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Message of the General Chairs of HELMeTO 2020

Dear friends,

the 2019 edition of HELMeTO confirmed a growing interest on the online higher education topics, as well as the relevance of the interdisciplinary approach that characterize our annual event. The presentations and the talks triggered an intense discussion about the complex relationship between technologies and pedagogical approaches. These reflections highlighted some topics of particular interest such as the potential role of learning analytics, the relevance of the learning design, and the key role of tutorship in online learning. While the HELMeTO steering committee was working on the 2020 edition, to be held in Bari, the Covid-19 emergency erupted and, in few weeks, online learning topics escalated in the agendas of all the education institutions around the world: schools, universities, education ministries and policy makers. On one side the emergency led us to reconsider the organization of the conference, bringing the entire organization online, on the other side it appeared to us that the unprecedented situation needed a dedicated special session within HELMeTO 2020, a session dedicated to the impact of Covid-19 emergency on online learning. The emergency has forced universities to adopt solutions for distance learning very quickly, often without being able to provide adequate planning or build up the specific technical and didactic skills to develop e-learning courses. Even the delicate aspect of the assessment, necessarily translated online too, was addressed with emergency solutions that each university has implemented on the basis of the technological resources and skills available as well as the specific nature of the degree courses. This extraordinary situation is well represented by most of the accepted contributions explicitly dedicated to the reaction of academic institution to the Covid-19 impact on their courses. Alongside these contributions there are those less linked to contingency, which address the key themes of online learning: learning analytics, online assessment, innovative teaching methodologies, roles and practices of online tutoring. We are aware of the fact that 2020 is not going to be a year as usual and all of us had to face something unexpected and unprecedented, facing the first global pandemic of the digital era, but, in the end, we decided to maintain the HELMeTO 2020 edition as a virtual workshop and place of discussion, with a special focus on the unexpected diffusion of online learning far beyond its usual reference domain. We received 59 extended abstract submissions from more than 170 authors and 13 countries (Spain, Indonesia, Russia, Japan, Norway, Canada, United Kingdom, Hungary, Yemen, Netherlands, Greece, Oman, Italy), after the peer review 40 contributions were accepted to the workshop.

September 17, 2020
Bari

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Perceiving Educational Value of Videos Based on Semi-automated Student Feedback and Theory-driven Video-analytics

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1 Introduction and background

Learning Analytics (LA), as a field, has established itself as a ubiquitous method for analysis of large sets of digital footprints coming from the interactions between/with the learners, teacher or the learning environment. LA has many promises, one of which is the capability to contribute to the awareness and reflection on learning processes. However, among one of the critical issues with learning analytics are the dimension of data (mainly click-based) and the connection of the data with context: theory and design [1, 2]. For this reason, LA is rarely used on its own and it usually is combined with other types of data collection and analysis methods - such as self-report data, annotations for sense-making, observations, multimodal data etc.

Video-based learning has been explored from different angles: mostly their effect on learning outcomes, attendance and academic performance, which yields mixed results [3]. There are also different types of videos for learning and depending on their affordances of interactions, we can have different types of data. This data can give us information on learning processes aligned with the data on other types of interactions and student profiles: *"combination of various learning analytics (e.g. content metadata, learners' profile) as well as the state-of-the-art statistical analysis techniques"*[4]. However, there still remain many essential unexplored aspects of video-based learning and the related challenges and opportunities; such as, how to use all the data obtained from the learner, how to combine data from different sources, how to make sense heterogeneous learning analytics, how to synchronize and take the full advantage of learning analytics coming from different sources, how to use analytics to inform and tune smart learning etc [4]. There are different properties of videos used as indicators for diverse reasons. One of the most highly cited studies in the area has investigated the relationship between the engagement of students and video properties [5] defining video properties with their length, speaking rate, video type, production style. A literature review found that most common measurements in video-analytics are video watch time, video interactions and learning results, reporting fine-grain measurement indicators for each [6], another one found that [3] the most common focus in video-analytics is the modality, while an independent variable - presentation style and independent - recall test. Self-reports (feedback) are also often used to evaluate different effect sizes.

From an analytics perspective, video data can be useful to understand and improve learning processes [7]. Fine-grain video interaction data can bring useful insights [3] and it can also be useful to build learner or teacher dashboard, but this area is in an initial stage [6]. To make sense of the learning data on one hand, and on the other, to have actionable learning dashboards the connection with a theory [9], and human-centred design is needed, involving user feedback as in the data collection but also the development processes [10]. In this paper we argue that combining semi-automated student feedback on the educational value of the videos with interaction (log data), based on the theory-driven properties of videos is one of the areas to explore.

2 Research questions and research design

The context of the study is situated in higher education, blended learning setting. The study investigates and preliminarily evaluates the usefulness of semi-automated student feedback in the evaluation of the educational value of videos and inclusion of the feedback in the learning dashboards with other data such as logs and learning outcomes. To this end, in this study we investigate the feasibility and usefulness of using semi-automated ratings on videos (**Fig.**1) to gather feedback from the students based on three different scales: (a) quality of audio and video, (b) clarity of the teacher and (c) usefulness of the video to prepare for the exam. We hypothesise that this information later can be further aligned with different indicators to enrich the data coming from videos with structured user (student) feedback. The semi-automated student feedback is based on the 5-star ratings. This input can potentially be useful not only to inform better design of the videos but also to feed the data to learning dashboards.

