

# Moving, annotating, learning: MotionNotes LabDays - a case study

**Crawley, M-L. & Cisneros, R. K.**

Author post-print (accepted) deposited by Coventry University's Repository

**Original citation & hyperlink:**

Crawley, M-L & Cisneros, RK 2021, 'Moving, annotating, learning: MotionNotes LabDays - a case study', *International Journal of Performing Arts and Digital Media*, vol. 17, no. 1, pp. 138-149.

<https://dx.doi.org/10.1080/14794713.2021.1880141>

DOI 10.1080/14794713.2021.1880141

ISSN 1479-4713

ESSN 2040-0934

Publisher: Taylor and Francis

*This is an Accepted Manuscript of an article published by Taylor & Francis in International Journal of Performing Arts and Digital Media on 05/05/2021, available online: <http://www.tandfonline.com/10.1080/14794713.2021.1880141>*

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International Journal of Performance Arts and Digital Media (IJPADM)  
Call for Proposals: Special Issue 2021

Digital Annotation and the Understanding of Bodily Practices

Special Issue Editor(s):

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Rebecca Stancliffe, Trinity Laban Conservatoire of Music and Dance

**Title:** Moving, annotating, learning: Motion Notes LabDays: a case study

**Authors:** Rosa Cisneros and Marie-Louise Crawley, Centre for Dance Research (C-DaRE), Coventry University

### **Abstract**

This article investigates how dance annotation practices might expand and shape teaching and learning in dance performance and training environments. We focus on a central case study: the web-based annotator, [MotionNotes LabDays workshops](#) that took place within the context of the EU-funded project, [CultureMoves](#) (2018-2020). CultureMoves was an interdisciplinary project investigating connections between dance, site cultural heritage and digital storytelling. [CultureMoves](#) developed an innovative approach including other digital tools for articulating the effects of technology on dance praxis alongside a close ethnographic reading of archival cultural heritage data from Europe's digital library, [Europeana](#). However, while the wider project includes strands such as ethnographic archival practices and ICH, the focus of this article is on MotionNotes. MotionNotes is a web-based annotator for dance videos/streams where multiple annotation track timelines include text, images/marks, URL, drawings and voice annotation. The tool also experiments with motion tracking and machine learning. Within the CultureMoves project, the tool was placed in a variety of choreographic and dance educational environments through a series of LabDay workshops. These practical sessions revealed three main areas of possibility for the annotator: in the teaching of dance material, in the remaking and transmission of existing work and as a choreographic tool for creating new work. Across all three areas, the multimodal learning possibilities offered by annotation reflected visual perceptions of live dance practice and also prompted dance artists and learners to think differently about their dance making, teaching and learning processes.

### **Biographies**

**Rosemary (Rosa) Kostic Cisneros** is a researcher, dancer, choreographer and curator who works closely with the RomArchive and many NGOs. She is leading various EU-funded projects which aim to make education accessible to vulnerable groups and ethnic minorities, and part of cultural heritage projects that bring dance and digital technologies together.

ORCID ID: <https://orcid.org/0000-0002-8169-0642>

University Profile: <https://pureportal.coventry.ac.uk/en/persons/rosamaria-kostic-cisneros>

**Marie-Louise Crawley** is Assistant Professor in Dance and Cultural Engagement at the Centre for Dance Research (C-DaRE), Coventry University. Her research interests include dance and museums, and areas of intersection between Archaeology, Classics and Dance Studies. ORCID ID: <https://orcid.org/0000-0003-4788-327X>  
<https://pureportal.coventry.ac.uk/en/persons/marie-louise-crawley>

