the perspective of these practices, microlearning is perceived as a process of taking small pieces of information or fragmenting knowledge into modules that can be learned separately at any time when access to the environment learning is guaranteed (gabrielli et al., 2006; Schafer & Kranzlmuller, 2007).

Virtual Campuses, 02, III, 2014

### [Pedagogic challenges of microlearning](#)

The challenge from a pedagogical perspective lies in the extent to which this microlearning environment must be pre-structured, or the degree of openness that knowledge/learning management systems can, or should, present based on differences in educational contexts. and this refers to aspects of didactic design, on the one hand, and to topics related to customization, self-organization and openness levels, on the other.

In this line, fesser (2010) notes that the differences between distribution systems for desktop (e-learning) and mobile devices (mlearning) are so significant that a completely different approach to instructional design, graphic design and user experience design and presentation of information. This author sets out four main categories in these differences:

1. Measurement of time, referring to the time and duration of the learning session. While in the case of elearning the duration of the training modules varies and a time is specified to complete them, mlearning is intended to take place anytime, anywhere, without time or space restrictions and usually in the form of small

- blocks of information. For example, a traditional online training course with multiple modules and fixed duration (elearning) and a quick guide to using a particular application (mlearning).
2. Access to information: In elearning, two of the main key objectives of any course are understanding and retention, as we think about applying new knowledge at a future time. On the other hand, in mlearning the most important thing is the possibility of access to information when it is required (often for its application in real situation).
  3. Context: In elearning it is necessary to establish the context before working the contents themselves (e.g., in a course of prevention of occupational risks, the contexts must first be indicated and then see what risks and why it is important). However, in mlearning the context is already established by the situation.
  4. Assessment: Donald Kirkpatrick's learning assessment model would apply to both elearning and mlearning, although there are differences in possibilities in assessment levels.

Perhaps one of the difficulties in dealing with the aspects of previous structure or the degree of openness of the environments that have been eaten winged is that they are addressed from the beginning of the language or the instruction that understands learning as a process that can and must be planned previously and where the elements are controlled. On the contrary, addressing the issue from the Central European conception of the teaching contributes to a teaching that cannot be planned, but only to prepare (Kerres, 2007; Friesen, 2007). The instruction that enables students to acquire an adequate level of education must be achieved through high flexibility in the structure of a lesson or course. That is, the student can be 'enseñado' and 'trained' to some extent, but the didactic emphasizes that a certain level of training can only be achieved by the student himself. The trainer must be cautious not to interrupt the student with a highly over-planned instructional or instructional instructional instruction. This takes on greater importance in an area characterized by an increasing porosity between training and training, or between what can be understood by real and virtual world, or between learning and playing, etc. This way of addressing it surpasses the mere designor instruction to address it from the teaching understood as a series of concepts, approaches, models, theories, experiences, technology or questions of an art of teaching and learning.

In a way, it is a question of rethinking the méall of síntesis and analysis of the treatment of small steps and of how it arises its structure. The processes of mediation and digitization abound, in this context, in the need to rethink the teaching. We are, then, faced with the classic considerations of the didáctica (hug, 2010): the subjects (who), contents and skills (who), méall and techniques (such as), motives, props and goals (for what reason and for that), such as social relations, social conditions and institutions, scenarios and agreements, economics and learning cultures, multimedia environments, power and control, or evaluation.

In order to respond to this need to rethink traditional models and to improve didactic thinking, hug (2010) proposes to consider education from the perspective of DIY,

since it favors postmodern, constructivist and contextualized orientations (Schon, 1991; hug, 2007; Attwell, 2010), in

contrast with a modern, realistic and truth-oriented understanding. The principles of DIY according to Levi-Strauss (1968 cited in hug, 2010:53) are openness, agility and flexibility in thought and action, dealing with heterogeneous material and limited resources, with actions connected space-temporarily applied to educational contexts in various ways.

The education as DIY responds to characteristics of these materials that are meaningful to both teachers and students. The principles are winged fit well to the experiences of microlearning, but staying there can imply an excess of 'de-articulation', atomization, demanding certain systemic dimensions of education.

This need to rethink the teaching approaches, become more evident in the face of new processes of teaching-learning that require a new way of understanding learning throughout life, throughout work, and with others (in a digital world). That is, characterized by an embedded, continuous and social learning-based learning (Salinas, 2012):

- Embedded learning, in that training throughout the work takes on increasing importance, within the work without sobering continuity.
- Continuous learning, associated with a personal management of learning, without sobering continuity in time and space, reducing the difference between living, working and learning.
- Social learning, from the moment there is a collective and contributory organization of learning, with valorization of contributions and support among peers.

In any of these trends it is essential to manage the personalized information. Indeed, the increase in the student's autonomy adds, overcoming the barriers of distance and time to access learning, greater interaction and the opportunity to share control of learning activities through intercommunication in a framework support and collaboration. Knowledge workers, preferred users of this type of learning, seek to learn social, autonomous, immediately and continuously, immersed in the workflow.