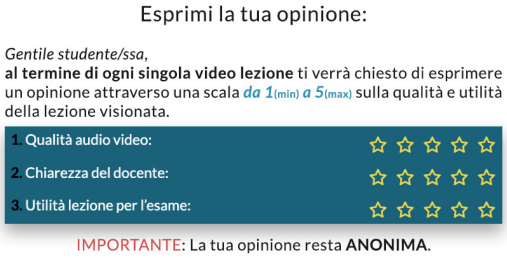

Fig. 1. The rating system

To illustrate and evaluate our proposal, and to operationalize theory-driven video properties, we have used a research-based cognitive theory of Multimedia Learning Principles (MLP). *"Multimedia instruction refers to presenting words and pictures that are intended to foster learning"* and consists of 12 principles aimed at providing effective and evidence-based tools for multimedia learning [11]. This article answers to the following research question: *Can we use semi-automated video-ratings and theory-driven video tagging to understand what types of videos lead to learning satisfaction and perceived educational outcomes?*

To evaluate the feasibility and usefulness of the approach, this study has used several sources of data: video annotations based on the 12 MLP principles; video ratings

on several scales to gather semi-automated student feedback based on 5-scale ratings; engagement with videos (visualisations); total number of ratings; video duration.

Annotations of videos were coded based on the 12 MLP principles on the scale of 0-1 to denote whether and how many of the principles were followed. The unit of analysis in this study is the video. We chose 6 different courses and coded only the videos with ratings above 25. While the amount of the videos in each course varies, we hypothesise that this is due to the video properties that videos in some courses are not rated above average.

3 Results, discussion and future research

Based on the analysed 44 videos and students' ratings do not significantly differ across the videos in this dataset. The average ratings are 4 and above, there is no rating below 4. Preliminary results show there is no significant association between N° of MLP followed (above 10), students' N° of ratings (**Fig**. 2) or different dimensions of the ratings (clarity, quality, usefulness). From the visualisation we can see that clarity and usefulness in some videos are associated with the N° of principles followed; we can notice that when the N° principles followed descend below 9, clarity and usefulness are rated lower. Regression analysis showed that there is some correlation between the N° of principles and the N°of visualisations (R=0.37; P=0.016). We could presume that the number of MPL followed should be at least 9 for the videos to have educational value for the students, however, given the size of the sample and insignificant variance between video ratings, we will need further studies. Also, to understand the relationship between different principles (out of 12) and the ratings, in future, we will need to analyse data according to each principle with a bigger dataset.

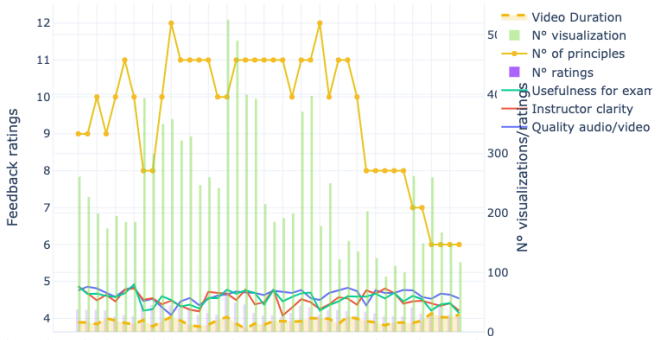

Fig. 2. The plot visualizing different data sources analyzed together. In some cases, we can observe slight tendency of decreasing ratings for *Usefulness for the Exam* and *Instructor Clarity* when the number of principles followed fall below 9.

Generally, the most interesting finding in this exploratory, proof-of-concept study is the misalignment between the research-based MLP and significant differences in the average student ratings (all above 4). While this can be explained by different factors,

that need further investigation with mixed methods approaches, it can have design implications for the dashboards. Aside from this, our study demonstrates the need for contextual, theory and design-driven data to solve validity issues of analytics data, and the need to examine the data-set closely before including them in the dashboards.

Following the study, we will first analyze bigger data-set, after which will involve students to investigate the factors behind the ratings and the correct formulation of the rating questions. This will result in a redesign of the rating system and aggregate more data to reevaluate the system. We will also run a qualitative study involving a design session with a participatory approach to understand what indicators teachers will need for evidence-based teaching practice to create a path for actionable dashboards. The aggregated visualizations will be presented to the teachers to understand whether semi-automated student feedback is informative and actionable for them. Moreover, the outcomes of this research will be used to build learning analytics dashboards and evaluate the potential of our proposal for its actionability to understand whether our approach brings valuable insights to educators. We also plan to include different sources of data such as learner engagement, motivation and learning outcomes to answer our next research question: *What is the relationship between video design, student engagement and student perceived educational value and quality of the videos?*

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