### Moving, annotating, learning: Motion Notes, a case study

#### Introduction

This short essay investigates how dance annotation practices might expand as well as shape teaching and learning in dance performance and training environments. The focus is on a central case study: the web-based annotator, [MotionNotes](#), within the context of the EU-funded project, [CultureMoves](#) (2018-2020). A user-oriented project, CultureMoves investigated connections between dance, education, tourism, cultural heritage and digital storytelling<sup>1</sup> technologies. The project developed a series of digital tools to enable new forms of touristic engagement and dance educational resources by leveraging re-use of content from the European digital library of cultural heritage, [Europeana](#). However, while the wider project includes strands about ethnographic archival practices and intangible cultural heritage, our focus here is on the MotionNotes tool. Within the CultureMoves project, the annotation tool was placed in a variety of choreographic and Higher Educational dance environments through a series of LabDay workshops across the UK. These practical sessions revealed three main areas of possibility for the annotator: in the teaching of dance material, in the remaking and transmission of existing work and as a choreographic tool for creating new work. Across all three areas, the multimodal learning possibilities offered by annotation reflected visual perceptions of live dance practice and also prompted dance artists and learners to think differently about their dance making, teaching and learning processes. The project also examined how dance artists and students might explore annotation in conjunction with structuralist and cognitive approaches for analysing choreography and the dancing body on screen. In the project findings outlined in this essay, we highlight how this technology can support dancers and dance learners not only in how they define their own embodied knowledge(s), but also their movement teaching and learning philosophies.

#### CultureMoves: Why annotate dance?

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<sup>1</sup> Digital storytelling is a short form of media production whereby various digital media (digital video, audio, photographic stills and other non-physical media) are employed and/or combined within a narrative structure to tell a story or present an idea.

As the documentation of dance has moved into the digital environment, the particular affordances of digital media have spawned many projects exploring how we might use computer technology to access and learn more about dance's content. The potential of digital annotation of dance time-based recordings has emerged as a core topic of interest to those involved in documenting dance and what we do with dance. According dance scholar and colleague on the CultureMoves project, Sarah Whatley (2020), 'in many ways, annotation in its simplest form is simply how you observe something, how you look at something and how you make notes about it.' In other words, digital annotation means being able to add notes to a recording, so that these notes can be read or seen alongside or attached to the digital recording. Some of those notes and processes of note-making can be individual to the observer/user and somewhat free-form, or there can be various ways in which the observer/user can be supported to think about different modes and methods of annotation. Over the last several years, various projects have developed annotation tools for dance. In CultureMoves, we were particularly interested in how we might support such processes of learning more about dance content and helping observers/users to get more out of the content by offering up a specific digital tool for annotation, MotionNotes.<sup>2</sup>

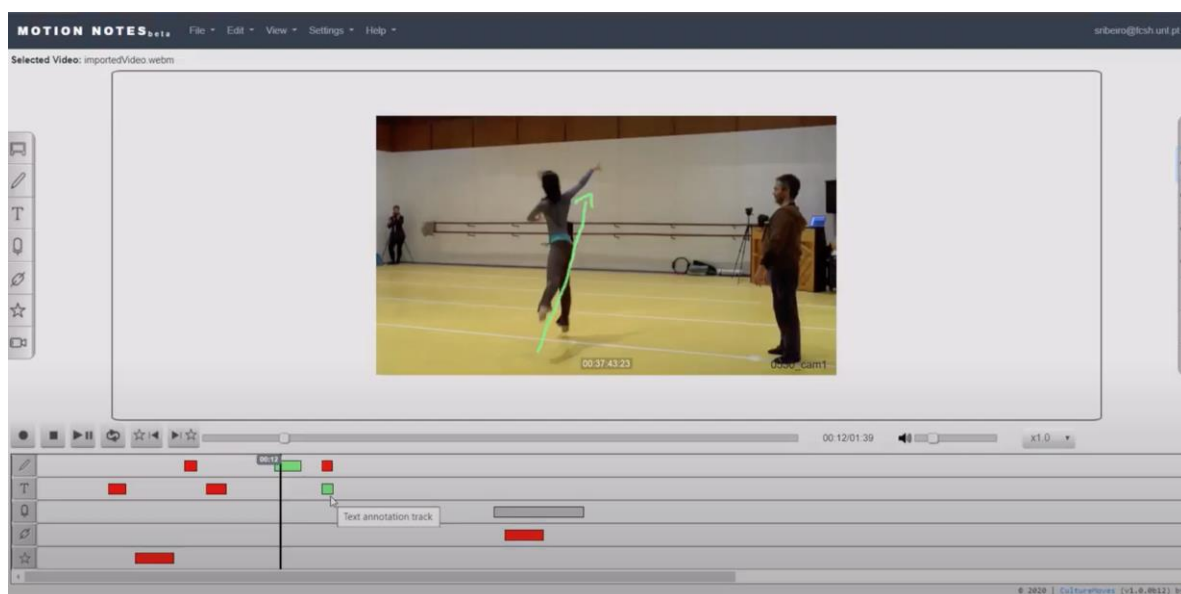
MotionNotes is a web-based real-time multimodal video annotator based on keyboard, touch and voice inputs designed to assist the creative and exploratory processes of both professional and amateur users. While the annotation process can be carried out on pre-recorded videos accessible from Europeana, a main differentiating characteristic of the video annotator is that it allows video recording in real-time and taking notes directly over the running video. The tool follows responsive design principles and can be used across all major operating systems, browsers and devices (including smartphones and tablets). The videos are WebM files (open, royalty-free, media file format).<sup>3</sup> Annotations and metadata are stored in an open video-specific JSON format. Five different ways of adding annotations have already been implemented - voice, drawing, text web URL, mark text -with multiple annotation track timelines. Three different modes of annotation are possible: Continuous, Delayed or Suspended. The tool also includes a real-time pose estimation functionality which uses machine learning techniques to identify a person's skeleton in the video frames, giving the user another resource to identify possible annotations. MotionNotes provides the user with a menu of different icons to use when they make a close study of a dance video. The tool can support them to more clearly see the dance content, to study and contrast different sequences within a particular dance or to be able to compare and contrast different dance genres across recordings. As Whatley (2020) points

