



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

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Background and context

- In communities of practice learning is based on participation within a group that shares similar interests, methods and issues (Lave, & Wenger, 2006). This process also affects digital environments with some differences for **virtual professional networks**. The web can be a resource for teachers to foster connections between different contexts and to enable the generation of ideas (Calvani, 2005).
- The **eTwinning** community is the largest European professional network for teachers, supported by a digital platform. Since the experience in eTwinning is manifested through a wide variety of possible actions, techniques for synthesizing multivariate measures may be appropriate tools to examine the community, as an informal training device for teachers' professional development and lifelong learning.
- 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). LA involves different disciplines: education sciences to describe learning constructs and conditions, data sciences to manage infrastructure and implementation of data mining tools, and statistics to process and interpret the data (Ferguson, 2014). To overcome some limitations of the data-driven approach, the **human-centered** perspective states to involve beneficiaries in the design of LA solutions (Buckingham Shum et al., 2019).
- LA has already been used as a tool for observing **large online communities** of teachers (Cambridge & Perez-Lopez, 2012). Although some LA pioneering studies on eTwinning have been conducted (Bai, 2011; Pham et al., 2012; Vuorikari & Scimeca, 2013), there is a lack of studies on the Italian community from a macro perspective, that can complement and support the information from administrators' monitoring.

Aims

The use of LA to explore the eTwinning community has two main objectives:

- to **analyze participation** in the community, through the monitoring of teachers' activities and how these are combined in different profiles of participation
- to **foster reflection processes** in beneficiaries, through discussion about resource use practices and interpretation of the patterns of teacher participation.

Research questions

- What are the different patterns of teacher participation in the online community?
- What inferences can be made about teachers' behaviors from the discovered participation patterns?
- What insights can be gathered from LA to provide recommendations to administrators and participants regarding the use of tools to foster active and relevant participation in the community?

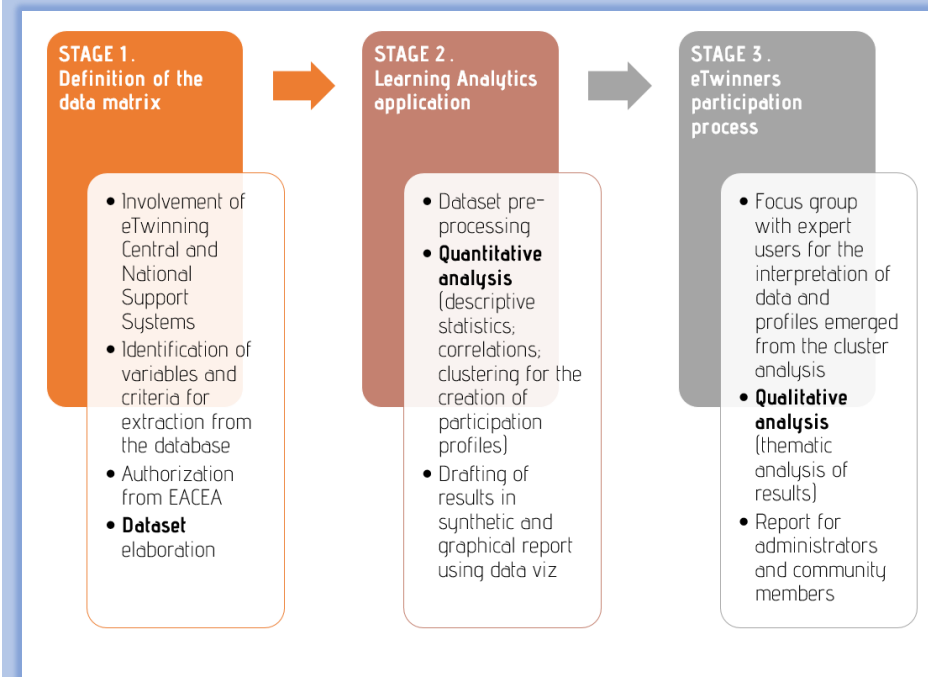
Methodology

Human-centered perspective

The present exploratory study concerns the application of a data mining technique and insight generation for an online community of practice of teachers. The purpose is to test the use of LA and interpret their results from a participatory perspective designed to foster professional development through data-mediated reflective practices. Developing a **participatory approach to LA** in, with and for the eTwinning community connotes the research as a case study (Yin, 1993).

Research design

The study will be conducted as a **mixed methods** research (Creswell & Plano Clark, 2017), with the aim of obtaining a multi-layered reading of information to be returned to the community itself, through the combination of the results of quantitative analysis to the detection of experiences and perceptions of teachers. Three stages will be conducted:



Data collection

Quantitative methods will be used in the application of LA statistics to describe the dynamics of participation in the platform community. Qualitative methods will be employed to discuss the emerged results and their relevance by conducting a **focus group interview** with 15-20 experienced eTwinners. For the LA application, the research focuses on the **log data of the Italian community** in a limited period of time of 6 months (01/09/2019-29/02/2020), prior to the impact due to Covid-19 in order to obtain a description of the activity under conditions of ordinary use.

Data analysis

After the descriptive statistical analyses, a data mining technique for profiling - non-hierarchical **cluster analysis** - will be applied to the dataset, in accordance with a LA process-oriented computation approach (Hoppe, 2017). A **thematic analysis** will be conducted on the focus group transcriptions (Braun & Clarke, 2006).

Preliminary results

- In collaboration with the Italian eTwinning National Unit, a data matrix of **38 variables related to the use of the digital platform** (e.g. registration date, content creation, communication actions, group and project membership) was constructed. The extraction produced a dataset composed of 90,666 cases. The dataset contains **mixed data** of categorical and numeric values about eTwinners characteristics and online actions.
- In the **pre-processing stage**, data noise was removed and missing values were analyzed. Subsequently, a data categorization was performed, checking each variable for categorical and numerical information and additional measures were calculated from the existing ones (e.g. time of experience in eTwinning from the date of registration, active/inactive status). Relevant cases for the next analysis became 80,306, of which 20,541 were labelled as active users in the reference period.

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