Research Article

Isto Huvila*, Olle Sköld

Choreographies of Making Archaeological Data

https://doi.org/10.1515/opar-2020-0212
received December 15, 2020; accepted October 13, 2021

Abstract: A lot of different concepts have been utilised to elucidate diverse aspects of archaeological practices and knowledge production. This article describes how the notion of choreography can complement the existing repertoire of concepts and be used to render visible the otherwise difficult to grasp physical and mental movements that make up archaeological work as a practical and scholarly exercise. The conceptual discussion in the article uses vignettes drawn from an observation study of an archaeological teaching excavation in Scandinavia to illustrate how the concepts of choreography, choreographing, and choreographer can be used to inquire into archaeological work and data production. In addition to how explicating physical, temporal, and ontological choreographies of archaeological work can help to understand how it unfolds, the present article suggests that a better understanding of the *epistemic choreographies* of archaeological, scientific, and scholarly work can help to unpack and describe its inputs and outputs, the data it produces, what the work achieves, and how it is made in space and time.

Keywords: choreographies, archaeological practices, epistemic choreographies, ontological choreographies, choreographer, fieldwork

1 Introduction

Choreography has gained traction especially after the turn of the millennium as a concept for explicating human–technology relations and the arrangement and change of practices in diverse contexts from science to healthcare (e.g. Coeckelbergh, 2019; Cussins, 1998; Law & Lien, 2013). Even if the concept of choreography is not entirely absent from archaeology-related literature (e.g. Huvila & Huggett, 2018; Thomas, 2014), it has been more typical to refer to archaeological fieldwork and knowledge production as practice, activity, craft, or craftwork (Edgeworth, 2011; Shanks & McGuire, 1996), and instead of choreography, to conceptualise it in such terms as, for instance, ecology (e.g. Huvila, 2018a; Witmore & Shanks, 2013), assemblage (e.g. Fowler, 2013; Lucas, 2012), or meshwork (Cobb & Croucher, 2020; Hicks, 2016). However, similar to how earlier research in other non-theatrical contexts has used choreographies (e.g. Coeckelbergh, 2019; Cussins, 1998; Law & Lien, 2013), choreographer, and choreographing as explanatory concepts, it is not inconceivable to think that the notions can have comparable use also in explicating the shifting grounds of archaeological practices, documentation, knowledge, and data making.

Article note: This article is a part of the Special Issue on Archaeological Practice on Shifting Grounds, edited by Åsa Berggren and Antonia Davidovic-Walther.

*** Corresponding author: Isto Huvila,** Department of ALM, Uppsala University, Thunbergsvägen 3H, Uppsala 75126, Sweden, e-mail: isto.huvila@abm.uu.se
Olle Sköld: Department of ALM, Uppsala University, Uppsala 75126, Sweden, e-mail: olle.skold@abm.uu.se
ORCID: Isto Huvila 0000-0001-9196-2106; Olle Sköld 0000-0002-0904-7222

The aim of this article is to elucidate how the notion of choreography can complement the existing repertoire of concepts and be used to render visible the otherwise difficult to grasp physical and mental movements that make up archaeological work as a practical and scholarly exercise. Drawing on an observation study of an archaeological teaching excavation in Scandinavia, this article inquires into how the concepts of choreography, choreographing, and choreographer can inform research in archaeological fieldwork practices and knowledge production, and more specifically, how a better understanding of its *epistemic choreographies* can help to unpack and describe its inputs and outputs, the data it produces, what it achieves, and how it is made in the longue durée and vaste ampleur of its space-time.

2 Choreographies

The notion of choreography has been employed in the recent science and technology studies literature as a metaphor for describing the coordination and ways of organising physical and conceptual movements in several different domains ranging from rather obvious theatrical contexts to several others. A particular line of research has focused on choreographies of care (e.g. Cussins, 1996, 1998; Law, 2010; Lien, 2015), but the concept has also gained traction in the analysis of human–technology relations in, for instance, the context of scientific practices and studies of digital technology (e.g. Law & Lien, 2013; Pickering, 1995; Vermeulen, 2018). Partly, researchers have been interested in how practices are organised and partly, how various actors steer activities as choreographs (Coeckelbergh, 2019). Several authors including Pickering (1995) and Coeckelbergh (2019) discuss how choreographies are ubiquitous in human–machine interactions, and how technologies and their designers act as co-dancers and choreographs in shaping how people move and act with technologies, and on a more profound level how people think. Through their normative capacity, choreographies unfold in Foucauldian sense as mechanisms of power (Coeckelbergh, 2019). A choreography can exercise power according to prevailing norms (Albright, 1997), but it can also act as a "choreography of resistance" (Parviainen, 2010) to exert counter-normative influence.

