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FLINN: A framework to characterize technology enhanced formal, non-formal and informal learning situations

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Abstract. *Thanks to technology, people learn continuously, anytime and anywhere, and in multiple situations that combine formal, non-formal and informal learning. However, recognizing the type of learning taking place in such technology-enhanced learning (TEL) situations is a big challenge, since the boundaries between these three kinds of learning are blurred. In this paper we present FLINN (Formal INformal and Non-formal), a framework that defines formal, non-formal and informal learning situations as a continuum of two factors: (a) how learning is achieved; and (b) the setting where the learning situation takes place. This framework helps systematically characterize TEL situations, and as a consequence understand the kind of learning taking place, and recognize the learning opportunities that may arise in these situations. To illustrate the FLINN framework we describe three different scenarios, all employing interactive tags combined with other technologies for supporting collaboration in different settings, and embracing a diversity of learning objectives.*

Keywords: *framework, formal learning, non-formal learning, informal learning, collaboration, mobile technologies.*

1. Introduction

Traditional learning practices are changing, led by the advance of Internet, mobile devices and the evolution of Web 2.0 applications and other software tools (Mills, Knezek & Khaddage, 2014; Roschelle & Pea, 2002; Sharples, Taylor & Vavoula, 2005). Nowadays, and thanks to technology, we can participate as learners in a variety of technology-enhanced learning (TEL) situations in which learning occurs anywhere and anytime, in multiple settings (workplace, home, a park...) and among people with a diversity of learning objectives (personal interests, institutional requirements, career goals...). These TEL situations can be supported by a variety of technologies and include and even combine different kinds of learning: formal, non-formal, informal learning (Mocker & Spear, 1982; García-Peñalvo, Colomo-Palacios & Lytras, 2012). Due to the increasing role of technology in our society, these TEL situations have become an important part of the daily lives of most adults and, therefore, one focus of study in the TEL community.

One of the problems related with TEL situations that is gaining interest in the TEL community is the importance of recognizing what kind of learning (formal, non-formal or informal) is taking place (Cook, Pachler & Bradley, 2008; Gallacher & Feutrie, 2003; Svensson, Ellström & Åberg, 2004; García-Peñalvo Conde, Zangrando, García-Holgado, Seoane, Alier, *et al.* 2013). In traditional learning, the boundaries between formal, non-formal and informal learning are blurred (Malcolm, Hodkinson & Colley, 2003). But in TEL situations the blur between these three kinds of learning is especially intensified, making it difficult to identify and

measure learning outcomes and competences (García-Peñalvo, Conde, Johnson & Alier 2013). In fact, most of research has focused so far primarily on measuring and recognizing learning outcomes and competences in formal learning situations (Christensen & Eyring, 2011; Kim, Kwon & Cho, 2014; Merchant, Goetz, Cifuentes, Keeney-Kennicutt & Davis, 2014). However, many educators, researchers and authorities such as the Organisation for Economic Co-operation and Development (OECD) stress that identifying and measuring learning outcomes and competences in non-formal and informal learning is still not well understood and should be further explored, particularly in TEL situations (Werkin, 2010; García-Peñalvo Conde, Zangrando, García-Holgado, Seoane, Alier, *et al.* 2013).

As an approach towards this challenge we propose a framework called FLINN (Formal, Informal and Non-formal). FLINN helps educators and researchers characterize TEL situations and as a consequence understand the kind of learning (formal, non-formal and informal) taking place. This way FLINN facilitates to better recognize the learning opportunities that may arise in TEL situations. FLINN defines formal, non-formal and informal TEL situations as a continuum of two factors: (a) how learning is achieved; and (b) the setting (the physical space) where the learning situation takes place. This framework is based on the idea that characterizing the type of learning situations is the first step towards realizing the impact of technology and understanding how to measure learning. Three scenarios are employed to illustrate the FLINN framework in this paper. All these scenarios make use of innovative technologies, including Internet, mobile devices, Web 2.0 applications and QR codes, to support collaborative learning across multiple settings and capture different learning objectives. Analyzing these three scenarios with FLINN enables to assess the impact of technology in different learning contexts.

The remainder of this paper proceeds with Section 2, reviewing the literature regarding the concepts of formal, non-formal and informal learning. Then, Section 3 presents the FLINN framework, which uses as a basis the research works discussed in Section 2. Next, three scenarios supported by innovative technologies are presented in Section 4 as illustrative examples of the type of learning situations that can be characterized with FLINN. Then, Section 5 discusses the three scenarios under the proposed framework. Finally, conclusions and future work in Section 6 serve to close the paper, highlighting other research avenues that could be derived from the framework proposed and the scenarios presented.

