Social Learning in Action: Asynchronous Perusall Colloquiums in Pre-Service STEM Teacher Training

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Abstract. Our case study examines the shift from traditional teacher training colloquia after teaching practicums to asynchronous Perusall conferences. Two groups of master's students ($N = 6$ per group) in STEM fields participated in this research. Post-practicum, each student uploaded three video presentations on their teaching experiences to the social reader Perusall, which were then discussed asynchronously. Preliminary findings indicate that students engaged twice as long as in traditional settings and generated ten times more annotations. Detailed data analysis using open data science, machine learning, and AI tools will be presented at the conference to show student feedback and perspectives.

Introduction: An asynchronous conference in social annotation platforms

Social annotation systems or platforms, notable examples of which include Perusall [1] and Hypothesis [2], have carved out an important place in effective and successful education [3]. These tools, also known as social readers, play a particularly significant role in students' asynchronous collaborative activities in blended or flipped learning environments. A unique format made possible by this technology is the regular annual conference *Perusall Exchange*, a completely online event. Its uniqueness primarily lies in the opportunity of asynchronous participation, where various types of presentation contributions can be followed (e.g., podcast, video, short article, or poster) at participant convenience. At the same time, it still allows an attendee to engage dynamically at any time in active group discussions with the author of the contribution and other attendees throughout the entire duration of the conference. Thanks to these features, the 2023 edition of the conference attracted over 2000 registrants, generating over 600 annotations [4].

Research problem: Social reflective learning in STEM teacher training

In pedagogical universities and institutions worldwide [5], a critical component of future teachers' preparation is the teaching practicum conducted at real schools under the supervision of experienced in-service teachers. In Slovakia, students eagerly anticipate this several-week-long event, which regularly concludes with reflective seminars. Such a seminar, typically a two-hour colloquium, enables students in small groups to present, share, and seriously professionally discuss their impressions, practical insights, and experiences. Following the resounding success of the asynchronous conference mentioned earlier, we initiated a pedagogical experiment (case study) by adapting our traditional colloquiums into an asynchronous Perusall format. From a research perspective, our main aim was to address the research question:

How do dynamics, interactions, and feedback change in the Perusall online asynchronous format?

Methodology: A case study

For our case study at our university, we selected two groups of 6 STEM teachers each, in their final year of teacher training (2022/23, 2023/24), specializing in physics with another science subject—typically mathematics, but also biology or informatics. After the autumn semester teaching practicum, each student prepared three 5-minute videos (School Intro, the Best Hour, the Worst Hour – Fig.1), which we uploaded into Perusall via Google Drive [6]. The students then had two weeks to discuss these contributions asynchronously.

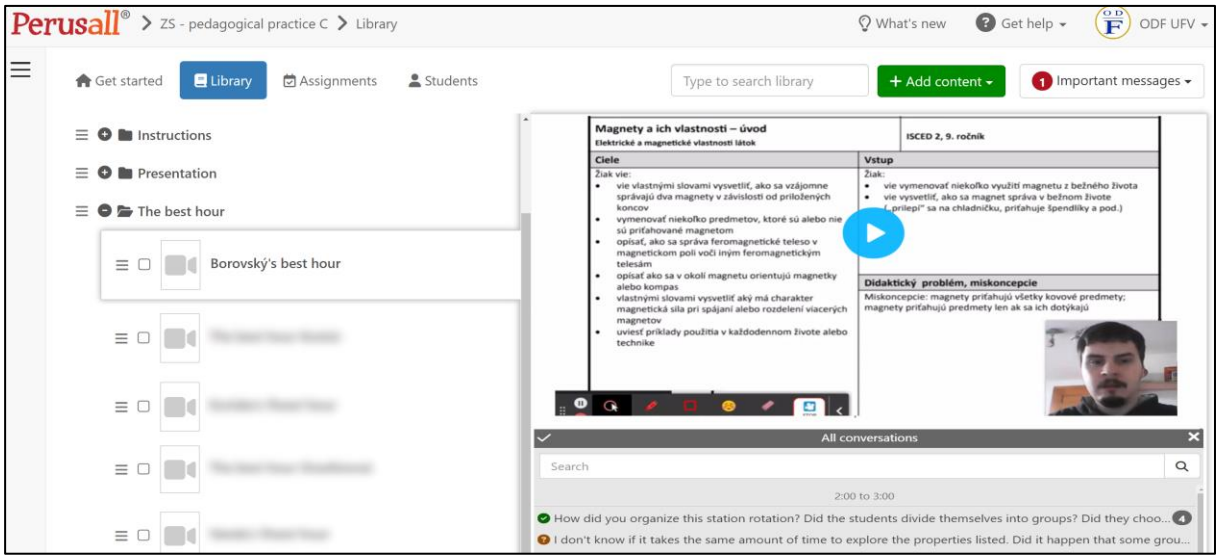

Fig. 1. A screenshot from a Perusall colloquium – a video presentation containing asynchronous conversations about one of the student's best teaching lessons from his teaching practicum at an elementary Slovak School (9th grade).

Preliminary findings and next steps

Our typical traditional colloquium lasts cca 3 hours and involves discussions of around 35 questions, comments, and suggestions per group (with 6 student presentations). In contrast, during the Perusall colloquiums, the Perusall built-in analytics shows that students spent on average twice as much time (about 6 hours of active engagement time per student; see more in [7]) and generated more than 400 conversational annotations (including questions, comments, and upvotes) per each group of 6 students. In Perusall, every student actively participated in the discussions. The results confirm an expected increase in student engagement and provide more comprehensive feedback. A full data analysis using relevant advanced methods [8] of open data science, machine learning, and AI will be presented, including, e.g., natural language processing with AI tools like ChatGPT for advanced text analysis (sentiment, topic, relevancy), time series analysis with clustering for participation behavior or decision trees for predicting and understanding student engagement.

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