

# Creative use of Twitter for Dynamic Assessment in Language Learning classroom at the university.

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**Abstract.** This contribution describes an experimentation involving two classes of basic Italian as L2 during the A. Y. 2014-15 I term at the University Complutense of Madrid. Within a general MALL and BYOD approach, Twitter was adopted as in-classroom tool for language learning Dynamic and Authentic Assessment, aiming at boosting the learning success and overall language proficiency. Students' satisfaction, engagement factors and levels have been measured via a post-intervention questionnaire, showing general positive outcomes. Final formal summative assessment also showed very positive general results and opened the way for further investigations.

**Keywords:** Mobile Language Learning, MALL, Higher Education, Twitter, BYOD, Dynamic Assessment, Authentic Assessment, Neuroscience of Learning, Creativity.

## 1 Introduction

Starting from Chomsky's studies on language acquisition [2], we know how big is the role that creativity plays in language learning. We in fact learn our mother tongue by making creative hypotheses about its functioning, and not just repeating others' sentences, as old behaviorist theories suggested. Creativity<sup>2</sup> can also explain the productivity of ordinary language, made of original re-use of pre-built structures.

Given that premises, we cannot exclude creativity in second language learning. On the contrary, we have to consider it as a key acquisition driver, and therefore promote its development in each learning stage and activity.

Current technologies, and mobile-based in particular, are ideal tools for this purpose, especially when considering their connective, social [4]. and collaborative aspects [5]. Mobile devices allow in fact the creation of augmented learning environments, where "the rapid researching and organization of information combines with the creative ability to manipulate, interpret and redesign this material into new

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<sup>2</sup> The author explored the concept of creativity and its development and effect in the language learning process in several papers; see in particular [16].

forms (e.g. using photos, descriptions, audio recording), as well as the power to share, collect and distribute the results of the investigation” [22]. Marek talked about mash-ups and the collective creativity afforded by modern technology and user-generated content: “One of the key changes is the opportunity for everyone to create (user-generated) content. In a growing number of cases, the consumer of information takes on the role of information provider as well [13].

In this paper, mobility and creativity are at the basis of an experimentation conducted during the last first term at the Department of Italian Philology of the Universidad Complutense de Madrid within two basic Italian as second language courses. Mobility was exploited through the use of Twitter in classroom for different purposes, including not only fostering intake and deep learning but also different, engaging and interactive way of continuous assessment.

The following sections will provide details of the experimentation, by providing a description of its scientific background (section 2), the experimentation setting and implementation and its findings (section 3). The last section includes some conclusions and suggestions for further interventions.

## 2 Rationale

The experimentation aimed to stimulate language learning and to promote the achievement of better results while keeping track of the whole process in real time.

Then, its main two components are:

1. Language learning process
2. Learning monitoring and assessment

As regard the first point, we can identifying some theoretical and methodological sub-components.

The first is the neuroscience of learning background that justifies the choice of a MALL (Mobile Assisted Language Learning) and BYOD (Bring Your Own Device) approach to boost the language learning process. From a cognitive neuroscience perspective, learning involves forming and strengthening neural connections. In this sense, neuroplasticity is what we call *learning*. However, creating a new circuit is not enough: circuits can be transitory if they cannot be tightly rooted into the brain structure. The question is therefore not only to create new circuits, but also to make them permanent.

Studies tell us that good neural networks are built by experiences containing elements such as novelty, intensity, and movement. Enriched environments, where novelty, intensity and movement play a key role, can lead to improved learning outcomes [19].

To have an effective learning, it is therefore necessary to enrich the environment and the experience, so to get a permanent and stable learning. In this context, it is easy to see that emotions play a major role: they can direct attention, that is necessary for learning [19]; they can influence learning and memory by releasing two important hormones produced by the adrenal gland: epinephrine and norepinephrine. The solution for a good emotional management is linking academical content to students' experiences so that their positive emotions associated with these experiences become

associated with the learning. That is just what Mobile Learning functionalities like micro-blogging, and therefore Twitter, do. Twitter and M-learning in general is a very favorable environment for integrating novelty and intensity, because it allows Situated Learning [10], that happens when someone uses or creates and/or shares and increments knowledge exactly where knowledge is needed or generated, feeding a mechanism driven by curiosity, creativity and practical needs. As Situated Learning is generated by an emotionally intense moments when something catches our attention for its beauty or other kind of attractiveness, in so doing it is very effective in creating or strengthening neural circuits.