2. Formal, non-formal and informal learning

We have reviewed the terms formal, non-formal and informal learning in the related literature. From the existing definitions, we adopt the ones by Mocker & Spear (1982) and Sefton-Green (2004) to frame these concepts. Both works define formal, non-formal and informal learning according to two factors: (1) the learning setting (i.e. the place where learning occurs) and (2) the general approach to instruction.

Mocker & Spear (1982) define formal learning as the learning that occurs in traditional settings and in which the learning objectives and the means to achieve them are decided by someone other than the learner. These authors understand traditional setting as “any place in which education is the primary or sole function”. Therefore, in formal learning, learners have little or no control at all over the choice of learning objectives. For these authors, non-formal learning can occur anywhere, and learners decide what the learning objectives are, although the means to achieve them are proposed by others. Also according to these authors, informal learning can occur anywhere, but in this case learners control the means to achieve learning

instead of the learning objectives. Finally, Mocker & Spear (1982) define a fourth category called self-directed learning in which learners become autodidacts, controlling both the learning objectives and the means to achieve them. Table 1 summarizes the classification proposed by Mocker & Spear (1982) according to who defines the learning objectives and the means to achieve them.

{Table 1. Classification of the types of learning proposed by Mocker & Spear (1982)}

The work by Sefton-Green (2004) also established a similar classification of formal and informal learning but taking into account the incorporation of Information and Communication Technologies (ICT) for learning purposes. This classification defines informal learning in contrast to formal learning as “two kinds of continuum”: organization (curriculum) and setting. By organization, this author means the way learning is structured. That is, formal learning is structured and organized with a set of predefined objectives and means to achieve them; while informal learning does not have a clear structure; it is casual or accidental learning. By setting, the author refers to the place where learning occurs, ranging from the more formal spaces (such as schools or Universities) through intermediate places (such as museums or art galleries) right to social structures (such as families or communities).

In this paper, we adopt the definitions by both Mocker & Spear and Sefton-Green and formulate an interpretation for the particular context of this work. This interpretation of formal, non-formal and informal learning is captured in FLINN, a framework to systematically characterize technology-enhanced learning situations.

3. The FLINN framework

FLINN (FormaL, INnformal and Non-formal) is a framework that structures formal, non-formal and informal TEL situations as a continuum of two factors: (a) how learning is achieved (y-axis); and (b) the setting where the learning situation takes place (x-axis).

The characterization of how learning is achieved builds on the definitions by Mocker & Spear (1982) and Sefton-Green (2004). In formal learning the learner does not decide what he wants to learn nor defines the means to achieve learning; when learning comes up it is aligned with the learning objectives defined by an institution or educational system. In non-formal learning, the learner decides what he wants to learn, but he does not control the means to achieve learning; when learning comes up it is aligned with the learning objectives defined by the learner. In informal learning the learner does not determine the learning objectives, but controls the means that can result into learning; when learning comes up it is casual or accidental.

The characterization of the settings where the learning situation takes place is adapted from the work by Sefton-Green (2004). We consider more formal spaces those where education or training is the main purpose (e.g. classroom), and more informal spaces those where there is no direct relationship with education or training (e.g. park).

Through the continuum of these two factors the FLINN framework blurs the boundaries between formal, non-formal and informal learning situations, enabling the characterization of learning situations with different degrees of formality and informality. For example, when learning is the result of an activity defined by the science curriculum of a secondary school and

takes place in a high school classroom, we can talk about a formal learning situation; if learning eventually emerges as part of this situation, we will talk about formal learning. While, if the activity is the same, but carried out in an informal setting such as a park, we will talk about a “less” formal learning situation, and about “less” formal learning (although still formal). Accordingly, we can have situations occurring in informal settings, but resulting in formal learning and situations taking place in formal settings but resulting in informal learning.

In Figure 1, we represent with circles learning situations that are completely formal (dark gray circle), completely non-formal (light gray circle) and completely informal (white circle). However, in many real world contexts we find “in between” situations that combine learning activities from different types. This is especially true in TEL situations, which enable to design and run richer activities that take place across settings (Looi, Seow, Zhang, So, Chen & Wong, 2009). Therefore, although FLINN is generic enough to be applied to any learning situation (supported by technology or not), it aims to help characterize TEL situations, in which the boundaries between formal, non-formal and informal are still more blurred.

