CROSSMMLA Futures: Collecting and analysing multimodal data across the physical and the virtual

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ABSTRACT: Workshop proposal for CrossMMLA focused on collecting and analysing multimodal data across the physical and the virtual. Under the current global pandemic, cross physical and virtual spaces play a substantial factor and challenge for MMLA, which is focused on collaborative learning in physical spaces. The workshop proposes an asynchronous format that includes pre-recorded video demonstrations and position papers for discussion, followed by a half-day virtual meeting at LAK'2021.

Keywords: Learning Analytics, Multimodal Learning Analytics, Hybrid Learning Spaces

1 INTRODUCTION

Over the last several years, Multimodal Learning Analytics (MMLA) has brought together diverse fields that combine educational, computational, psychological, and related research into how people learn

and how these complex processes are supported with technology. SOLAR's Special Interest Group on Multimodal Learning Analytics Across Spaces (Cross-MMLA SIG) aims to promote research that considers the challenges of making sense of complex educational data that involve multiple interaction modalities, people, and learning spaces. Understanding and optimizing learning traces from the real world requires new degrees of sophistication across technology, learning, and design; and building upon the ongoing and previous work from the Learning Analytics and related communities.

The workshop aims to explore how learning analytics can effectively capture students' learning experiences across diverse learning that include practice-based activities (medical simulations, sports, field-based science, vocational trades). The core challenge is to capture these interactions in a meaningful way that has been translated as part of formative assessment in real-time and post-reflective reviews (Di Mitri et al., 2018; Echeverria et al., 2019). However, under the current global pandemic, the notion of cross physical and virtual spaces plays a substantial factor and challenge for MMLA, which has is focused on collaborative learning in physical spaces.

Overall, the rapid global shift to virtual learning challenges the research and practice for this field and educational practices. MMLA needs to develop theories about the analysis of human behaviours during diverse learning processes across spaces and create practical tools that could augment learners' and instructors' capabilities. These tools and practices need to be designed and implemented in ethical and sustainable ways to provide value and equity for all learners.

The workshop will serve as a forum to exchange ideas on how we as a community can use our knowledge and experiences from CrossMMLA to design new tools to analyse evidence from multimodal and multisystem data. How do we extract meaning from these increasingly fluid and complex data coming from different kinds of transformative learning situations, and how to best feedback these analyses' results to positively support those learning processes?

1.1 Background

MMLA combines the power of affordable sensor technologies and advances in machine learning to observe and analyse learning activities (Blikstein & Worsley, 2016; Ochoa, 2017). This technology acts as a virtual observer and analyst of learning activities across multiple contexts between stakeholders, devices, and resources. Work by current researchers explores how real-time and automatic video and audio analysis can support learning by automating the analysis of these activities through the development of new tools and methods (Chan et al., 2020; Chejara et al., 2020; Kasparova et al., 2020). Martinez-Maldonado and colleagues (Martinez-Maldonado et al., 2020) are carrying work to streamline multimodal data into meaningful layers that explain critical insights to teachers and students. The potential of the approach to create learning analytics interfaces that communicate insights on team performance and concerns in terms of accountability and automated insights discovery. Researchers have also realized that multimodal data collection in the learning sciences demands new and powerful methodological and analytical techniques and technologies. Noroozi and colleagues (Noroozi et al., 2019) highlight the issues for learning scientists to handle, analyse, and interpret complex and often invisible multimodal data when investigating the regulation of learning

in collaborative settings. Molenaar and colleagues (2020) are developing tools for learners to use personalized visualizations for Self-Regulated Learning in Adaptive Learning Technologies that highlight the hidden cognitive, social, and emotional aspects of learning.

1.2 Aim of the Workshop

However, the dimensions and contexts of MMLA are complex and layered and provide researchers with multiple challenges. In the current world situation, both research and practice are further complicated by the necessity of remote learning that includes mixed scenarios with virtual co-located and face-to-face learning activities. The MMLA community urgently needs to find ways to research, design, and further develop our tools and methods to investigate across this new landscape.

The workshop aims to discuss the following actively:

- How can MMLA contribute to support hybrid/virtual learning initiatives across physical and digital spaces?

Researchers and education providers have been adapting to local regulations because of the COVID-19 disruption, and education has been re-invented worldwide. Therefore, our workshop's larger aim is to investigate what roles can MMLA as a community have in supporting this adaptation in the short term and how we can joint efforts to prepare ourselves against the next disruption (in the mid-long term).

2 PRE-WORKSHOP ARRANGEMENTS

This workshop continues a recently established but already very consistent tradition of workshops on multimodal learning analytics (MMLA) and across-spaces learning analytics (CrossLAK). These past events have leveraged various formats, from hands-on learning experiences and tutorials, based on participant contributions/papers and conceptual and community-building activities (which have eventually led to the creation of a Special Interest Group within the Society for Learning Analytics Research).

We proposed an asynchronous format that includes pre-recorded video demonstrations and position papers for discussion that allow for an engaging workshop. For video demonstrations and position papers, and an online web platform was provided for viewing two weeks before the workshop. Before the workshop, we will launch a call for submissions that will shape the demonstration part. The submissions for the demonstration may include one or more of the following:

The submissions for the position papers are focused more directly on the theme of this year's CROSSMMLA workshops crossing the physical and digital learning landscape to support learning under pandemic times. A special focus will on how MMLA can contribute to research and practice to support learning along with these themes:

- Logistical (related to the organisation and planning of multimodal data collection, implementations of MMLA in real-world settings, fidelity issues, real-world evaluations etc.)

- Methodological (related to the system of methods, analyses, technical improvements, data cleaning, pre-processing, and other techniques.)
- Ethical (related to the moral principles and aspects of the MMLA work, fairness, transparency, accountability, surveillance, performance-orientation (Cukurova et al., 2020)

2.1 Important Dates

Date	Activity
29 November 2020	Workshop calls for participation announced
10 January 2021	Workshop Papers Deadline
9 February 2021	Camera Ready Deadline for Demo and Position Papers
21 February 2021	Early Bird Registration Ends
31 March 2021	Web Video Platform Live for demo and position papers
12 April 2021	Half-day at LAK'21 Conference Virtual

3 WORKSHOP OBJECTIVES

The workshop was asynchronous with the videos and discussion available to interested parties from late March, allowing participants (interested people) to watch and start conversations about the position papers and demonstrations. Participants will sign-up for the focused panels based on their interests from participation with the online platform. The workshop is planned to occur during the main conference's pre-conference schedule and planned for a half-day format of up to 4 hours (April 11 or 12, 2021). The workshop is divided into four parts.

- Introductions and workshop overview
- Breakout sessions for in-depth discussions about posters and demos
- Sessions overviews and general discussion
- CROSSMMLA SIG and next steps
- Aside from the (intangible, but very important) learning of participants about CrosssMMLA and the strengthening of the SoLAR Special Interest Group (SIG) on CrossMMLA.

Practicalities, we are investigating for supporting the workshop:

- Web-platform for hosting videos and discussions
- Video Conference tool like REMO for easier breakout sessions

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