Science Education and Social Networks

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Abstract

Vocational education is one of the key aspects of the National school reform entered into force in 2015 in Italy. Traineeships became compulsory for students in the last three years of the upper secondary schools. The reform was inspired by the European policies on lifelong learning of the last decades, mainly addressed to satisfy needs arising from various actors: educators, students, stakeholders.

Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, a public health body belonging to the Italian National Health System, developed a work-based education project titled "Digital Natives at work" in response to the reform requirements. It was devoted to 72 students aged 15 to 17 and belonging to 5 secondary schools.

Social media were used as tools to disseminate science in a rapid, exact, visible and smart way. Ninety-five % of Italian high school students, in fact, are users of at least one social network and 20,5% use social media more than 3 hours per day: these and other statistics represented the social and cultural background and the premises of the project planning.

The work-based learning promoted knowledge, skills and correct behaviours on food safety, animal health and veterinary public health. Students used some of the widespread digital communication tools (blog, Facebook, and WhatsApp) to disseminate adequate healthy approaches among the peer group.

The implementation of a public Facebook profile and two blogs, using specific narrative and communication techniques, were the main project outputs.

The monitoring system focused on the evaluation of students' involvement in the project, the number of followers of the Facebook profile, the competences acquired (scientific knowledge, technological skills and transversal abilities).

The encouraging results show that science based communication plans can increase their success choosing language and means suited to the target needs. Further studies are necessary to measure impact and target response.

1. Introduction

In 2015 a national reform of the school education system (Law n. 107/2015) entered into force in Italy inspired by the European policies on lifelong learning. The Copenhagen process, the Lisbon Strategy, and Europe 2020 established that vocational education and training (VET), skill and competence acquisition, transfer and capitalisation of learning outcomes, and the transparency of educational qualifications represent key elements to meet current and future socio-economic challenges.

In this framework, the Italian school reform enhanced work-based learning: traineeships became compulsory for the last three years of the upper secondary schools, giving the students the opportunity to face the labour market, facilitating job placement at the end of their studies. This is also to prevent early school leaving and promote social inclusion and non-formal structured learning experiences.

In 2015-2016, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise (IZSAM) developed with 5 upper secondary schools of Teramo Province a vocational education project coherent with the priorities set by the schools and the Institute mandate.

IZSAM is a public health body belonging to the Italian National Health System. The Institute provides scientific and technical support to the National and Regional Governments in veterinary public health, promoting an integrated approach to the system of animal health and welfare and food safety. Health education is in its mandate established by law.

In response to the reform requirements, IZSAM developed a work-based education project titled "Digital Natives at work".

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The project context was based on studies concerning the use made by adolescents of social media as means of relationship, communication and learning: in Italy, 95% of upper secondary school students use at least one social network and Facebook is the most used one, while 20,5% use social media more than 3 hours per day.

The initiative focused on two crucial items: relevance of public health and environmental protection; communication and information through new technologies and media.

The project lasts 3 years. In the first one, it involved 72 students between 15 and 17 years old, engaged to achieve the following objectives:

• approach the main veterinary scientific issues related to health protection;
• experience modern communication strategies;
• use specific narrative techniques (i.e. Storytelling) supported by audio-visual media;
• use social networks and applications (i.e. WhatsApp) to disseminate scientific information;
• be familiar with a professional scientific environment;
• practice their attitudes, skills and abilities;
• assess their educational and professional life plan.

Indirect beneficiaries were the peer group, family, and citizens that were informed on the project and the topics covered via social media.

2. Materials and methods

The work-based learning was intended to promote knowledge, skills and correct behaviours on food safety, animal health, and veterinary public health. Students used some of the widespread digital communication tools to disseminate correct approaches to healthy lifestyle among the peer group.

The traineeship had a length of 50 hours carried out through experts' lessons and interviews, visits at the IZSAM laboratories, hands-on work experiences such as communication activities using social media and web tools. The students were divides in two groups having the same plan of activities.

The two groups, of 36 units each, were step-by-step introduced to IZSAM mission, organisation and tasks. A multidisciplinary team delivered specific talks on communication and science dissemination, scientific language, the use of scientific 'sources' and 'bibliographic' research, narrative storytelling techniques, food safety and animal health issues.

The visits at the IZSAM laboratories were useful to have a concrete experience of veterinary activities. In the labs, such as diagnostic microbiology, virology, serology, biotechnologies, etc., students met and interviewed veterinarians, biologists, chemists, laboratory technicians while at work.

During the traineeship, students were stimulated to take pictures and videos to report and share their experience using social media.

WhatsApp was the application used to facilitate the project coordination and monitoring. Tutors and experts interacted in a friendly and informal environment: a continuous and rapid information flow on the organisation of the activities and the sharing of contents was encouraged.

Inductive learning styles, problem solving, cooperative work, creative thinking, and use of new technologies are some of the keystone methodologies used to develop "Digital Natives at work".

The project team defined a skill model to identify knowledge, abilities and transversal skills to be improved.

Students' interests and attitudes were valued to assign activities and tasks accordingly.

3. Results

The implementation of a public Facebook profile and two blogs, using specific narrative and communication techniques, were the main project outputs.

"The digital science" and "Science is life" were chosen by the students to title the social network page and the blog. They also created two logos to tailor the homepage of the social media.

Figure 1. *"*The digital science*"Logo*

SCIENCE *IS* LIFE

Figure 2. "Science is life" Logo

The Facebook page, on line since May 2016 and administrated by the IZSAM project team, is a public page indexed in the Facebook categories "Didactics", "Health", "Education" and "Environment". Students selected topics and contents to publish posts according to their personal interests.