On the other side, we need to find a theoretically justified way to assess learning *while* learning takes places. This need is generated by the contextual nature of the learning process at issue. Situated learning is in fact structurally based on the integration with the context, it is completely embedded in the dynamic flow of experience, so that it requires a similar, dynamic assessment methodology, able to be integrated into the learning process without interrupting and blocking it – but, on the contrary, promoting it and becoming, essentially, a part of it.

Dynamic Assessment is therefore the most proper methodological solution to evaluate the outcomes of a situated language learning process, because, if adequately arranged, it can “disappear” as assessment and be completely assimilated to the rest of the learning process.

In traditional assessment, assessment and instruction are instead typically understood as distinct activities, existing in a dichotomous relationship [9]. Assessment is seen as an activity not only distinct, but even at odds with, the goals of teaching. Furthermore, it takes the form of artificial problems or questions, i.e. it results detached from the concrete context students are in.

Dynamic Assessment (DA) is a radically different form of assessment, even if cannot substitute traditional and standardized assessment in many cases, essentially due to institutional and political reasons [9]: official contexts such as schools and universities do in fact need traditional and standardized evaluation as evidence of the teaching process. DA has a different function and, unless there is a radical change of the institutional framework, it cannot be used as the only evaluation methodology. This does not mean it is less important: on the contrary, as we hereby are trying to explain, it can play a crucial role especially in situated learning by acting as a learning booster *while* allowing the teacher to take track of learners’ progress and to improve them.

Based on Vygotsky's zone of proximal development, DA generally uses a triadic *pretest-teach-retest* process. This scheme does not correspond to another form of separate testing activity, but is meant to describe three main functions that the observer (the teacher as the tester) attributes to tasks performed normally by students, who becomes testees without being aware of that. A pretest is given to discover what information the student already has. A teaching time on the unknown content follows the pretest, then a similar test is given. None of these three moments has to be formal: for example, the student reading a sentence can give the teacher information about what he knows or does not (pretest); then the teacher can explain something related or even simply re-phrase an incorrect or misspelled sentence in order to make the student hear its right version (teach). The retest phase can therefore be another moment of reading. The experimentation took up this core concept and intended the Twitter use

as the pretest and/or retest moment, following the teaching phase in a continuous process occurring throughout the lesson.

The following table, taken by [15], summarize the key differences between Dynamic and Non-Dynamic Assessment.

| Dynamic Assessment  | Non Dynamic Assessment   |
|---|--|
| <ul style="list-style-type: none"> <li>• It is process-oriented.</li> <li>• The learners' developmental changes are tracked and supported.</li> <li>• Learners become more responsible on their own learning.</li> <li>• The examiner takes active role during the testing situation. (Anton, 2009).</li> <li>• The teacher acts as facilitator of language-processing and problem-solving techniques.</li> <li>• The student learns to become an active user of self-monitoring strategies to regulate their own understanding.</li> <li>• The goal is to enhance students' conceptual understandings and to produce more insightful intentional learners. (Campione, 1989)</li> </ul> | <ul style="list-style-type: none"> <li>• It is product-oriented.</li> <li>• Learners are not supported.</li> <li>• These tests are not designed to evaluate specific instructional strategies for remediating learning deficits.</li> <li>• The examiner is neutral.</li> <li>• Opportunity to directly influence learning is overlooked within the context of traditional assessment.</li> <li>• Traditional assessment does not recognize the learner's potential to succeed with adequate environmental support.</li> <li>• The assumption underlying these tests are: All the students have had the same opportunities to acquire the information and skills probed in the tests (Campione, 1989)</li> </ul> |

**Tab. 1.** Dynamic and Non-Dynamic Assessment Comparison by Naeini and Duvall 2012.

To solve the other problem, that of the artificiality of traditional assessment, and to avoid the negative effect of anxiety generated by the examination context, the Authentic Assessment (AA) approach has also been adopted. AA is performed-based, i.e. students are asked to perform real-world tasks that demonstrate meaningful application of essential knowledge and skills. Working on authentic tasks is an engaging activity in itself and, being fully incorporated into learning process, becomes an episode of learning for the student. In language learning, AA is facilitated by a communicative approach: using the target language to say or tweet something that is not directly elicited is a form of AA [3, 14, 23].