The metaphorical references to choreographies have their underpinnings in the theory and practice of their theatrical counterparts. Much of the theorising on theatrical choreographies and dance is concerned with issues of embodiment, experience, practice, and skills (Coeckelbergh, 2019). Choreographies have affinities with compositions, algorithms, and scripts (Coeckelbergh, 2019). Depending on how much room they leave for improvisation, their influence on choreographed activities can vary (Coeckelbergh, 2019). A choreography can have elements of the composition but like Tuuri, Parviainen, and Pirhonen (2017) and Coeckelbergh (2019) emphasise, choreographies are co-constituted in both arts and everyday life by humans and nonhumans in action rather than composed *a priori*. Choreographies are to a certain extent fixed (Pickering, 1995), but in comparison to algorithms, both theatrical and metaphorical choreographies tend to be much more precarious (Law & Lien, 2013), open for tinkering (Law, 2010), less precise, and compelling – even if their irrefutability depends on the authoritativeness of the choreographer and how the choreography is put to work. Coeckelbergh (2019) describes an "authoritative choreographer" as a choreograph who is in total control and contrasts it to a "corresponding choreographer," a participant who creates a dance together with dancers in a never-finished performative practice. As a topological and spatial (Vermeulen, 2018) "way of organizing movement" (Coeckelbergh, 2019, p. 43), a choreography differs from a script, i.e. an inscribed version of a performable story as a whole, complete with a description of the plot, dialogue, and the setting.

A parallel aspect to what choreography is how and what it choreographs. Choreographies and choreography as a practice have rules that need to be followed even when an artist is improvising (Kozel, 2008). At the same time, choreographies are typically invisible to the people they involve (Coeckelbergh, 2019). Dancers and actors know what to do of experience implicitly through their bodies (Coeckelbergh, 2019) rather than explicitly following a specific visible formula. Dance and theatrical performance are about simultaneous doing and happening (Coeckelbergh, 2019). They are social activities that involve not only co-dancers but also the audience, a choreograph, choreography (Coeckelbergh, 2019) and require a fair dose of cultural knowledge in addition to individual experience and expertise (Thomas, 2003). Albright

(1997) showcases classical ballet as a genre of dance where choreographies typically consist of sequences of recognisable signature moments, whereas in modern dance, these are consciously questioned and broken (see also Thomas, 2003).

Coeckelbergh (2019) suggests that in the context of technology studies, the notion of choreographies can help to think about ethical development and deployment of technologies and explicate the politics of technologies (who or what choreographs whom). The temporality of orders emphasise synergy rather than mere multiplicity (Vermeulen, 2018). Moreira (2012) discusses public deliberation as a choreography. It may appear weak in comparison to authoritative decision-making, but as Moreira notes, as a choreography, it goes beyond reaching verdicts to collective sense-making and epistemological inquiry of the process itself (Moreira, 2012).

Other authors have extended the notion to discuss entanglements of different temporalities as temporal choreographies (Felt, 2015), ethnography of movements as choreographic ethnography (Thomas, 2003), and (ontological) alignment (Metzger, 2013) of different ontological orders as ontological choreographies (Cussins, 1998; Thompson, 2005). Cussins discusses ontological choreographies as "coordinated action of many ontologically heterogeneous actors" to forge "a functional zone of compatibility that maintains referential power between things of different kinds" (Cussins, 1998, p. 192). An ontological choreography can render human beings and technologies or certain technical procedures compatible with each other, or engineer political or legal decisions that determine the kind or nature of physical or biological matters. It is a "deftly balanced coming together of things that are generally considered parts of different ontological orders" (Thompson, 2005, p. 8). Extending what Thomas (2003) writes about choreographic ethnography, the analysis of diverse movements from the perspective of choreographies – whether they are ontological or bodily ones – can provide new vantage points to inquiring into established categories and overcoming entrenched dualisms.

As a whole, even a brief review of the literature on choreographies both in theatrical settings and perhaps especially in non-theatrical contexts suggest that choreographies, choreographing, and inquiring into the role of choreographers open potentially useful perspectives to analysing topologies, movements, and agency in various types of practices and instances of knowledge production. Considering this, it is conceivable that they can offer potentially fruitful openings and points of comparison for investigating archaeological work and knowledge production as well. After taking a brief excursion in the next section to earlier research on archaeological fieldwork and documentation practices with a focus on their key constituents, this article proceeds to set forth two vignettes of archaeological field practices that are used later in the text to exemplify how the concepts of choreography, choreographing, and choreographer together with ontological and, as proposed later, epistemic choreographies can be usefully applied to shed additional light to archaeological fieldwork and knowledge production.

3 Archaeological Fieldwork and Documentation Practices

There is a relatively broad corpus of empirical observational, reflective, and theoretical studies on the archaeological fieldwork. However, so far much of this work has been somewhat fragmentary, and many of the different lines of research have remained disconnected from each other (Huvila & Huggett, 2018). In addition to archaeologists themselves (e.g. Edgeworth, 2003; Lucas, 2001; Mickel et al., 2016; Zorzin, 2010), archaeological practices have interested researchers in information studies (e.g. Huvila, 2019b; Olsson, 2016), science and technology studies (e.g. Pijpers, 2020; Webmoor, 2013), communication (e.g. Goodwin, 1994), sociology and philosophy (e.g. Pavel, 2011), ethnology (e.g. Davidović, 2009), and, for instance, philosophy of science (e.g. Chapman & Wylie, 2015, 2016). Recently, the dialogue between researchers has started to intensify through national and international cross-disciplinary efforts such as the COST Action ARKWORK (www.arkwork.eu), a European network of researchers investigating archaeological practices and knowledge work (Pálsson et al., 2017), ARIADNE and ARIADNE + infrastructure projects (Aloia et al., 2017; Niccolucci, 2020), and smaller local and regional research projects (e.g. ARKDIS, 2013–2017; Dallas,

2018). Much of the earlier studies have approached fieldwork and field documentation practices from the perspective of self-reported case studies (see e.g. Berggren & Hodder, 2003; Silliman, 2018) and ethnography and participatory observation (e.g. Carman, 2006; Davidović, 2009; Edgeworth, 2003; Khazraee & Khoo, 2011; Zorzin, 2010), but researchers have been utilising also other methods, including interviews (Starzmann, 2012), questionnaires (e.g. Holtorf, 2006), action research (e.g. Huvila, 2012), and document analysis (e.g. Pavel, 2010).