In other words, it is a question of evolving from the didactic for distribution to the didactic for collaboration and reflexivity. Advance from the models that describe the teaching as a "technical process" and that sees the teacher as a simple executor to equip with competences and skills to increase its effectiveness through resources (deploying what has been called 'generic' methodologies), towards more open models that see the taught as a space of knowledge and knowledge and sociopolitical space in which knowledge is selected, legitimized and distributed to subjects differentially and that sees the trainer as a professional with the capacity to decide and judgment and able to reconstruct his own practice critically and to include the media in a creative way (methods 'specifics') (Salinas, 2009).

With these teaching strategies more focused on the student it is about motivating to learn in a new and unfamiliar way, and in the case of network learning, using a wide range of tools and techniques very diverse and sometimes little known (Salinas, 2004). In order to incorporate these artisanal methodologies from the perspective of the

trainer, environments will have to respond to open, flexible approaches, adaptable to the characteristics of the user, which broaden in their encourage research and self-denial. That is, they enhance the interaction, conversation and social learning, the continuous professional and personal development and establish connections at the global level.

In this sense, according to Neuhold & Lindnet (2006), microlearning is one of the many new concepts that aim for a new level of integration of learning with the practices of emerging digital technologies. The same authors add that there are different challenges for e-learning and microlearning, which have been known for a long time:

- a rich interaction, going más alla of the type instructions "goto the nextstep";
- a customization that is not hindered by standards and all predefined m é;
- the integration of feedback/support into complex learning processes;
- the social embedding of individual learning aspects in collaborative contexts and team processes;
- the flexible reuse of content that has so far been restricted and not sufficiently adaptable;
- the integration of elearning into organizations: the acceptance of digital learning as a fundamental part of flexible and innovative organizations is still lacking in many cases.

For Gabrielli et al. (2006), effective microlearning experiences should be:

- Highly transferable and unnoticed from the student's activities, so that students can download and upload the materials ofcticos fácilmente from one device to another.
- easy to use and easy to use, allowing access at any time and place, with the support of the use of themobile phones, PdAs or other connected devices by locala rea networks (LAN).
- Persistent, which means that the learning environment including all modifications operated on it by a student throughout life, must be independent of the physical instance on a given device.
- especially through the improvement of the different activities that contribute to the achievement of the goal of learning(s).
- individual and shareable, in such a way as to adequately support individual learning activities, while allowing students to obtain or provide support frompeers, tutors or other experts in the use of ICT.
- adaptable and/or adaptive to the needs of students, so the different styles of interaction can be selected by students based on their preferences or skills or suggested automatically by the system according to profiles of students specific or models developed during the daily interactions with the microlearning environment.

The approaches we are dealing with here also integrate aspects of the formal, informal and non-formal area, all from a conception of educational institutions as centres of knowledge. Integration facilitated by the use of social networks that can exceed institutional networks, and, above all, by the use of the new possibilities of the network (to connect a range of resources and systems in a personally managed space). The center of the didactic system, as Salinas, Perez and Benito (2008) is the context, the situation, the learning scenario and allis where the teaching develops, deploying

methodology communication relations. Each situation of the didactic, especially if understood from a constructivist approach to learning offers a unique and unrepeatable combination of the elements of the teaching elements, requiring a strategy also. From prefabricated methodology to artisanal methodologies, you can think of a spectrum of strategies ranging from methodological in the virtual environment with well-described steps to methods owned by the trainer and that are owned by the trainer build from the analysis and decision-making on the specific situation and the different elements of the process of the teaching process – individual characteristics of the students, content, environment, context–.

- The configuration of the scenarios themselves. Researching the possibilities offered by the integration of knowledge management systems to develop new modalities in e-a processes in virtual environments leads to new scenarios that will require some expertise from trainers to

associated pedagogy skills. If we think of teaching as a design of situations and learning experience, as guidance and facilitation of the use of resources and tools they need to explore and develop new knowledge and skills, the professor acting as manager of the pleyade of learning resources

and accentuating her role as a counselor rather than understanding her as mere transmitter of content

(Salinas, Perez and Benito, 2008), it will require to be managed in the different models of remote setting, a certain master's degree in the production and distribution of content and resources for different situations (blended, distance, etc.); domain of different related aspects of the devices, as well as the devices, as well as knowledge of the effects of these devices on learning. Paradoxically, in these student-centered methodologies, the role of the trainer presents greater complexity (Salinas, 2012).

From a pedagogic perspective, it may be desirable to approach the phenomenon from an open view, since this type of learning does not seem to arise from an adaptation of didactic to new devices and small units of information (podcasts, sms, articles, emails...) but as an adequacy of the formation

and personal and professional development to the rhythm of the individuals of the XXI century, in that view of the didactic applied to artisanal, open, flexible methodologies. In this moment of change, any micromoment is harnessed by microlearning to make the LLL a reality.

The integration of virtual learning environments into this framework contributes to reversing the tendency of students adapting to the system to go towards a system that is increasingly adapted to the student. In the Mott and Wiley line (2009) in proposing the open learning network (OLN), a hybrid of CMS and the personal learning environment (PLE), the idea is to move towards an alternative to institutional environments to harness the potential of the Web in improving learning. Here, the teaching strategies represent alternatives from which the trainer can choose a new methodology of teaching based on active work, autonomy and flexibility, and where the student is the protagonist of his learning.