By adopting both the described approaches, DA and AA, Twitter becomes the central point of an integrated, highly interactive process. Due to its micro-blogging and social media functionalities, it can be the ideal solution to solve the dichotomy between teaching/learning and assessment when there is the need of a tool able to assess progress *and* stimulate learning and vice-versa, at the same time, as in our case – and in all contextual learning in general. The relationship between learning and assessment is radically transformed: performance-related anxiety is reduced or even eliminated and the resulting learning scenario is enriched by a new powerful source of stimuli, able to convey learners' attention on new objects and therefore to generate new, socially co-created, knowledge.

For the teacher/tester, these Twitter moments are special occasions to observe what is being acquired and how, what kind of difficulties students encounter and what are their focuses of interest. For the students/testees, apart being hidden moments for practice and assessment, they are special occasions for playful, fun and original re-use of the pieces of language they just learnt. Stimuli coming from the knowledge just acquired join those coming from the contextual situation, while social interactions feed the content creation process in a creative way, by mixing suggestions from friends, assonances between words and memories.

### **3 The Experimentation**

In order to achieve the goals of promoting language learning while tracking ongoing progress, the experimentation exploited, on one side, the entertainment and fun potential of mobile devices and, on the other side, the hidden but highly effective nature of untraditional assessment methods such as Dynamic and Authentic Assessment.

Twitter was selected due to its popularity and easiness of use. People and young people in particular are very familiar with it, even if they do not have a personal account, so that it is easy for everyone to understand and follow what is going on on it. Twitter was adopted within a general BYOD approach: the use of mobile devices in the classroom for quite all functions (such as checking mails and texting) was permitted. This decision came from a twofold consideration. First of all, even when the use of phones is forbidden, it is very hard to get an actual control of the situation, thus often resulting in a stressing loss of time and energy. On the other side, given our common habit to be always on, being forced to be off can result in generating frustration and anxiety, consequently inhibiting the learning process. Since [8] studies on the Affective Filter, language teachers know very well, and much more than other teachers, how much negative feelings can get a negative impact on learning. Furthermore, retrieving on the Internet pictures and videos and other multimedia contents related to what is going on in the classroom is a very relevant part of the classroom life, and can deeply improve the quality of the lesson.

The experimentation involved two classes of basic Italian as L2 during the A. Y. 2014-15 I term at the University Complutense of Madrid. The first class belonged to the Modern Languages and Literatures degree (Faculty of Philology). Their curriculum comprises at least two courses of Italian L2, up to 8 in case of Italian as Major Language (from A1 to C2 CEFR level). It was composed of 32 students and they all (but one) had no previous linguistic competence of Italian. The second class belonged to the Musicology degree (Faculty of History and Geography). Their curriculum comprises only one basic course of Italian L2, conceived to provide them linguistic notions to understand key music related lexicon coming from Italian. The size and composition of the second group was similar: about 30 students and no previous knowledge of Italian. This course was 15 hours shorter than the first one.

It is important to highlight that the experimentation was conceived as part of the personal, unofficial, Professional Development Plan of the author. It was intended as a very small scale intervention to test the effectiveness and feasibility of the main

working hypotheses, with a view to scale it up in case of positive outcomes. For this reason, it was preferred to involve two different classes and to consider past classes as control groups for some key items – such as final proficiency levels – instead of conducting the experiment with only one class plus a parallel control group.

The experimentation was conducted in the following way.

At the very beginning of the course, the teacher explained that Twitter was intended as a tool to practice Italian during the lesson, by creating tweets with the *pieces of language* learnt in the classroom. For an easier retrieval, a specific hashtag was ideated collaboratively for each class: #itagnoloUCM<sup>3</sup> for the first group and #musitalia<sup>4</sup> for the second.

Even if tweets could be created at any time and possibly also outside the class timetable, two or more specific moments were allocated during the two-hours lesson to tweet (re)using lesson contents. Tweets, labeled with the class hashtag, were projected on the classroom screen and could be seen as soon as they were created. In this way, they were commented and possibly integrated and/or corrected by the teacher and/or students in real time, creating threads or just giving space to grammatical or cultural debates.