Earlier, both evidence-based and theoretical literature have elaborated on a large number of concepts and metaphors to describe archaeological fieldwork and documentation practices. Much of the research has focused on excavation that Edgeworth (2011) describes as the core method of archaeology, which does not only account for a significant proportion of archaeological evidence but also underpin the ways of seeing and thinking in archaeology as a whole. Even if there are certain tendencies to frame archaeological work especially in management (Huvila, 2019c) and outreach (Andreassen & Pierroux, 2013) contexts as a tameable process, in the research literature, it is more typical to describe archaeology as a craft (Edgeworth, 2011; Shanks & McGuire, 1996), assemblage, or for instance, meshwork (Cobb & Croucher, 2020; Hamilakis & Jones, 2017) that unfolds as a situated, messy and unpredictable melange of individual and collective thinking and bodily hands-on doing. The work itself, its procedures, documentation methods, and what is documented vary a lot from one project and excavation to another not only due to diverging traditions and legislation between different countries and regions (Carver, Gaydarska, & Monton-Subias, 2015; Pavel, 2010) but also due to differences between particular excavations, projects, and groups of archaeologists. Rescue excavations differ from research-driven fieldwork. Especially commercial contract archaeology tends to be characterised by a greater degree of procedural standardisation, whereas academic and non-commercial excavations are to a greater degree driven by a more explorative episteme (Börjesson & Huvila, 2019). Commercial contract archaeology has also been criticised for introducing a "factory model" (Shanks & McGuire, 1996) to archaeological work that undermines the agency of individual archaeologists and unfolds as a dystopian and exploitative neo-liberal capitalist undertaking (Zorzin, 2015) rather than a framework for ensuring the production of high-quality archaeological knowledge (Börjesson & Huvila, 2019).

Archaeologists use a large variety of techniques and tools ranging from pen-and-paper to digital measurement devices and computer applications to conduct and document their work and observations in the field. Archaeological information and documentation materialise in many physical forms, and the different genres of information stem from and integrate into a similarly broad spectrum of archaeological practices (see e.g. Huvila, 2019a; Mickel, 2015; Pavel, 2010). Multiple researchers have emphasised the embodied nature of archaeological information and knowing and debated to which extent archaeologist's bodily experiences can be treated as analogous to those of the people of the past (Hodder, 1999; Thomas, 2004). Materiality is another central aspect of archaeological practice in both how archaeology engages with the past through material evidence and how it is interpreted, understood, and turned to documentation. Olsen's (2012) aptly titled book stresses the archaeological engagement with (material) things as a key to understanding how archaeology works by describing archaeology as a discipline of things.

Others have observed the parallel socially and culturally anchored nature of archaeological knowledge production and its underpinnings in the interests and the cultural and social background of the excavating archaeologists (e.g. Bernbeck, 2012; Carman, 2017; Edgeworth, 2003; Rose-Greenland, 2013). Mickel (2016) studied archaeological knowledge production and knowledge flows in field archaeology by mapping the social networks of the participants of the Çatalhöyük research project observing how the networks change shape in time opening and closing fault lines between teams of specialists. Especially the feministic research of archaeological practices has directed attention to hierarchies and inequalities in the archaeological work and the opportunities for resistance and change of power relations (e.g. Gero, 1996; Wylie, 2007; see also Eddisford & Morgan, 2019). Davidović (2009) underlines the role of tacit knowledge and communities of practice in learning and enacting archaeological practice, whereas Huvila's (2019b) study emphasises the role of infrastructures in the learning of archaeological work and Wendrich (2012) that of apprenticeship. Pijpers (2021) draws on, among others, Ingold's (2020) work and focuses on relationality of archaeologists and the archaeological record and describes archaeological meaning-making and knowledge production in terms of storying and worlding through correspondences between the archaeological record and what archaeologists do in practice.

In addition, several studies have investigated archaeologists' strategies to tackle the fragmentary nature of archaeological evidence. Rose-Greenland (2013) suggests that archaeological discoveries are occasionally produced through "prospective loading" before they are actually made by unearthing evidence during an excavation. Wylie (2017) explains how archaeologists contextualise their finds and observations to their background knowledge about how observed features and finds could have been produced, what might have affected their diffusion and degradation as conceptual and technical scaffolding. Both prospective loading and scaffolding emphasise the fluidity of archaeological information. Archaeologists use their background knowledge to help them to "take" (Huvila, 2018a) their own and others' observations and turn them into archaeological information rather than that the information itself would be immutable, directly retrievable, and the same for everyone.