{Figure 1. FLINN framework. The dark gray circle represents a completely formal situation, the light gray circle a completely non-formal situation and the white circle a completely informal situation}

4. Three illustrative scenarios

In this section, we describe three different scenarios and analyze them with FLINN to understand the kind of learning taking place on them and the impact of technology in different contexts. The first scenario is focused on improving collaboration among workers in a company. The second scenario aims to foster social learning and capturing emerging topics in face-to-face discussions associated to a Massive Open Online Course (MOOC). And the third scenario aims to provide interactive workplaces for pupils to learn about cross-curricular issues in a school. All these scenarios share some aspects, but differ in others.

Regarding the similarities, the three scenarios make use of innovative technologies, including Internet, mobile devices, Web 2.0 applications and interactive tags generated with the tool etiquetAR (Pérez-Sanagustín, Martínez & Delgado Kloos, 2013). etiquetAR is both a web-based and a mobile-based application (see Figure 2) that benefits from the Quick Response (QR) technology to support the design and enactment of augmented learning experiences based on interactive tags (Pérez-Sanagustín, Melero, Hernández-Leo, Delgado Kloos & Blat, 2013). Through the web-based version of etiquetAR users can create tags and include them in a collection that is managed from the etiquetAR web interface. Each tag supports different profiles in a way that the users can associate several links to different contents in the same tag. The contents can be of different types: videos, documents, texts and URLs. In addition, etiquetAR allows exporting and downloading these interactive tags as QR code images that can be printed and placed at any location, and updated with new content through etiquetAR without re-printing them again. Through the mobile-based version of etiquetAR, users can access the content associated to the tags. Any QR code scanner can be employed to access the content. However, there is also a mobile app for Android OS, specially designed for improving user interaction with etiquetAR tags (Olmedo Camacho, Pérez-Sanagustín, Alario-Hoyos, Soldani, Delgado Kloos & Sayago, 2014). Through this mobile app, users can read the interactive tags and then they are

requested to select one of the multiples links defined for the tag. Furthermore, learners can easily add comments to the contents associated to the tags; comments that become accessible to other users.

{Figure 2. EtiquetAR (<http://etiquetar.com.es>) Web and Mobile application interfaces}

Regarding the differences, each scenario proposes alternative ways to combine all these technologies. In addition, each scenario aims to support collaborative learning across different settings and to capture different learning objectives.

4.1. Scenario 1: Collaboration at the Workplace

This summer, the Center for Technology and Innovation (CTI) starts an initiative that aims to improve the visibility of their research work with the rest of the centers of the institution. At the same time, this initiative wants to promote collaboration among CTI members to facilitate decision-making processes related to their current research advances. With this initiative, the directors of the CTI expect to increase the multidisciplinary of their research projects, promote innovation and improve the quality of their projects.

One of the activities proposed for this initiative consists in using tags generated with etiquetAR to augment several common spaces within the institution, with information about CTI running projects. For this activity, each member or group of members of the CTI working in the same research project registers to etiquetAR and generates a tag containing two links: (1) a text or a web page explaining the objectives of the project and (2) open questions that the team members working on this project need to resolve to advance in the project. The first link is associated to the profile “About the project” and the second one to the profile “Open Questions to Explore” in etiquetAR. In this way, anyone reading the tag could select one of these two links.

The tags generated are printed three times and attached to different locations within the institution. One tag is located at the dining room so that members of other research centers can read them and learn about the running projects. A second tag is attached at the entrance of the building so that people from surrounding research centers can see what is going on in the CTI. The third one is situated at the entrance of the offices of the researchers, so that anyone in the CTI can read what the different team members are working on.

The tags are placed in these locations for 3 to 4 weeks. During this period, people belonging to the institution are expected to use their mobile devices to read the interactive tags, and contribute to the open questions by adding comments or suggestions to the contents. Every week, the team members meet and discuss these comments and suggestions to see whether they can use them to advance their research.

According to the FLINN framework (Figure 3) the CTI is a non-formal setting. When researchers go to their workplace in the CTI they are expected to learn aspects related to the particular tasks or concrete projects they are carrying out, but despite this relationship with learning, learning is not the primary purpose in workplaces; and thus the learning situation in this scenario is classified as in a non-formal setting. However, the way learning is achieved in this scenario changes before and after introducing the technology. Before introducing the technology, researchers can achieve some learning about other colleagues’ projects in an informal way, by

chance or curiosity, typically as a result of informal talks in shared areas. However, and after introducing technology as part of this initiative, learning at the workplace becomes “less informal”, although still “non-formal” (see Figure 3). While etiquetAR tags are the means introduced by the institution to promote knowledge sharing and to explore others’ projects in a more structured way, the employees are the ones that will decide whether they participate or not from the conversation through these tags.