Sometimes, tweets were created outside the classroom, for example by students who could not attend and wanted to participate from home. Sometimes, the teacher used Twitter send reminders about homework. After the official closure of the course and just during the week before final examinations, the teacher provided grammatical tips to the first group.

For the Musicology class, a special activity was organized on the 20th of October 2014, with the aim of stimulating the creation of content and possibly incorporating music-related input. The activity consisted in a 15' tour inside the faculty building, searching for interesting and possibly funny things (people, situations) to show and briefly describe via Twitter. This activity was not planned in advance: it was proposed to re-activate a flat lesson and was broadly based on the scavenger hunt activity described in [19].

At the end of the course and of the term, a post-intervention questionnaire was given to the students of both the courses to evaluate their engagement and satisfaction. The outcomes of the questionnaires were put in relation to the official examination results and with the contents produced during the experimentation. All these tools and data constitute the integrated evaluation set of the experimentation.

### 3.1 The data

In total, about 80 tweets were created by the Musicology degree class and about 100 by the Modern Languages and Literatures degree class, showing a quantitative difference probably due the different amount of total hours of the course.

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<sup>3</sup> The hashtag comes from the contraction of two words: Italian(o) and Spagnolo (Spanish), a invented but quite common word to indicate the code-mixing phenomenon by learners of both languages, due to their similarity. The suffix, UCM, is the acronym of the University Complutense of Madrid.

<sup>4</sup> The hashtag is the contraction of music and Italia/Italy.

The tweets created were very diverse and showed a great variety of form, content and relationship with the context (what had been just said in classroom or other relevant environment-driven stimuli).

These are some of the most interesting tweets from the Musicology group.

The first two pictures gathers some of the tweets created during the first day of the course, 29th of September 2014. More than 20 tweets were created during that very first moment, reflecting a general positive reaction. Many of them were also re-tweeted and sometimes little conversations developed, as in the first example.

Some of the tweets take-up the main content provided during the lesson, such as greetings (*bon giorno* – good morning, misspelled) and the sentence *non ho capito niente* (*I did not understand anything*). Others, such as *que cosa volei mangiare* (*what do you want to eat*, misspelled), were perhaps stimulated by the lunch time. Even if *over-performances* like these (as previously said, it was the first day of the course) are quite common within a Lexical Approach [11], a high level of up taking of the content provided, together with a high level of personal re-working is evident.



**Fig. 1.** Some example of tweets made during the 1<sup>st</sup> day of Musicology class, containing a short Twitter conversation.<sup>5</sup>

<sup>5</sup> The learners agreed to publish their photos, that are anyway their public photo profiles on Twitter. Names are hidden, but in the case of the teacher-author (see figg. 2,3).



**Fig. 2.** Other tweets made during the 1<sup>st</sup> day of Musicology class, containing quotations from an Italian song (*Tintarella di luna*) and food brand (*Nutella*).

As said above, on the 20<sup>th</sup> of October an out-of-the-classroom activity was made, and students went for a walk in the faculty in search of interesting things to tweet. The tweets created reflect the up taking of the movement verb *andare* (to go) in *io vado al bagno* (I go to the bathroom), as well as that of some modal verbs such as *dovere* (have to/must) in *noi dobbiamo fare un'attività* (we have to do an activity, misspelled) and *noi dobbiamo studiare l'italiano per l'esame* (we have to study Italian for the examination).

Interactivity is shown by the conversation between a student, asking the teacher (me) how to say *going down the stairs*, code-mixing Italian and Spanish, and the answer of another student, who, maybe surprised by the first question (or, more probably, because of the place-inference related to the question, given that they were supposed to be in the same place), reacts with *escalera??* (stairs??).

*Un professore più pazzo per la facoltà...socorso!* (A very crazy professor in the faculty! Help!), describes a person – maybe a professor they know – looking crazy while walking in the faculty.



Fig. 3. Tweets made during the *walk in the faculty* activity of Musicology class.