The deeply entangled and fluid relation and agency of both the past and present human and material things is a central theme also in philosophically oriented archaeological literature that builds, interestingly enough, to a significant extent on the same theoretical base as many of the recent evidence-based studies of the archaeological work. For example, archaeologists like Lucas (2012) and Fowler (2013) draw on Deleuze and Guattari's conception of assemblage to describe the nature of archaeological practice, Hodder (2012) refers to entanglements, and Ingold, an anthropologist whose work has had a significant influence on archaeological theorising, describes the intermingling of human and material worlds through meshworks (Ingold, 2011), corresponding (rather than being) (Ingold, 2020), lines, and movements (Ingold, 2016).

As a whole, the earlier literature on the archaeological fieldwork and how it is documented points to the significance of different mental, bodily, and paradigmatic moves enacted interspersingly on the individual, group, and collective levels to how archaeology is achieved in the field. In parallel, it evinces the complexity and implicitness of how these moves are documented, conveyed, and interpreted by other archaeologists. While especially the considerable body of theoretical work on the underpinnings and constituents of archaeological knowledge and scholarship provides insights into the premises of archaeological practices and the existing, albeit more fragmentary and smaller, the empirical body of literature on the archaeological work itself, much of the earlier work has been interested in characterising and finding suitable metaphors to describe archaeological field practice. In contrast, even if useful notions are not by no means extant from the literature, there is no direct surplus of concepts that would help to disentangle and unpack the snarl of how archaeology is achieved in practice as either practical or intellectual endeavour.

3.1 Vignettes

To illustrate and provide insights into how the notions of choreographies, choreographs, and choreographing can help to disentangle the knotty engagements of archaeological work and inform the study of archaeological field practices and knowledge production, we proceed to describe two vignettes of archaeological knowledge work relating to photodocumentation and finds processing during a fieldwork project. As a source for applicable vignettes, this article draws on an ethnographically inspired observation study of a 5-days long teaching excavation (field school) in a Nordic country in 2016. The excavation team consisted of four senior archaeologists and eleven undergraduate and graduate archaeology students. The study was conducted by the first author and documented by taking notes and photographs. The observer did not attempt to conceal his presence on the site and interacted with the team throughout the project but acted as non-intrusively as possible in an attempt to document the study context in as naturalistic terms as possible. The consent of all participants of the teaching excavation was acquired at the beginning of the study. The analysis of the study material used in developing the vignettes was based on qualitative content analysis (Krippendorff, 2004), close reading (DuBois, 2003) of the situation and documentation on site, and using writing as an explicit method (Richardson, 2000) of analysis.

The vignettes that were sourced from observations on different occasions throughout the excavation project illustrate the diversity and multiplicity of the intellectual and physical movements and moving in the archaeological fieldwork that can be described and explained in terms of choreographies and

choreographing. The rationale underpinning the use of vignettes rests on their ability to purposefully communicate key moments of archaeological fieldwork that benefit from the heterogeneity of the collected data in a clear thematic structure of presentation (Hughes & Huby, 2002). Instead of attempting to unpack the archaeological work as a whole, these examples aim to illustrate how mapping archaeologists' movements during fieldwork in terms of choreographies and choreographing can help describe and understand what goes in and comes out of the process, what it achieves, and how archaeological fieldwork is configured in space-time.

3.2 Photodocumentation

In contrast to a standard excavation, where a site is documented using one agreed-upon approach, the observed excavation team relied on two parallel systems of field documentation. The site and the investigation process were documented using a traditional pen and paper-based approach in field notebooks, pro forma contexts sheets, and hand-drawn plans and sections. In addition, the site was documented by using a novel photodocumentation approach based on the use of photogrammetry to create a series of 3D models of the unearthed contexts in real-time during the excavation, and by documenting observations, for instance, major finds and interpretations, in a geodatabase linked to the models. The rationale for such a double procedure was to test and develop digital photogrammetry-based site documentation and to teach students conventional field documentation methods and a novel efficient digital workflow that produces highly detailed documentation of a site.

The photodocumentatation followed an approximately uniform choreography that was tweaked according to the circumstances in hand. The first critical movement was to decide when to document a trench. The trenches were documented in their entirety several times during the week in an attempt to capture a good view of all excavated contexts. The decision was ultimately in the hand of one of the senior archaeologists who was acting as the principal choreographer of the photodocumentation, but it was discussed intensely between three of the four senior archaeologists and together with the students before a final decision was made. The participants of these discussions varied. In some cases, a specific individual was sought for consultation, in others, the decision was made in a group that consisted of one of the seniors and the students that happened to be there at the time. Because the making of a 3D model required taking a series of high-quality photographs of a trench at one time using an SLR camera and making sure that they cover the entire view, the work had to be explicitly coordinated with the pen-and-paper documentation team. Coordinating the interplay of the two parallel teams and how they worked required a lot of effort from the senior archaeologists. The trench had to be cleaned and prepared, so that all key contexts and features were as visible as possible in the photographs. At the same time, it was not feasible to draw plans by hand because it required that the documenting archaeologist moved in the trench and scraped the dirt to observe, measure, and find limits of different contexts in the stratum. The senior archaeologists guided students especially during the first time they were moving around the trench and taking photographs. They explained how the photogrammetry software used the photographs to create a 3D model and what was important to consider when shooting pictures for this purpose. The excavation had to be halted also for a short while when the photographs were taken and the 3D model was created in a photogrammetry software package. When taking the photographs, it was critical to consider the lighting conditions. Too sharp shadows, darkness, or too much direct light reduced the quality of the photographs. Another similar factor was the humidity of the stratum. In the direct sunlight, the dirt dried too quickly, reduced the contrast of colours, and made it impossible to distinguish individual contexts and features.