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<sup>2</sup> The MotionNotes tool emerged from the work that our CultureMoves colleague Carla Fernandes had been doing with her team at UNL (Universidade NOVA de Lisboa, Portugal). Fernandes' previous work on the ERC-funded project *Blackbox: Arts & Cognition* (2014-2019) demonstrates the long history of her research into the different ways in which the process of annotation can support the digital documentation of the various compositional processes involved in dance making. For more on Motion Notes, see further Rodrigues *et al* (2019).

<sup>3</sup> A central question here relates to the ethics of what occurs when dance becomes data. Once data from a dancing body is collected and stored for repurposing, as it is with the annotator tool, care is required for the ethical re-use and dissemination of this data, whether this be for creative or educational purposes: see further, Cisneros *et al* (forthcoming).

out, this annotation process itself enables a particular ‘tuning the perceptions’ of the observer, of the user, of the reader of the dance so that they start to see the complexity of the dance. Such a process can be something which is very individual to the reader/observer - so annotations might vary from reader to reader - but it can be a very useful tool to begin to compare different observations, particularly if a group is all looking at the same video. These differences are often tied to language and the ways in which that disciplinary knowledge is described, explained and expressed via the process of annotation. Through annotation, divergent values are revealed. In addition, as MotionNotes offers the user the choice between different types of annotation modes (and therefore methods), it also provides a space where multimodal learning is possible, which we will further develop in the following descriptions of the LabDays.



*Figure 01: Screenshot from MotionNotes tutorial highlighting different annotations.  
Photo credit: CultureMoves Project (2019)*