{Figure 3. Characterization of the first scenario (Collaboration at the Workplace) using the FLINN framework. This scenario occurs in a non-formal setting, and technology contributes to make the learning situation more formal, moving the way how learning is achieved from informal to non-formal}

4.2. Scenario 2: Social learning in MOOC face-to-face discussions

Massive Open Online Courses (MOOCs) have been a revolution in education, allowing students across the globe to access courses from elite universities free of charge. One of the main potentials in a MOOC is the opportunity for connecting learners and generating rich discussions around the course. These discussions are typically supported by online software tools, such as discussion forums, Facebook or Twitter (Alario-Hoyos, Pérez-Sanagustín, Delgado-Kloos, Parada G., Muñoz-Organero & Rodríguez-de-las-Heras, 2013). However, the large number of participants in MOOCs also raises the opportunity to arrange informal face-to-face meetings between groups of people who live in the same location, in order to continue the discussion about the MOOC contents and support those peers with problems. Actually, it is possible to find MOOC communities in the Meetup website (www.meetup.com) for Coursera, edX or Udacity. These offline group meetings can be a motivation for learners to create a social network around the MOOC and get in touch with people that have similar professional occupations and passions. Actually, there are ongoing works researching the potential in learning of creating face-to-face study groups to discuss and reflect about MOOC contents (Blom, Verma, Li, Skevi & Dillenbourg, 2013).

John is a Professor delivering the MOOC LT21 (Learning and Teaching in the 21st century). John likes to follow learners’ contributions in the social online tools around this MOOC, and is aware that there are some informal face-to-face meetings in several cities in Europe and North America. However, he has no clue on what it is going on during informal face-to-face meetings. In fact, John is quite worried because he is not able to detect emergent topics generated during these meetings, which may be of interest for the learners that cannot attend. Even more, it might be the case that some discussions that are closed in one face-to-face meeting are repeated in another different location, due to the lack of awareness of what happened in previous meetings. To overcome the aforementioned limitations, John decides to augment learners’ experience in MOOC informal face-to-face meetings adding a layer of digital information with etiquetAR tags.

In a first step, John generates a tag for the course with etiquetAR. This tag is part of the course logo, redirecting to the MOOC home page whenever scanned. As the course advances, John creates different profiles in etiquetAR associated with the same tag. These profiles redirect students to particular URLs. For example, John chooses to create a new resource every new

week. That resource redirects to the MOOC contents that are addressed during that week, or to the threads that learners should discuss in the informal face-to-face meetings held across the globe during that week. Also, and thanks to *etiquetAR*, John associates a set of questions to each of these profiles. These questions can be employed to lead the debate in the face-to-face meetings. Thus, with *etiquetAR*, MOOC teachers like John are able to associate different contents and questions to one single QR code, which in this case acts as the banner of the MOOC.

In a second stage, learners attend the face-to-face meetings. Paul, who attends the meeting, prints the course logo and carries it with him with a twofold purpose: identifying the people participating in the face-to-face meeting (if they are in a public place they need a way for recognizing themselves); and letting other participants scan the QR code with their smartphones or tablets. In this way, they can easily access the content for that session and the questions posed by the teacher. After the discussion, Paul submits the conclusions, answering each of the questions set by the teacher. Since *etiquetAR* tags allow adding comments, the attendees can see the conclusions from other meetings that were held before. Therefore, learners are aware of their peers' contributions, and do not need to start the discussion from scratch, ensuring richer conclusions as the overall outcomes of these informal meetings. Further, this awareness mechanism can also be useful to refute some of the arguments given in other groups of learners and finding differences arising from the culture or language depending on the location.

After that and in a third stage, John uses the web-based version of *etiquetAR* to see the contributions generated in the informal face-to-face meetings, and detects some emerging issues and conflicts. These new issues and conflicts are addressed in the social tools of the MOOC and in subsequent video lectures. It is important to note that if John finds responses to the questions that are not relevant for the MOOC or that may be confusing; he can hide them through the *etiquetAR* web interface.

According to the FLINN framework (Figure 4), we can classify most learning situations in MOOCs (i.e. watching video lectures, solving exercises, etc.) in an informal setting, since students can learn anywhere (public transport, cafeteria, home...). In addition, in MOOCs, participants determine what they want to learn (i.e. what MOOCs they want to enroll, when to drop-out, etc.). However, the means to achieve these goals are defined by the teachers of the organization or institution that designs the MOOC. Therefore, we can classify most MOOC situations as non-formal, regarding how learning is achieved. Face-to-face meetings in MOOCs are, in general, unstructured; they being disconnected from other similar meetings worldwide. This is why these meetings can be generally classified as "more informal" than most learning situations in MOOCs, regarding how learning is achieved. When introducing interactive tags for promoting social learning in MOOC face-to-face meeting, the learning situation becomes "more formal", since students interact guided by the content defined in advance by the teacher, which drives the discussions around the MOOC. Consequently, the use of technology in this scenario helps to formalize a learning situation that would be typically informal, at the same time that helps to connect isolated MOOC meetings around world.

