Exploring participation in online teacher communities through Learning Analytics: a human-centred approach

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Background and context

Learning Analytics (LA) is a recent area of research in the educational field, where big data processing techniques can gain credibility and expand (Williamson, 2017).

The majority of LA research in professional contexts of teachers employs data-driven and automated training supervision methodologies, with no involvement of the users, both in terms of a shared definition of the constructs to be studied and feedback on the analysis outcomes. To overcome the limitations of the data-driven approach, the **human-centred** perspective states to involve beneficiaries in the design and assessment of LA solutions (Buckingham Shum et al., 2019).

Online communities of practice can support lifelong learning through the involvement within a network that shares similar interests, methods and issues and can represent an informal training system for teachers' professional development (Calvani, 2005; Macià & Garcìa, 2016; Wenger, 2006). **eTwinning** is the largest European professional network for teachers, supported by a digital platform. Since participation in eTwinning is manifested through a wide variety of possible actions, techniques for synthesising multivariate measures may be appropriate tools to examine the teachers' behaviour in the virtual community (Bai, 2011).

Research questions

RQ1. What are the different models of Italian teachers' participation in eTwinning?
RQ2. How do community participation models relate to professional development?
RQ3. What suggestions can be gathered from the LA to promote active participation in the community?

Methodology

Research design: case study based on a mixed methods research strategy (sequential explanatory):
1) *Pre-processing phase:* Identification of variables and criteria for extraction from the database, as authorised by EACEA and eTwinning National Unit.
2) *Quantitative phase*: Data-driven research and process-oriented computational approach to LA.
3) *Qualitative phase*: Participatory perspective of human-centred LA for collaborative interpretation of the results with the stakeholders (Buckingham Shum et al., 2019).

Data collection: the log data of the Italian community in a period of six months (01/09/2019-29/02/2020) and a focus group interview with 15 eTwinning Ambassadors.

Data analysis: After the descriptive and correlational statistical analyses, the K-means cluster analysis was applied to the dataset (Dulli et al., 2009). A thematic analysis was conducted on the focus group transcriptions (Braun & Clarke, 2006).

Results

Learning Analytics application (RQ1)

The dataset contains categorical and numeric values about Italian eTwinners (N = 80.306) characteristics and online actions, selected adapting the eTwinning Analytics Framework (Vuorikari & Scimeca, 2013) about:
- profile information (professional role, Italian region)
- general use (signup date, logins)
- social networking (following, followers, contacts)
- collaboration and exchange practises (project and group membership).

There are 20.541 active users (25.58%) in the reference period. The findings revealed that the **long-registered users** are those who access the system the most and carry out more collaborative projects, with a large network of contacts. Collaboration in students' projects and membership in informal teachers' groups are also closely related.

After the z-score data standardisation of continuous variables, **three clusters of active users** were obtained: *Supporters* (n = 1289), doing a variety of online activities, have an advanced network and a good level of collaboration on projects; *Leaders* (n = 156), at the centre of many connections and also often responsible for coordinating activities and setting the environment for student learning; *Satellites* (n = 19.096), with limited experience as eTwinners, doing actions sporadically and mostly involved just in one collaborative project.

Participative interpretation of the Learning Analytics results (RQ2; RQ3)

The expert users recognised the three distinct **patterns of community participation** that resulted from the cluster analysis and interpreted this stratification in relation to the extent of involvement and support received. However, the ambassadors' perception of community participation differs from the data-driven picture, particularly in terms of the proportion of active users.

The analysis of the **learning and professional development processes** revealed their progressive configuration: starting from the entry, conditioned by teachers' interests and motivations, the system elicits a process of self-assessment of the professional resources and competencies to be activated (linguistic, digital, and methodological/teaching), which could be enhanced by experimenting with collaboration in student projects and peer networking activity.

Finally, the **challenges and improvement proposals** were outlined into three intervention dimensions: professional, community management and technological-organisational. Particularly emphasised by eTwinning ambassadors were the enhancement of methodological-didactic training, the necessity to guide new members through follow-up actions and the ability to provide feedback to platform administrators to improve user-experience.

Conclusions

The mixed methods strategy applied to the LA application facilitated the opportunity to link **behavioural and experiential elements** in the actions tracked by the platform (Buckingham Shum et al., 2019).

A small subset of the online community had a significant impact on the overall activity. The participation modes were represented by the gradual **intensity of use**. The findings are consistent with studies of large online communities that highlight the **coexistence of experts and beginners** (Bai, 2011), whose contact creates significant learning value for both (Wenger, 2006). The results confirm that, to benefit from eTwinning opportunities, teachers must commit a significant amount of time and dedication, consistently with the community's beginnings (Vuorikari & Scimeca, 2013).

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