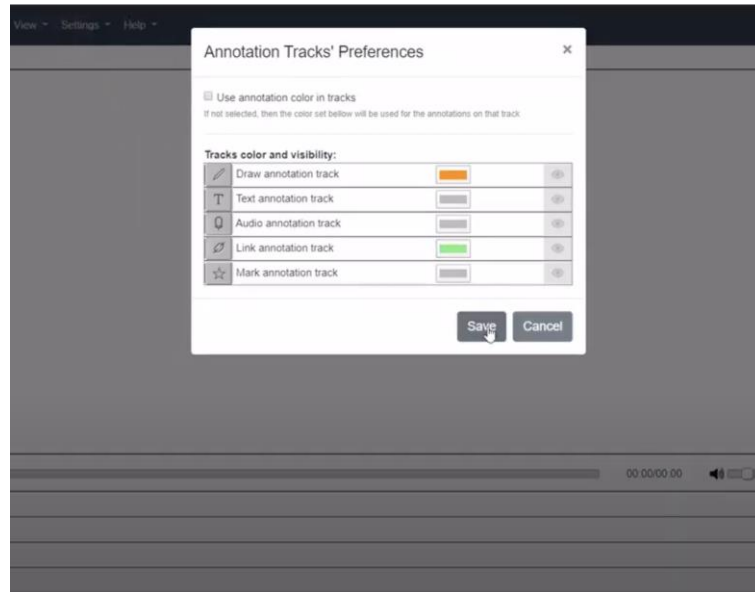


Figure 02: Screenshot from MotionNotes tutorial highlighting different features.  
Photo credit: CultureMoves Project (2019)

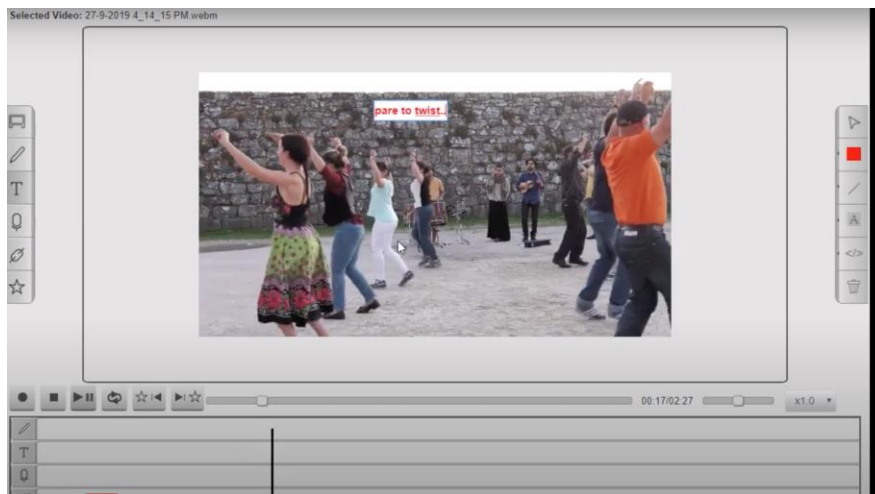


Figure 03: Screenshot from MotionNotes tutorial which is using a Portuguese folk dance video.  
Photo credit: CultureMoves Project (2019)

### MotionNotes LabDays

The research methods employed throughout the lifespan of the project encouraged end users to be included at every step of the way through the series of project 'LabDays' to develop, test and play with the digital toolkit. These LabDays were underpinned by Communicative Methodology (CM), a sociological method that travels across social, cultural and linguistic boundaries. CM was employed but in a specific dance context. In terms of dance-making and education, the CultureMoves team encountered a number of dance artists and educators throughout a series of nine project LabDays that offered hands-on opportunities to explore re-

use of Europeana content through the digital toolkit, and to explore a beta version of the annotator. The series of nine LabDays conducted were designed to offer independent UK-based dance artists and choreographers, as well as dance students and lecturers in UK Higher Education settings, the opportunity to explore the project tools, to engage with digital content and to consider the relationships between dance, public space, tourism, digital storytelling and cultural heritage. In terms of the MotionNotes annotator, the LabDays offered participants a series of exercises to work through to test the tool's capabilities and how it might be useful for dance-making and dance education processes. These LabDay practical sessions and ensuing discussions revealed several possibilities for the MotionNotes annotator within the context of dance education and choreographic creation, across three main areas: i) in teaching dance material, ii) in remaking and transmitting existing work and iii) as a choreographic tool for creating new work. We will now focus on findings from three of the nine LabDays. These three LabDays all took place in November 2019 in the UK.