Other tweets seem to be unrelated with the task and reflect personal relationships and emotional interactions. That's the case of the last one in the screenshot above, wishing happy birthday to Javi, and of the first two of the following screenshot, asking *How to say I hate you* and saying *Good! You are very special. This is great....*



Fig. 4. Other tweets made during the *walk in the faculty* activity of Musicology class.

As regarding the second group, there is a number of interesting tweets related to the *like* meaning. This is highly consistent with the emphasis given during the lessons to this major verb and also with an emotional way of expression, typical of young people.



**Fig. 5.** Tweets made by the Modern Languages & Literatures class, including use of *piacere/to like*.

From the grammatical point of view, these tweets were very informative, because, although the use of the verb *piacere* (*to like*) is very similar to the Spanish *gustar*, agreement mistakes - such as lack of agreement between subject (plural) and verb (singular) - are very common. The following tweets, on the other side, shows a perfect mastery of the *piacere* morpho-syntactics (*I don't like lessons at 3 p.m. because I am hungry*). The fourth following tweet displays another grammatically correct use of the verb, with the third singular person and the accordance with the feminine singular indirect pronoun (*le-her*, in *My friend Paula likes Italian very much*).



**Fig. 6.** Other tweets made by the Modern Languages & Literatures class, including use of *piacere/to like*.

In the tweets in figure 7 we can see more spontaneous and varied content. They belong to a later period of the course, after about 7 weeks of lessons. The first shows the use of the past *ho imparato* (*I learnt*). The second expresses a desire in the future by using the modal verb *volere* (*I want*), and a personal opinion about the film

*Interstellar*. The tweet is also part of a thread/conversation. The third is a description of the evening in Madrid. The fourth, by one of the most active student, is a quite complex sentence using the verb *preferire* (to prefer): *I prefer going to the bar before going to the gym because I am a very lazy boy*.



**Fig. 7.** Other tweets made by the Modern Languages & Literatures class.

This overview closes with a couple of tweets that are very different from the others. The first, by the same *lazy boy* of above, is addressed to the teacher, in front of him, to remind her to give him back the pen he lent her. Besides the humorous use of the tweet, it shows a quite good mastery of the Italian indirect clitic pronouns (*darmi* is *dare plus a me*, i.e. *give to me*) used with a modal verb (*potere, to can*).



**Fig. 8.** Can you give me back my pen, teacher? Thank you.

Finally, this last tweet has a very expressive and poetic function, by using [6] terms. It quotes a modern Italian poet, Cesare Pavese, and is made by the only non-beginner of Italian of the class: *This morning the life slides through the water and the sun around the water ever young reflection*<sup>66</sup>.



**Fig. 9.** A quotation from Italian poet Cesare Pavese.

<sup>66</sup> Translation by the author.

### 3.2 The post-intervention questionnaire

In order to have data about the students' perception of the experimentation and about the factors that could have played a role in their engagement, an evaluation questionnaire has been prepared and given to the students of both the courses. The questionnaire, composed of close questions, aimed at investigating the following points:

- a. If the students liked or not to use Twitter in classroom
- b. The reasons they liked or disliked it (three possible answers)
- c. If the students had an active role in the activity, for example by creating and/or re-tweeting one or more tweets.

To provide an explanation to the possible positive answer to the question a, the students could choose among one or more of the following answers:

- Because it was useful to learn
- Because it was fun
- Because I interacted with others.

To provide an explanation to the possible negative answer to the question a, the students could choose among one or more of the following answers:

- Because it was boring
- Because I don't have Twitter
- Because I did not understand the tweets.

These answers have been considered illustrative of the main reasons for a positive or negative reaction and have been selected on the basis of a twofold consideration: the comments that the students spontaneously made in classroom, especially during the first period, and the findings from a previous research on mobile language learning – in particular the creative and playful aspect, concerning interactivity and crowd sourcing and the different social networker identity [20].

Even if very short and simply structured, the questionnaire resulted useful to identify the most important factors that influenced the impact on the users/students.

The following diagram shows that over 70% of the students reacted positively. The 26% negative answers, on the other side, it is not irrelevant. It is easy to think that, only for the fact that a BYOD approach has been adopted, students are automatically happy to participate.