After the photographs were taken, the SLR camera was brought to the site hut and the images were uploaded to one of the computers used for creating a 3D model. After transferring the photos to the computer, the students imported them into photogrammetry software, prechecked their coverage, and processed them to create a preliminary 3D model with the help of two senior archaeologists. If the senior archaeologists considered that the model was not good enough, either the students or especially if the team

was in a hurry to continue with the excavation, one of the senior archaeologists went back to the trench and took additional photographs. When the model was considered good enough, the students started documenting features and major finds in the preliminary 3D model and the excavation in the trench could continue.

3.3 Finds Processing

The observed excavation was not extremely rich in finds and because much of the work during the week went to excavating mixed layers, the finds processing was not as intensive as it might be at other excavation sites. The students had consulted literature prior to the excavation and were introduced to typical finds that could be expected to be found on the site at the beginning of the excavation by one of the senior archaeologists. He had the experience of sites from the same period as the excavated one and worked as a designated finds officer in the project. He also showed the undergraduate students during the early part of the excavation the standard choreography of working with finds: what to do with them, in which order, how to treat them, which types of finds should be kept, and which ones should be discarded. He also discussed finds identification and other finds-related matters throughout the week in several occasions in the trench together with the students.

The typical procedure of how the unearthing, identification, and processing of finds started with a student discovering something he or she suspected as being a potential find. The students quickly learned to first look and feel the things they came across to understand whether they were reminded of the physical characteristics of objects they had found or seen earlier. Besides looking, the finds officer had also noted that feeling an object with a hand or even using the tongue to feel their finer contours is helpful. Tasting did not, however, become a typical choreographic movement among the students and was also dismissed by the director of the excavation as a too risky approach from work safety and health perspectives. After looking and feeling the object by themselves, the students tended to show them quickly to their fellow students that worked in the same trench or happened to be nearby. In some cases, it seemed likely that approaching fellow students was a collegial movement of asking a peer. Sometimes, it could also act as a substitute to going to one of the seniors, especially when a find seemed to be particularly difficult to interpret. Some of the students tended to approach both their peers and seniors by asking questions, while others started soon to approach others by first presenting their initial hypothesis. It was also possible to see that during the week, the choreography changed as the students have begun to approach some of their peers, mostly older ones but also others, as experts in diverse finds and excavation technique-related matters appeared to be knowledgeable and confident. After an eventual discussion in a student group but in many cases directly after they were discovered, the finds were shown to one of the seniors, usually the one who happened to be standing nearby. If everyone so far had thought that the find was interesting, it was shown to the finds officer. At this point, the seniors often talked through the finds with the students, explained what they saw, how and why they considered a find to be an artefact, or otherwise significant to be kept. Finally, depending on the concluding verdict, the find was either bagged to be cleaned and catalogued or discarded.

4 Discussion

4.1 Ways of Organising Movements

In the vignettes, it is possible to identify a large number of instances of "way[s] of organizing movement" (Coeckelbergh, 2019, p. 43). The interplay of pen-and-paper and photo documentation followed a fairly

standard choreography that functioned as a scheme for organising the movements of the team members and to schedule and arrange moments when it was relevant and possible to take photographs, draw plans using pen and paper, and excavate further. Similarly, the movement from the trenches to the site hut and back, the use of tools to produce 3D models, and the unearthing and identification of potential finds followed recurrent choreographies that were, as the one's observed in the earlier literature, fairly fixed (as in Pickering, 1995) topological and spatial arrangements (cf. Vermeulen, 2018) of embodied movements.

The teaching excavation drew attention to how the experience and skills of student participants developed during the week (Coeckelbergh, 2019) and how the senior archaeologists invested heavily in passing on and elaborating their collective "cultural knowledge" (cf. Thomas, 2003) of doing archaeological fieldwork. Even if the choreographies were to a certain extent comprised (cf. affinities of choreographies and compositions e.g. in Coeckelbergh, 2019; Tuuri et al., 2017) the senior archaeologists, they were co-shaped during the week by the students who participated in the excavation. The students participated in the discussions and decisions and, as the finds processing vignette shows, developed their own routines – which can be described as sub-choreographies – of consulting some of their peers as experts in specific matters they appeared to be knowledgeable about. The technologies of documenting the trenches and how they were designed did similarly influence how the choreography unfolded in practice much similar to how, for instance, Pickering (1995) and Coeckelbergh (2019) describe the choreographies of human–technology interactions.