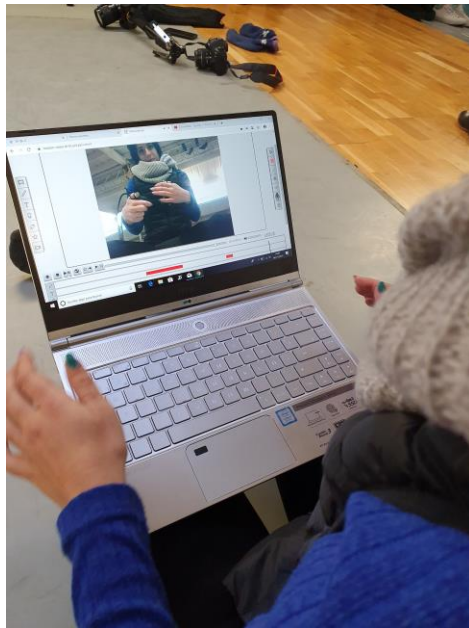
### 1. LabDay: Slanjayvah Danza

On November 4th 2019, the CultureMoves team undertook an exploratory LabDay with Slanjayvah Danza Company<sup>4</sup> (Leeds, UK). This dance company was established in 2004 by artistic director and choreographer Jen Wren and aims to produce high quality artistic dance productions and complementary education and participation programmes. The company also works with a series of dance genres - from contemporary to flamenco to traditional Scottish step-dance - so offered an interesting case study in looking at various forms of dance as intangible cultural heritage. For this hands-on LabDay, the CultureMoves team worked with Wren and dance artists Leticia Cabezudo and Charlotte Mathissen with the CultureMoves digital toolkit in the dance studio to first explore Europeana content, to generate movement material and short movement scores, and then to use MotionNotes to record and annotate both existing and newly developed dance content. In particular, the dancers explored annotating some existing choreography from the current work, *6 Feet 3 Shoes*. Following the practical exercises, there was a lively discussion of the potential utility of the tool for 'in-between' rehearsals and remote working, and how it might also facilitate and assist with teaching company repertory or reworking existing pieces with a different cast.

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<sup>4</sup> <https://slanjayvahdanza.com>

A short video documenting the Slanjayvah Danza Labday can be accessed at: <https://www.youtube.com/watch?v=k48FCy-zolq>



*Figure 04: Flamenco dancer Leticia Cabezudo annotating video where she practised her castanet exercises. Leeds, UK  
Photo credit: Rosa Cisneros (2019)*

Researchers asked the dancers how useful the annotation tool might be for transmitting and learning specific dance vocabulary in a rehearsal studio setting and how useful the tool might be for teaching movement. The dancers pointed to the tool's usefulness for drawing out fine detail, exactness and precision, noting that this is particularly useful for traditional dances where steps have a specific technique and/or precision of rhythm and spoke of how the annotator could be 'a learning tool for choreography' (dancer feedback). Dancers attested to finding the tool potentially more useful in a teaching rather than a creative context, especially in terms of how it could be organically used in an educational way, particularly in terms of documenting the oral traditions of the transmission of traditional Scottish step dance and flamenco. The dancers pointed to how tools such as the MotionNotes annotator might enable clear documentation of previously 'undocumented' (or less documented) traditional dance forms and help in the building of digital archives for such forms. Wren in particular discussed the use of 'mouth music' in the process of devising traditional Scottish step-dance choreography and the specific importance between counts, steps, accent and rhythm for this genre, and how the annotator might facilitate the specificity of synchrony between accent, step and rhythm. In addition to thinking about the specificity of movement, the dancers also began to ask what annotations might be able to tell us differently about the *quality* of movement, the sort of 'subtext' to the dance quality (e.g. 'melting here', 'heavy legs and arms there') that is the record of the specific movement held in the dancer's body.<sup>5</sup> One further point particularly of note in the current Covid-19 context is that dancers discussed the potential value of the annotator for

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<sup>5</sup> When thinking about dance as intangible cultural heritage, we might begin to think of this embodied knowledge held in the dancer's body also in terms of the body's archival capacities (cf. Lepecki 2010; Griffiths 2014)



remote working 'in between' rehearsals - they have previously used WhatsApp video and audio recordings to learn repertory between rehearsals but pointed to the value of precision that the annotator could offer for reading and learning the choreography itself as well as for identifying and playing with qualities of movement.