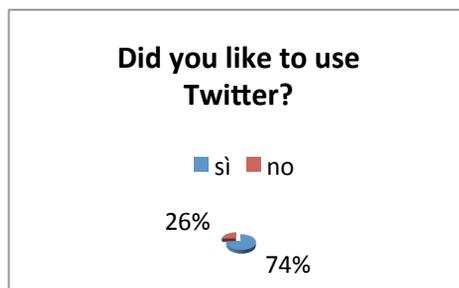
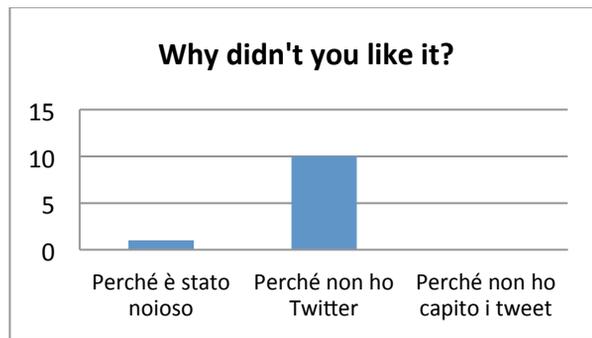


Fig. 10. First question answers.

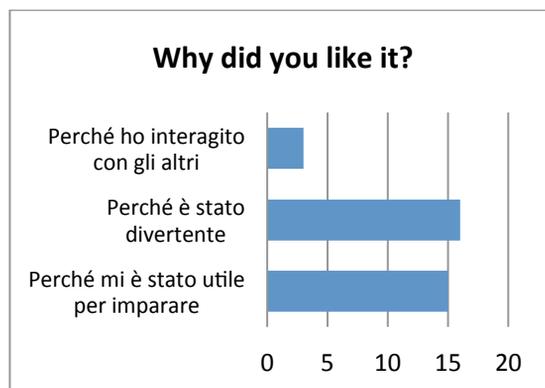
The analysis of the reasons given by the students to explain their negative reaction is very enlightening. For the majority of the cases, the problem is that they did not have Twitter, i.e. they did not have a Twitter account and/or they did not use it. Quite none of them said there was any problem in understanding, while that was supposed to be a probable negative factor, given that the tweets were in Italian and the course was addressed to absolute beginners. On the other side, in at least two cases, actual but not declared problems in understanding emerged very clearly from the compilation of the questionnaire.

The small percentage of answers about the boredom of the activity seems to be related to the main answer (not having a Twitter account). In any case, it is a very marginal result.



**Fig. 11.** Reasons for disliking, from the left: Because it was boring; Because I don't have Twitter; Because I did not understand the tweets.

Among the liking reasons, the first is that of the playful aspect, closely followed by the usefulness for the learning process. Those who liked the experimentation as an occasion to interact with other colleagues represent a very small percentage.



**Fig. 12.** Reasons for liking, from the left: Because I interacted with others; Because it was fun; Because it was useful to learn.

As regarding the way of using Twitter, the majority of the students gave a positive answer (34%), but negative answers increase (66%). There seems to be a correlation between a general positive answer and a positive answer to this kind of question, but, as it will be explained more in details below, it is a tendency and not an absolute correlation. The question about the number of tweets sent and re-sent or saved as favourite aimed at measuring the activity level among the students, even if only in their perception and memory (in the sense that the majority of them could not check out the actual number of tweets created, and, therefore, it is possible that some answers are not correct). It is interesting to see that the majority of the active users created at least 3 tweets (67%), and that the second answer is 1 (17%).

The answers to the last two questions, about the re-use and the rating of others' tweets (saving them as favourite) are similar to those just presented. *More than 3* and *1* are again the first two answers, but in reverse order.

The data collected with the post-intervention questionnaire tell us that the experimentation has been generally welcoming and liked, mostly because perceived as funny and useful to learn better the new language.

Those who disliked the experimentation, in the majority of cases, did not have a Twitter account. It is probable that they felt excluded from the activities. As said above, the participation via Twitter was intended on a voluntary basis. Therefore, this fact raises an important issue: that of the freedom limit for students in cases like that. Is it right to leave these activities open to who wants to take part in them, without requiring explicitly their engagement? Does it constitute a different context from other curricular activities, only because mobile devices are used? Or only because it is an experimentation? And why? Are we giving it, in this way, less relevance to this experience or not?