The fact that the two vignettes were drawn from a teaching excavation underlined the proximity of the documented choreographies and compositions. Correspondingly, their functioning as mechanisms of power according to the hierarchies and norms of academic and professional seniority (cf. Albright, 1997; Coeckelbergh, 2019) rather than as a form of resistance was apparent even if it would be imprecise to describe the senior archaeologists as extreme examples of authoritative choreographers. Following the ways of organising movements at other types of excavations would undoubtedly reveal different sets of power dynamics, individual and institutional choreographers, and choreographies. The critique of the "factory model" (Shanks & McGuire, 1996) of contract archaeology (e.g. Zorzin & St-Pierre, 2017) as a capitalist and industrial enterprise suggests the authoritativeness of social and political systems as choreographers of activities that severely restrict the freedom of the participants of the excavation to themselves choreograph their and others' work in a much more fundamental sense than an individual field director is ever capable of doing. In contrast, Eddisford and Morgan's (2019) reading of single-context archaeology as a potentially anarchist practise and an approach to resist field director's dominance as a chief choreographer of an excavation provides an example of a potential choreography of resistance (as in Parviainen, 2010) that can exert counter-normative influence on the archaeological fieldwork. Even if the ideal might be in many cases a choreography that would engage all pertinent actors as co-choreographers to an attainable extent, extremes do not necessarily mean a complete dominance or lack of it. As studies of contract archaeology work (e.g. Zorzin, 2010), and for example, how it is reported suggest (e.g. Börjesson, 2015; Gustafsson & Magnusson Staaf, 2001), individual archaeologists still have opportunities to influence their own choreographies even in a markedly authoritative setting. Similarly, completely individualistic and un-choreographed anarchy is undoubtedly also a dystopian utopia. At extreme, it would mean the end of excavations and archaeology as meaningful collective efforts.

4.2 Choreographies of Archaeological Fieldwork

Even if we posit that choreography has a lot of potential in explicating the topologies of archaeological practices, it is hardly a concept that alone can explain everything. Rather than replacing alternative conceptualisations, the concepts of choreography, choreograph, and choreographing have a potential to complement them by drawing attention to facets of archaeological fieldwork that otherwise risk remaining comparably invisible. Instead of merely characterising fieldwork, for instance, as an information flow or, for example, as an assemblage of practices, it provides a distinct conceptual apparatus for unpacking and

following archaeologists' specific spatial and temporal movements, highlighting for archaeology crucial interplay of past, present, and future instances of archaeological activities, documenting procedures, and documentary (re)use and processing in the broader context of archaeological work that transverses individual sites, excavations, and surveys.

Understanding the rhythms, openings, and closings of the choreographies of how archaeologists work in the field can help to understand what goes in and what comes out of the meshwork of archaeological fieldwork and what happens within the duration of the archaeological fieldwork. It can also help to understand what is the "data" archaeologists are collecting and documenting and what characterises archaeological data making specifically and as an instance of coordinated multi-temporal, multi-actor, and multi-spacial scholarly and professional work. For example, comparison of photodocumentation and pen and paper-based recording of an excavation provide new vantage points (cf. Thomas, 2003) to how they unfold not only as two different technologies or infrastructures (cf. Huvila, 2019b) of archaeological knowledge production but also as sequences of fine-grained intellectual and bodily movements with points of convergence and divergence, and separate moments in time-space when the respective types of documentation come into being. In photodocumentation, it happens in specific instantaneous acts that might be repeated (e.g. photographing or model building and repeating the acts if the result is not deemed good enough), whereas in the pen and paper-based approach, the actions stretch over a longer period of time as an evolutionary process of becoming.

Even if the two vignettes were only partly highlighting the connectivities beyond the studied field site, it is apparent that the choreographies of archaeological work and knowledge production engage people much broader from and beyond the broader archaeological community. This includes archaeologists who have worked in previously reported projects consulted during and prior to an ongoing excavation, researchers and heritage professionals, politicians and professionals in neighbouring professional and scholarly fields, the peoples of the past, and to an increasing extent through public and community archaeology initiatives, the local population, and the society at large. Throughout the making of data, a series of performances occur when the archaeologist is required to put her work-in-the-making on display in an investigation plan, Data Management Plan, public outreach activities, reporting, scholarly processing, and publishing. Even if a fieldwork project is often a short-term exercise, its temporalities span from the distant past to the future, and its locality to a specific small area of land expands to cover a broad scope of spatial entanglements on local, regional, national, and global levels. In parallel, especially in rescue archaeology – which is the dominant context of fieldwork in large parts of the world (Börjesson & Huvila, 2019) – the society and its presiding political ideologies impose archaeology with choreographies that can be alien to its internal logic and priorities. In this respect, the two vignettes described in this study unfold as particular to a rather cloistered context detached from the realities of professional archaeology and how archaeological work and knowledge production is choreographed in the society at large. At the same time, however, it is crucial to acknowledge that a teaching excavation is not detached from that reality. Even if its influence might seem subtle and difficult to recognise, the society-wide politics also influence a field school. Such politics and their choreographing influences on a teaching excavation are probably most easily discernible in the political worldviews and priorities of how to educate and train future archaeologists, in the ideas of what an archaeologist needs to know in the future (e.g. digital methods), and what is important (e.g. to be fast and efficient) in the work itself.

Whether produced and scrutinised on a societal or project level, there is clearly an intricate set of rules to how to do what and when even when archaeologists are improvising (cf. Kozel, 2008) and the choreographies seem obscure. A large part of these protocols of how the movements described in the vignettes are organised are implicit and invisible. They are obscured out of sight to an extent that in the vignettes, making them visible required a lot of dedicated effort from the senior archaeologists (cf. Coeckelbergh, 2019). On a superficial level, these efforts of explicit "articulation work" (Fjuk, Smørdal, & Nurminen, 1997) might give an impression that the work is more formally constrained than it is in practice and points toward the applicability of representing it in terms of a formal process or workflow. However, looking closer to what is happening and how the choreographies unfold in practice makes it clear that the movements of fieldworkers are quite apparently not guided by a detailed script or an algorithm but rather a less precise and

compelling arrangement that leaves a lot of room for negotiation, improvisation, and co-creation. While a certain set of ideal movements could undoubtedly be scripted and it would be possible to write a script for both photodocumentation and finds processing, neither of them would be a highly accurate representation of the actual variety of the work that the students or senior archaeologists did. As Coeckelbergh (2019) emphasises, choreography is not a script. It is an organising movement in a different sense and pointing attention to different aspects of the movement than a script. As a consequence, conceptualising archaeological fieldwork and knowledge production as choreographies brings attention to details of work that might be omitted in script-like descriptions found in the methodological literature and to a limited extent in field reports and publications.