## 2. LabDay: Anton Mirto

This LabDay in Manchester, UK, held on November 6th 2019 focussed on looking at the potential of the digital annotation tool with artist Anton Mirto of London-based A2Company.<sup>6</sup> Mirto and the research team looked at annotating footage from Mirto's previous work to explore her choreographic and performance practice. Alongside the team, Mirto worked through the MotionNotes annotation tool on previously recorded and uploaded choreographic work, looking at the usefulness and value of functions for choreographic site-work such as *And it went everywhere* (2013), *The Army* (2017). In contrast to the Leeds LabDay, where dancers had focussed on the value of the annotator for learning and transmitting choreography or teaching a particular 'step', Mirto was more interested in the creative potential of the tool. In particular, she pointed to the value of the annotator as having potential to simulate choreography before and alongside working with dancers in the studio, seeing the value of the annotator as what she termed a 'choreographic playground' (Mirto, 2019).

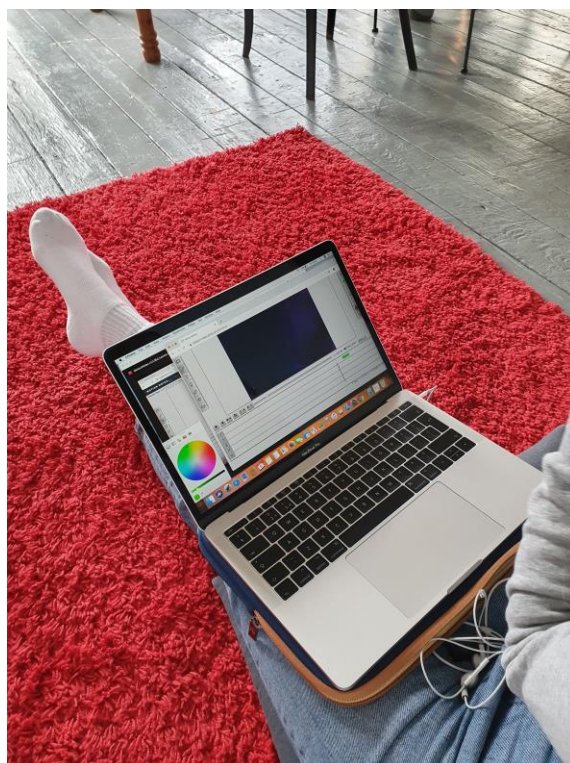


Figure 05: Dancer using MotionNotes. Manchester, UK  
Photo credit: Rosa Cisneros (2019)

<sup>6</sup> [http://www.a2company.org/anton\\_mirto.htm](http://www.a2company.org/anton_mirto.htm)

With a developed site-dance practice and an interest in connections between architecture and dance, Mirto was struck by the architectural aspects of the real-time pose estimation function. Mirto stated how she usually draws as an annotation practice for remembering the visual images of her choreography; in her own words, she works 'filmically' (ibid), drawing very quickly image by image, rather like a storyboard. While usually more reliant on the dancers for their bodily memory in remembering timing and rhythm, she saw the value of being able to send an annotation to a dancer for the nuances of tiny detail for teaching the piece or for finding precise timings. With *And it went everywhere* (2013) where dancers are connected to structures by lengths of taut fabric, Mirto's choreographic directions usually encourage dancers to gauge, intuit or 'feel' tensions and thus timing and rhythm; Mirto expressed how the tool was forcing her to be much clearer and more specific in terms of the directions she might give and how, in gaining more fluency with the tool, she might be able to find a shared 'language' (ibid) with a dancer. When asked by researchers whether the tool might somehow change the hierarchy between director and performer, Mirto expressed that the process felt more 'rigid [...] there is less space for improvisation and feeling [...] the best works are felt works where it's not about precision but a feeling from a performer that is authentic in time and space' (ibid). Mirto repeatedly questioned the place of annotating intuition within the work: her work is highly intuitive, improvisational, 'felt', led by the dancers' breath. In a way somewhat similar to the question asked by the Leeds dancers about the possibility of annotating the quality of movement, Mirto repeatedly asked how one might annotate mood and breath and begin to transcribe those intuitive, unspoken choreographic moments. This seems to be a key demonstration of annotation processes as a means of making tacit, embodied knowledge more visible.