There is no absolute answer to this kind of questions. The choice to leave open the participation corresponds to the will to keep intact, as far as possible, the fun and creative value of the tool – a component that surely should have been reduced by the mandatory use of the app. From the answers collected, it seems that, at least for this purpose, the goal has been achieved.

Moreover, it has to be pointed out that even who did not have the possibility or the will to use Twitter could anyway take part in classroom discussions, as it actually happened very often.

But another two relevant considerations arise from the same point.

The first is a general consideration.

If we think about the reaction students use to have when activities – curricular or not, experimental and normal - are not open but mandatory, i.e. when the participation is not voluntary like in our case, are we still sure that they actually have no other choice but engaging? Very often students do not do what they are supposed to, even when they are officially without any other possibility. In cases like this, the negative reaction is not read as a lack of engagement but as a kind of disobedience – something that generally does not improve the performance more than in other cases.

Leaving explicitly freedom of participation corresponds, on the other hand, to the didactical principle of learning personalization and, especially for university students, to personal responsibility for their own learning path.

The second consideration is about the gradation existing within participation. It is not a matter of binary opposition 0-1. There are many shades and possibilities

distinguishing the various grades and modalities of engagement. As in using any social network, there are several different types of user. There are those who follow but never intervene, the so-called *spectators*, those who sometimes intervene, and those who are always very active [20]. We can think that these behaviours reflect personal attitudes and habits, and that not necessarily a spectator is expected to fail or to learn less in comparison with the *hyperactive*, in just the same way we cannot automatically attribute a higher I.Q. to a more extroverted or successful person. Also due to this kind of arguments, the choice to leave open the participation appeared justified.

#### **4. Some conclusive observations**

As specified above, DA cannot substitute formal assessment, especially in a high education context. Furthermore, consistently with the main objectives of the intervention, a way to get a precise measurement of possible improving in learning success was needed.

The overall final proficiency level, measured via traditional standardized summative assessment (shaped like official CEFR-based certification of Italian L2), resulted much higher than that of the previous years, with an average of higher marks of over 80%. If we take into consideration only the highest marks (comprised between 9 and 10 in a scale of 0-10), they were 21% in 2012-13 A.Y., 48% in 2013-14 A.Y. and 57% for this year. As it is clear, even if the experimentation is likely to have played a strong role in getting this achievement, a meaningful improvement was registered last year too, when the experimentation was not implemented (but the class at issue was really exceptional). Therefore, more detailed analysis should be done, as the better performance could be correlated to other factors. Control groups in the same period of time should also be set.

The post-intervention questionnaire served to evaluate students' perception and satisfaction, together with engagement factors and levels. Outcomes were very positive, the negative ones referring to those without a Twitter account (and not interested in activating it). This latter aspect raised the issue of the opportunity of making participation mandatory or not. Even if solutions are not absolute in cases like this, the open approach appears to be well-grounded within a general andragogy-based framework and self-directed and personalized learning in particular [7].

Some general remarks can be done regarding the role of innovation and creativity in the whole process.

The experimentation was characterized by several innovation factors: the BYOD framework, still very uncommon in higher education [1]; the use of Twitter in language learning and in particular in Dynamic Assessment. Dynamic Assessment is strongly related with a radically un-traditional teaching approach that does not distinguish teaching/learning process from assessment [19], thus promoting the establishment of a positive and relaxing climate, highly favourable for learning and language learning in particular [8,12].

Creativity permeated the whole experimentation, both from the pedagogical and the users' perspective - i.e. from both the sides of the story: teacher and students.

From the pedagogical side, it is related to MALL, conceived a *learning booster*. This deals with neurophysiology of learning, the relationship between cognition, memory and learning itself and with two key features of learning success: novelty and intensity [21]. Novelty and intensity are related to attention and emotion and contribute to create or strengthen neural circuits. Twitter and m-learning in general is a very favorable environment for integrating all these factors, promoting the spurring of creativity through the collaborative creative construction of content and creative use of language [10]. The diversity and the originality of the tweets created, often going beyond what was proposed in the classroom and including multimedia contents, quotations of lyrics and poems, jokes and personal memories, confirm this potentiality and open more space to further exploitation of the tool.

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