As a way of organising and describing movements rather than a composition, workflow, formal procedure or set of rules, the simultaneous fixity and openness of choreographies appear to correspond strikingly well with the spatio-temporal arrangement of movements during an archaeological excavation. Also, the concept of choreography foregrounds something akin to anthropological insights into how the senior archaeologists and the students together move to intermittently manifest and enact collective symbolism and meaning-making patterns of archaeological knowledge production (cf. Geertz, 1973) that would not be present in workflows and other more linear renditions of activity staging and characterisation. However, while archaeologists improvise a lot, there are still rules that are followed. Similarly, as both the variation in the photographing of trenches and identification of finds show, also improvisation has patterns. In both vignettes, it is possible to discern a general line of action, which is followed routinely even if the exact details and decisions could vary. Similarly, it is possible to recognise certain "signature moments" (see Albright, 1997) such as the cleaning of a trench or watching and feeling finds in the observed choreographies that are recognisable in all choreographies even if considering what Albright (1997) suggests of the genres of dance, as a whole, the situatedness and complexity of archaeological work turns its choreographies in a figurative sense closer to the modern dance than the classical ballet. A similar division between signature moments and improvisation applies also to photodocumentation. The general criteria of what is a good 3D model remain relatively stable but what traces to follow to decide on what is an interesting artefact "short-circuit the process of inference by simply selecting traces thought to represent the behaviours of interest (using correlates alone) while failing to rule out other possible causes of those traces" (Schiffer, 1996, p. 14).

As Coeckelbergh reminds of choreographies in general, also in the context of archaeological fieldwork, they can serve as a useful concept for making visible the politics of doings and its implications to what is good and bad archaeology. By asking who or what choreographs whom and how the different ways of organising movement lead to different movements and outcomes can help to unpack the influence of technologies and arrangements of work on its outcomes, and as Moreira (2012) emphasises, to inquire into the process itself. Beyond visualising the interplay of different human and non-human actors (Huvila, 2016; Pickering, 1995) and infrastructures (Huvila, 2019b) on the field site as a dance, the notion of choreography can help to describe how the metaphorical dance is conditioned, and, for instance, when technologies and their users put each other to work (Huvila, 2018b), what movements it entails.

Finally, as indirectly suggested already earlier when considering the (un)representativity of the two vignettes and what factors beyond the excavation site choreograph archaeological fieldwork, choreographies and choreographing offer insights into who or what are the choreographers in different situations and how they not only choreograph physical movements but also on a more profound level how things that participate in choreographies relate to each other. These arrangements of movements are comparable to the "ontological choreographies" in Cussins's (1998) study of infertility clinics that forge ontologically heterogeneous things compatible with each other to an extent that they can be linked to each other to a distinctly archaeological whole. In the two empirical vignettes, the physical position and movements of different individuals and their availability for making judgments had a major influence on who got to decide, how specific finds were made to become artefacts or discarded, and how a correct moment to document a trench was decided. It was equally obvious that the pen-and-paper and photogrammetry-based documentation systems choreographed each other through their widely different temporalities that the archaeologists found frequently difficult, if not impossible, to accommodate to each other (cf. Huvila, 2019b). As a result,

they influenced each other's rendering of the site through the documentation that was produced. The same applied to elements like weather and sun that regulated in a temporal (Felt, 2015) and spatial sense how, where, when the photodocumenters needed to move in order to take high-quality photographs. If the analysis would have been extended to other activities on and beyond the site, it would have been undoubtedly possible to identify similar patterns in relation to other activities from excavation logistics (i.e. movements relating to removing dirt using different tools) and social context of archaeological work in the studied country to the how the spatial location and layout of the site choreographed movements on the site and the project at large far beyond the human and non-human things that were directly present on the observed site during the excavation.

4.3 Beyond a Metaphor: Documenting the Making Archaeological Data

In addition to functioning as a useful figurative metaphor for explaining and understanding the topology of archaeological fieldwork, a closer consideration of the concept of choreographies can also provide cues to how to make them visible both for newcomers and those archaeologists and other stakeholders who are not present at a specific excavation. As Vermeulen (2018) suggests, choreography emphasises the synergy of movements and actors beyond stating their multiplicity. In this sense, a choreography comes with a capability to function as a description of the spatio-temporal movements during a particular archaeological field project rather than a mere metaphor to illustrate the many mental and physical moves performed therein.