The PTAT (People Talking About This) indicators were used to evaluate the page performance and user engagement and participation. The table below reports the indicators and the results achieved from May to September 2016.

PTAT indicators	Results
• people who click "like"; • people who post on the bulletin board of the page; • people who interact with the publications (including events and albums; • people who mention the page; • people who share contents; • people who put "like" to the post and / or perform any action on the page;	• Total of 1,569 people reached the students with the published posts;. • 215 people reached the page with the video 'virology for passion', 90 views in a week; • 97 people reached the students with photos of the laboratories; • 175 people reached the page with the post concerning the presentation of the project; • 130 "like" to the page; • 137 "likes" to the posts.

Figure 3. Selected indicators and results of the page performance

During the traineeship, the students tested the Blog, as a digital "logbook" of the traineeship.

Students with specific informatics attitude and web management skills were involved in designing the two Blogs. The Blog layout, developed in Wordpress, had the following characteristics:

- black, white and green colours to evoke Nature and Science;
- logo and images at the centre-top of the page to make direct reference to the main topic of the blog;
- the core of the blog is positioned on the left side of the page, (posts, images, space for comments, etc.)
- the search bar located at the right side and in the footer to improve the search of the articles.

All students were invited to write texts and select images and video to be published in the Blog. The project experts revised the texts and shared them with the students to strengthen self-assessment and the learning process.

At the end of the traineeship, students answered a satisfaction evaluation questionnaire; they were also asked to indicate their main areas of interest.

Results show that: students were equally involved in topics related with animal health and food safety; most of the students preferred laboratory visits since this training methodology allowed to directly experience the work environment and research activities; meeting with the experts were also positively valued as favouring interaction with professionals; group activities and role-playing facilitated relationships and experiential learning.

As concerns the project monitoring, students were invited to assess the learning process identifying acquired knowledge and skills for each categorised area (Figure 4).

Area	Elements
Knowledge	Technical-scientific aspects • basic knowledge on the National Health System; • basic knowledge on Food Safety and Food Hygiene; • basic knowledge on zoonosis; • knowledge on environmetal protection. Communication • basic elements • WEB 2.0 communication • Digital storytelling • Methodologies to manage social network pages (Facebook) • Methodologies to manage a blog
Skills	• Use of WEB 2.0 communication techniques • Production of dissemination materials through digital storytelling techniques • Management of social network pages (Facebook) • Blog creation • Dissemination of scientific contents using a simple language
Transversal skills	To understand the professional contexts and adapt behaviours; To identify and respect hierarchy within the institution; Time and resource management Team - working Communication and control of emotions Problem solving

Figure 4. Skill assessment areas

Students also expressed their preference on topics to be covered in the following project phases. The table below shows their preferences.

Table 1. Students preferred topics
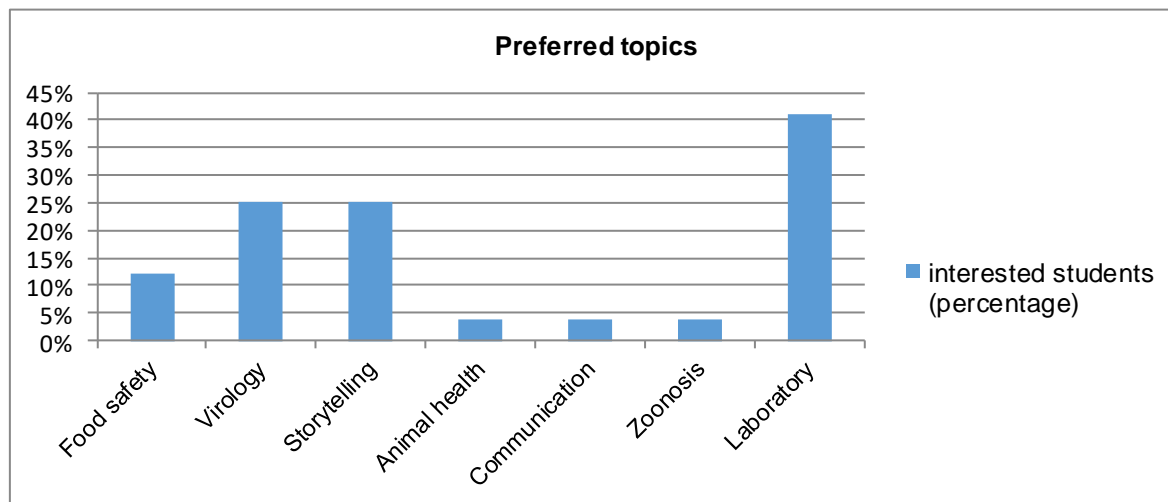
4. Conclusions

The initiative lasts three years: the next phases will support students' independence in developing digital communication plans to address scientific messages. Priority topics were identified thanks to the student self-assessment; the next challenge is to let students develop dissemination and communication products on IZSAM research projects already concluded. The encouraging results show that science based communication can raise students interests and develop their communication skills. However, some reticence was perceived in the use of Facebook as a tool to disseminate information on the traineeship and the related scientific issues. Students appeared more free and comfortable with the design and testing of the dedicated blog. The need to separate the professional aspects from the personal "life", communicated mainly via Facebook, was detected.

The revision system used by the project experts facilitated progressive learning and gradual acquisition of autonomy. However, it led to a loss in terms of immediacy of the social tools.

The identification of a specific space to share feelings and contents on the work experience was set as a future goal.

We think that further studies are needed to measure impact and target response and provide additional elements to improve the vocational education experience.

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