Mirto and the researchers also discussed how the different marks and annotation modes might highlight dancers' attention differently to remember the choreography depending on what type of learner they are, recognising that the different types of annotation that are possible allow for multi-modal ways of learning. Again, the value of the using the tool for teaching repertory was evident. Mirto expressed how it would be useful for a movement director to be able to look back at the work and annotate virtual bodies before returning to work on the dancers' real bodies and to use the annotator to learn more about what is happening at a specific moment in time. Moreover, as Mirto began to feel more at ease with the annotator, she described finding a hint of 'creativity' (ibid) within the tool itself, enjoying marking lines to re-emphasise the work's own dance lines, finding specific emphases in direction that one might not be able to see or find with the dancers in real time without the annotator. Mirto also described how the annotator might allow the choreographer to input additional information onto dancing bodies and to work creatively with that information: to superimpose other layers of creativity (eg. costume lines, or even extra dancers) and to play with choreographic possibilities virtually first, with the annotator becoming a 'choreographic playground' (ibid).

### 3. LabDay: Amy Voris and regional artists

The third LabDay to be explored here took place on November 8th 2019 and was hosted by dance artist-researcher Amy Voris at her studio in Manchester, UK.<sup>7</sup> Voris' practice is process-oriented and collaborative, driven by the desire to develop enduring relationships with people and with movement material. The outcome of the work is contingent on hunches and interactions that occur during the process and varies widely. The CultureMoves team was in the studio with Voris and four other regionally based artists from the North-West of the UK - Dani Abulhawa, Sheila De Val Madsen, Ellen Jeffrey and Shelley Owen - to playfully explore the CultureMoves digital toolkit and the MotionNotes annotator.



*Figure 06: Dancer capturing a video using real-time function. Manchester, UK  
Photo credit: Rosa Cisneros (2019)*

Over the course of this LabDay, two main strands of potential for the annotator once more arose: i) for teaching dance material in a pedagogic setting and ii) as a choreographic tool for creating new work. In terms of the tool's teaching potential, the dancers - all of whom have teaching experience - pointed to the value of the tool for using with dance students, for facilitating someone else's learning in terms of practical work, or for teaching and learning

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<sup>7</sup> <https://www.amyvoris.com>

dance analysis. The dancers noted in particular how the slowing down function might prove useful for learning nuanced detail such as tracking shifts in weight. It might be an effective way to give feedback on videos of students' practical work, leaving notes and markers as a way of commenting. One of the dancers even pointed to the potential to use the tool for video lectures, for example. Again, this might be particularly useful perhaps in the current climate of the Covid-19 pandemic and the necessary drive towards blended learning in the future, combining face-to-face teaching with digital and potentially asynchronous teaching. One of the dancers who works on a movement module for architecture students noted how the annotation process might be particularly useful for her students in using the annotator to look at the body in space and to highlight relationships between spatial patterning and embodiment. She began to think about how she might use MotionNotes to devise a series of movement and annotation tasks to bring dance students and architecture students into dialogue. However, the dancers also raised an important question: noting how, for dance and movement teaching and learning, live body-to-body transmission is so important, how might the MotionNotes tool be able to fully reference the three-dimensionality of the body? It may be that the transmission of corporeal knowledge and the nuances of interconnected bodies in a space can potentially be lost or diminished because of the digital. However, in negotiating what is happening in the digital annotation process, as dance becomes data, it is essential to understand how digital technologies can, in fact, also prime dancers to observe and reflect upon their dancing bodies in a number of ways. As such, [Digital technologies] can reveal otherwise 'hidden' properties of the dance and articulate, document and highlight embodied knowledge *alongside* a 'traditional' body-to-body transmission. Digital tools enhance embodied transmission and can reveal more about its properties; they are not intended to replace it (Cisneros *et al*, forthcoming: n.p.)