From a documentary perspective, a choreography can serve as a description and essentially also as a form of paradata i.e. data that describe processes (Bentkowska-Kafel & Denard, 2012; Couper, 2000) cf. metadata that describes data (Pomerantz, 2015). A choreography can be shared and recreated to a reasonable degree on and on again, but at the same time, taking into account the variation in the situation at hand and leaving room for improvisation. Similar to how Thomas (2003) comments on the formality of classical ballet choreography, descriptive choreographies of information making could exploit easily recognisable, well-documented, and generally known significant moments to facilitate mutual understanding of the choreography and its intended outcomes. Instead of inventing new categories of moves, building on a combination of classical sequences and new steps could make new choreographies easier to create, share, and grasp. However, rather than sharing merely old and new sequences of movements, the social and topological nature of choreographies make them useful for sharing knowledge beyond procedures or outcomes. Choreographies can directly facilitate sharing also by doing – an aspect of knowledge sharing emphasised in science studies (e.g. Schiffer, 2014), the learning and practice-oriented line of information and knowledge management research (Newell, Robertson, Scarbrough, & Swan, 2009) and archaeology alike (e.g., Davidović, 2009; Wendrich, 2012). Simultaneously, they can be reasonably expected to provide useful means to communicate embodied forms of information and knowing that are common not only to field archaeology but also to many other varieties of human pursuits (e.g. Olsson, 2015; Olsson & Hansson, 2019; Olsson, Lloyd, Lueg, & McKenzie, 2018; Suorsa, Suorsa, & Svento, 2019).

The documentation of the making of archaeological data can benefit from a consideration of at least two types of choreographies. Ontological choreographies (Cussins, 1998) rule upon how stratum becomes archaeologically relevant and finds turn into artefacts. Describing them unpacks and accounts for ontological moves during the archaeological fieldwork that bring together physical artefacts, the archaeological stratum and stratigraphic sequences, geophysical and archaeobotanical analysis results, and the whole constellation of things belonging to different ontological orders that are capable of informing archaeologists. The notion of ontological choreographies can be complemented with a parallel concept of *epistemic choreographies* that in a comparable sense describe and choreograph the movements of the information work of turning the site to archaeological information and knowledge (or, as Edgeworth, 2003, describes it with finds, rubbish or artefacts) i.e. what for instance field archaeologists do to document, describe, and capture what they see.

In addition to their potential capacity to provide a concept to describe the movements and actors involved in archaeological information making, explicating these two types of choreographies in a non-figurative sense can help to make them visible and easier to understand for someone who has not participated in them in the first place. In a broader practice sense, a better understanding of the ontological and epistemic choreographies of archaeological – and in general, scientific and scholarly – work can help to unpack and describe its inputs and outputs, what it achieves, and how it is achieved in space-time. In very practical terms, inscribing both types of choreographies can provide means to richer documentation of how archaeological fieldwork and other types of scientific, scholarly, and professional activities are conducted. Besides a better understanding of the work done, these descriptions can facilitate the use and understanding of its results and outcomes, including interpretations, information, and, for instance, research data. In developing ways how to do it in practice, it could be undoubtedly helpful to seek parallels in how choreographies have been used in both metaphorical across disciplines but probably, even more so, in a practical sense in theatre and dance. In comparison to the description of methods, tools and actors involved in information making, as discussed in the earlier literature (e.g. Coeckelbergh, 2019; Cussins, 1998; Vermeulen, 2018), choreographies can facilitate the description of physical movements, embodiment, practice and skills, sequences, and rules the information making entails as a social activity in archaeology but also in other parallel contexts involving complex social, physical, and intellectual information practices.

5 Conclusion

This article has inquired into how a better understanding of the choreographies of archaeological fieldwork can enhance the understanding of how archaeologists do their work in the field. Beyond archaeological fieldwork, the discussion points further to how the concepts of choreography, choreograph, and choreographing can be used to render visible the otherwise difficult to grasp physical and mental movements that make up multi-actor scholarly and professional work also in other comparable contexts. What is proposed is that following and documenting choreographies – in metaphorical but especially in a literal sense – could provide a way to understand what archaeologists are doing and how archaeology is achieved. This could be obviously extended further to explicating, describing, and inscribing other types of practices and their outcomes. More specifically, this study has explored how a better understanding of the *epistemic choreographies* of archaeological – and in broader terms, of any scientific, scholarly, professional or leisurely – work can help to unpack and describe its inputs and outputs, what it achieves, and how it is made in the longue durée and vaste ampleur of its space-time. Together with ontological choreographies that account for moves that bring different ontological orders together, epistemic choreographies open up as a way to document how archaeological information and knowledge come into being – what moves are necessary to make the archaeological stratum informative of the past human activities.

Acknowledgements: The authors would like to thank the director and the participants of the excavation for welcoming the first author to join the team and to observe their work for the duration of the excavation. A preliminary outline of the main ideas of this text was presented in an oral presentation at the 4S/EASST 2020 meeting written and prepared together with Dr. Lisa Börjesson. We would also like to thank Dr. Börjesson for invaluable comments on the present manuscript. The work has also benefited of the discussions at different events organised by the COST Action ARKWORK, supported by COST (European Cooperation in Science and Technology).

Funding information: This work has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme grant agreement No. 818210 as a part of the project CApturing Paradata for documenTing data creation and Use for the REsearch of the future (CAPTURE) and from the Swedish Research Council under the Grant 340-2012-5751.

Author contributions: Huvila conducted data collection and analysis, participated in conceptualising of the study and drafted the article. Sköld participated in conceptualising and writing the article. The authors have accepted responsibility for the entire content of this manuscript, and approved its submission.

Conflict of interest: Authors state no conflict of interest.

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