{Figure 4. Characterization of the second scenario (Social learning in MOOC face-to-face discussions) using the FLINN framework. This scenario occurs in an informal setting, and technology contributes to make the

learning situation more formal, moving the way how learning is achieved from informal to non-formal}

4.3. Scenario 3: Interactive Workplaces at School

The primary school POLAR (Primary educatiOn and LeARning) is characterized for using a pedagogical approach based on supporting diversity. Usually, teachers in POLAR design their lessons based on activities of different types (Auditory, Visual and Kinesthetic) so as to support different learning styles. The annual plan of POLAR this year includes introducing technology as a means to support teachers in managing this diversity. As a pilot experience, teachers organize an activity called “Interactive Workplaces”. This activity consists in creating several workplaces for students around different areas in the school (classrooms, corridors, courtyards...); each of these workplaces covers cross-curricular issues by means of problems.

Teachers decide to use etiquetAR for augmenting these workplaces. They create a different interactive tag with etiquetAR for each workplace, and associate three links to each tag. These three links offer a different representation of the same problem: Auditory, using audio files; Visual, using video files; and Kinesthetic, using a complementary external element that is located at the workplaces.

For the activity, students are distributed in groups. Each group is equipped with a tablet. During one week the students have time to explore the school and visit the different workplaces, solving the problems proposed by the teachers. When reading a particular tag, students can choose the type of representation that best fits their learning style or interests, accessing one of the three links available in order to solve the problem. Also during the activity, teachers have a tablet that includes an installation of ClassOn (<http://www.class-on.org/>) (Gutiérrez-Rojas, García Crespo & Delgado Kloos, 2012). ClassOn is a software tool for enhancing activities orchestration by means of awareness mechanisms. Teachers can follow the actions of the different groups of students through ClassOn, detecting the activities that students have done or if they stacked at a particular workplace.

According to the FLINN framework (Figure 5) this scenario occurs in a formal setting (i.e. a primary school), but students decide the learning objectives to be achieved. Usually, school lessons are completely formal situations since teachers define both the learning objectives and the way in which they are achieved. However, in this scenario, technology offers the students the possibility of conducting their own learning experience determining their learning objectives through the activities they choose at the workplaces. Therefore, in this scenario technology contributes to make the learning situation “less formal”. This is an example learning situation in which technology transforms how learning is achieved from formal to non-formal.

{Figure 5. Characterization of the third scenario (Interactive Workplaces at School) using the FLINN framework. This scenario occurs in a formal setting, and technology contributes to make the learning situation less formal, moving the way how learning is achieved from formal to non-formal}

5. Discussion

The systematic analysis of the three scenarios with FLINN shows how this framework helps characterize TEL situations, and as a consequence, better understand the kind of learning taking place. In the three scenarios, FLINN helped clarify the role of technology in structuring learning, moving TEL situations and learning from more informal to more formal (scenarios 1 and 2), or giving students more control over the TEL situation and their learning, moving from more formal to more informal (scenario 3).

The characterization of these particular three scenarios with FLINN evidences that, in the same physical space (setting), technology can have a big impact in the way learning is achieved. Specifically, in all three scenarios, etiquetAR tags combined with Web 2.0 and mobile technologies are the means to transform learning situations into interactive TEL situations, in which participants have more control for determining their learning objectives. More research has been done with other technologies such as GPS, for transforming how learning is achieved in informal settings, such as a city (Santos, Pérez-Sanagustín, Hernández-Leo & Blat, 2012). TEL situations like this one could also be analyzed with FLINN to better understand the impact of other technologies in transforming learning.

The three scenarios presented in this paper take place in a single setting. However, we contend that FLINN is a framework especially useful for characterizing the next phase on the evolution of TEL situations: seamless mobile learning scenarios (Looi *et al.* 2010) or seamless TEL situations (Sharples, McAndrew, Weller, Ferguson, FitzGerald, Hirst, *et al.* 2012). These seamless situations benefit from mobile technologies to enable learners to learn at any spatial locations and across contexts that can be categorized in the continuum between formal and informal settings according to the FLINN framework. Some research has been done in real learning contexts to analyze how technology drives the activity flow between different settings (Muñoz-Cristóbal, Prieto, Asensio-Pérez, Martínez-Monés, Jorrín-Abellán & Dimitriadis, *in press*), bridging the gap between formal and informal learning (Mills *et al.* 2014; Cook *et al.* 2008). In such seamless TEL situations, FLINN might play a key role to capture their complexity and offer a deep understanding on how learning comes up.