In addition to thinking about how they might use the annotator for teaching and learning dance material, the dancers were also drawn to the creative and choreographic possibilities it offered. They expressed a clear interest in how it might be used as a 'creative platform' (dancer feedback); with its ability to 'add' other dancers virtually (through drawing or through using the pose function), they noted how 'it's like a duet' (ibid) and in such a way support the maker in suggesting future choreographic possibilities and 'finding future choreographies' (ibid). One dancer found that the delay function created an interesting cycle, especially with the mirror option, which 'makes the choreography process a bit less lonely if you're making solo work' (dancer feedback). The dancers also expressed how the annotator 'felt like a companion to a creative process [...] an evolving document of the creative process' (ibid). As such, the annotation process itself might become part of the choreographic process, generative and suggestive. In such a way, the annotation process develops not only a documentation of choreography but itself becomes a co-choreographic tool allowing for the material to be played with or thought about differently. The MotionNotes tool helps to classify and categorise sections of the choreography and encourages deeper reflections on the part of the annotator, dance-maker and/or dancer.

## Conclusion

The various CultureMoves LabDays provoked interesting discussions about dance documentation and annotation, about what we are doing when we use written, material sources (pen and paper) in the studio and how digital tools might help supplement live bodily creation and transmission of material, rather than replace it. Dancers repeatedly discussed how dance's ontology as ephemeral and immaterial is often talked about and how digital documentation allows us to capture some of that ephemeral material, especially what might otherwise get 'lost' in creative or archiving processes. At the Manchester and Leeds LabDays referenced here, dance educators were interested in how the annotation tool could potentially be 'a creative document [...] a multi-modal and poetic means of documenting a choreographic research process' (dancer feedback). Using the tools also prompted dance learners to think about those wider ethical questions of what happens when dance becomes data and the implications of the ethical storage of dance data, the ownership of digital dance material and IPR. Dancers and dance educators repeatedly highlighted the potential of the MotionNotes annotator for teaching and transmitting work, for learning and teaching specific dance vocabulary, and as a choreographic tool. The annotation process encouraged a different kinaesthetic sense and understanding, allowing the user to use text and written language to articulate body memory and thereby facilitating a form of bodily dialogue. In addition, annotation stimulates the user to be simultaneously subject, informant and participant while reflecting on the dancing body.

At all three of the LabDays outlined here, dancers discussed the usefulness of the annotator for nuancing tiny details, for finding a shared language to document the dance, and pointed to the variety of different annotations as helping dancers to learn existing dance material through multi-modal ways of learning. Because the annotator helps dancers and dance learners to document and understand the movement of the body in space, on several occasions, the potential of the tool for architecture students was noted; the annotator has potential for bringing dance and architecture students into a dialogue where drawing dance relates to spatial patterning and embodiment. This could be as useful in the study of architecture as well as it is in dance. For learning and teaching choreographic skills, the tool and the act of annotation using MotionNotes also revealed itself to potentially be one for generating choreographic potential and simulating choreography even before going into the studio: the annotator then becomes 'a choreographic playground' (Mirto, 2019). As such, the tool develops not just as a documentation of existing choreography but as a co-choreographic tool to allow the choreographer and dancer to play loosely and generatively with existing material. In a dance educational context, the MotionNotes annotator revealed itself to be valuable in the teaching and transmitting of specific vocabulary, due to the capacities for detail and precision that the tool allows. While dancers nuanced the necessity of the three-dimensionality of bodily learning and the importance of body to body transmission for dance, they also noticed how the annotator tool could enhance this learning. Examples in a dance studio / classroom setting, point to the potential for the annotator as a teaching tool, to create annotated video lectures, for example, or to be able to leave detailed notes and markers as comments on video recordings of practical work, and indeed to be used for the teaching of dance analysis. As such, the project findings highlight how digital annotation technology can support dancers and dance learners in how they define not only their own embodied knowledge(s) but also their movement teaching and learning philosophies.

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