6. Conclusions and future work

This paper has presented FLINN, a framework aimed at helping educators and researchers characterize TEL situations, and understand the kind of learning taking place in them. FLINN has served to categorize three different TEL situations supported by Internet, mobile devices, Web 2.0 applications, and QR codes. Each of these situations combined the technologies in a different manner, occurred in a different setting, and had different learning objectives that were achieved in several ways.

Because FLINN is a recent proposal, it is still too early to provide evidence and strong conclusions about whether this framework is clear and readable enough for the rest of the TEL community. Thus, future plans include working with other researchers and educators in this line to understand the following two questions: (1) To what extent does this framework serve to characterize other TEL situations defined by different researchers and in different context? and, (2) How useful do other researchers find this framework? Both questions together will provide us some feedback about the usefulness of the framework and also information about how to improve it.

Another line of work is to complement the FLINN framework with proposals from other researchers about evaluation techniques and strategies to understand and assess the learning quality and outcomes in different TEL situations. The framework proposed by Skule (2004) to measure and assess informal learning at work is an example of the type of information that could complement FLINN regarding how informal learning is achieved in non-formal settings.

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Table 1 Classification of the types of learning proposed by Mocker & Spear (1982).

		Who defines the learning objectives?	
		Institution	Learner
Who defines the means to achieve the learning objectives?	Institution	Formal learning	Non-formal learning
	Learner	Informal learning	Self-directed learning

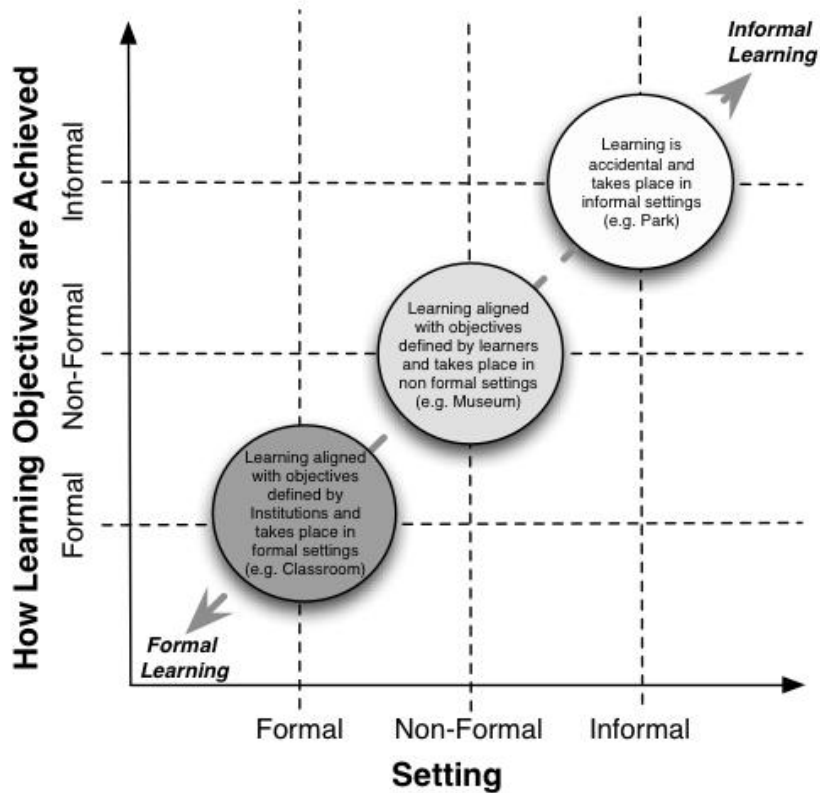


Figure 1 FLINN framework. The dark gray circle represents a completely formal situation, the light gray circle a completely non-formal situation and the white circle a completely informal situation.

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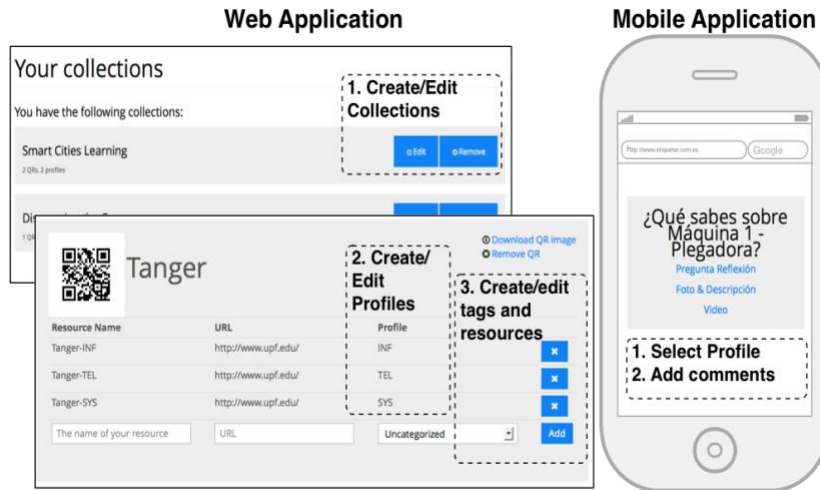


Figure 2 EtiketAR (<http://etiquetar.com.es>) Web and Mobile application interfaces.

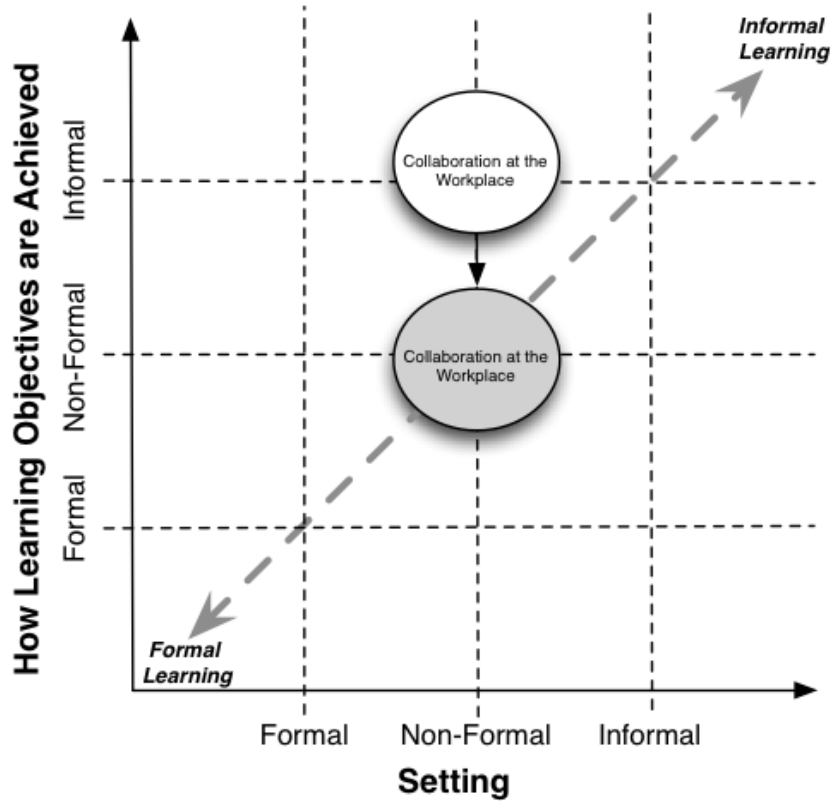


Figure 3 Characterization of the first scenario (Collaboration at the Workplace) using the FLINN framework. This scenario occurs in a non-formal setting, and technology contributes to make the learning situation more formal, moving the way how learning is achieved from informal to non-formal.

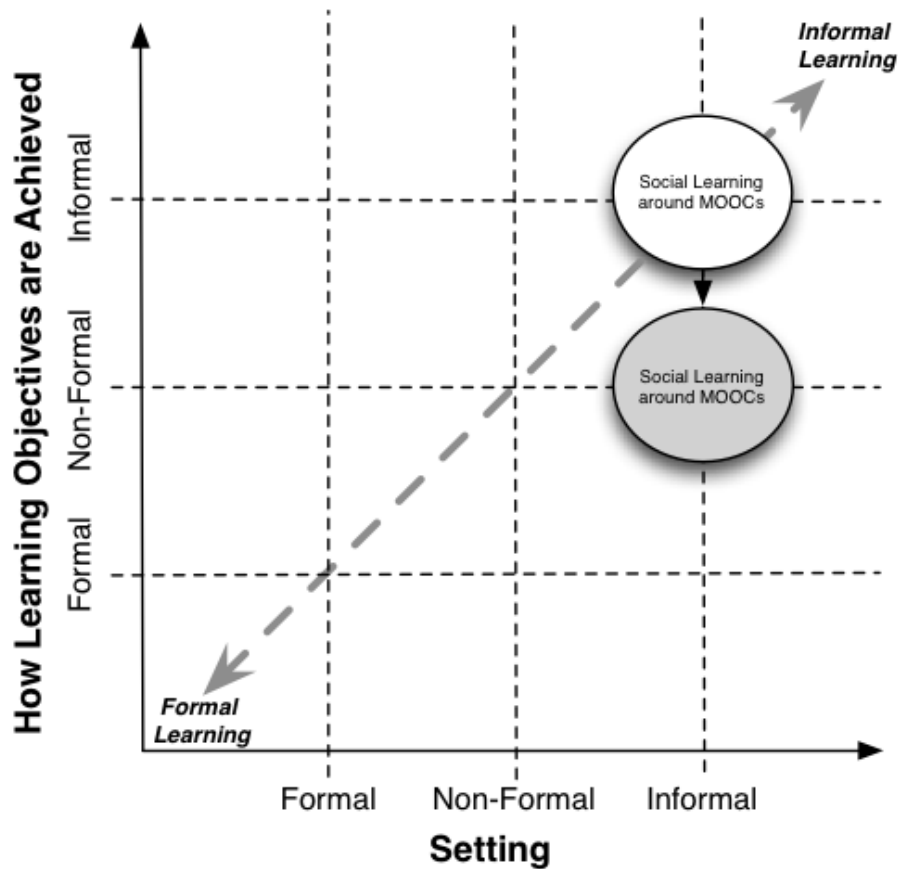


Figure 4 Characterization of the second scenario (Social learning in MOOC face-to-face discussions) using the FLINN framework. This scenario occurs in an informal setting, and technology contributes to make the learning situation more formal, moving the way how learning is achieved from informal to non-formal.

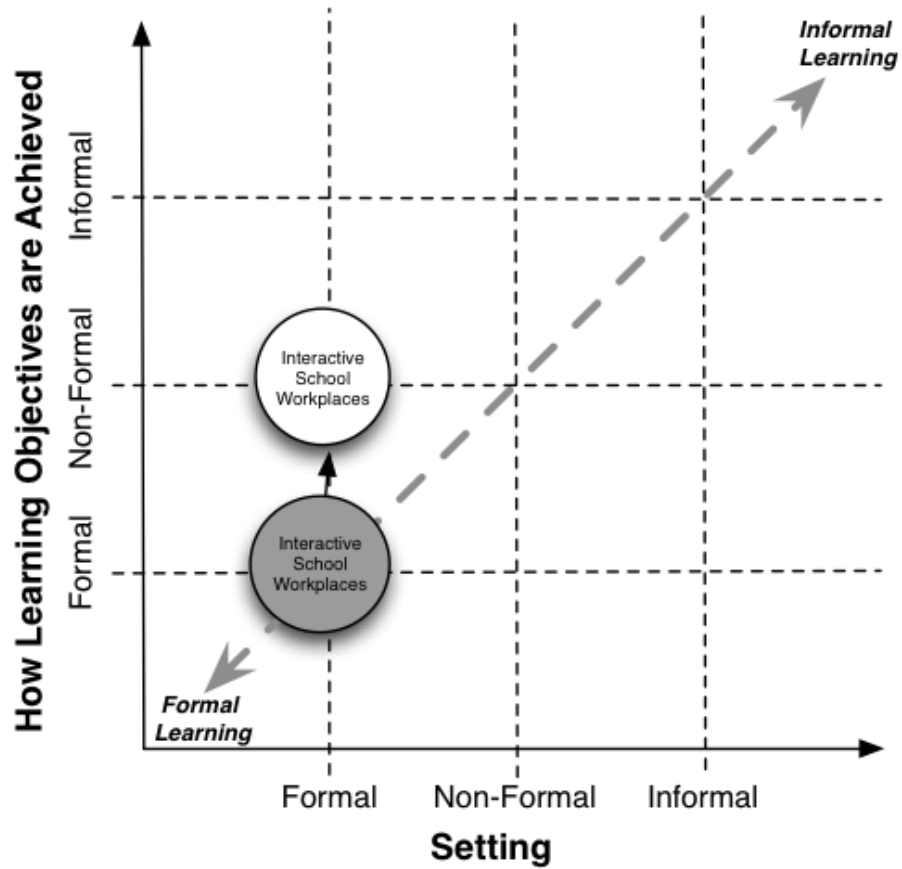


Figure 5 Characterization of the third scenario (Interactive Workplaces at School) using the FLINN framework. This scenario occurs in a formal setting, and technology contributes to make the learning situation less formal, moving the way how learning is achieved from formal to non-formal.