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Original Study

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Archaeological Knowledge Production and Global Communities: Boundaries and Structure of the Field

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Abstract: Archaeology and material cultural heritage enjoys a particular status as a form of heritage that, capturing the public imagination, has become the locus for the expression and negotiation of regional, national, and intra-national cultural identities. One important question is: why and how do contemporary people engage with archaeological heritage objects, artefacts, information or knowledge outside the realm of an professional, academically-based archaeology? This question is investigated here from the perspective of theoretical considerations based on Yuri Lotman's semiosphere theory, which helps to describe the connections between the centre and peripheries of professional archaeology as sign structures. The centre may be defined according to prevalent scientific paradigms, while periphery in the space of creolisation in which, through interactions with other culturally more distant sign structures, archaeology-related non-professional communities emerge. On the basis of these considerations, we use collocation analysis on representative English language corpora to outline the structure of the field of archaeology-related non-professional communities, identify salient creolised peripheral spaces and archaeology-related practices, and develop a framework for further investigation of archaeological knowledge production and reuse in the context of global archaeology.

Keywords: archaeology-related communities; semiosphere theory; Yuri Lotman; digital heritage; non-professional archaeology.

1 Introduction

The proliferation of Information and Communication Technologies (ICT) has created new practical opportunities for improvement in many fields, but, more importantly, it has caused major changes in how society functions (e.g., Castells, 2000). It has affected economic, political and cultural processes on a global

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scale and contributed to the emergence of sociocultural effects, which researchers and opinion leaders have described using metaphors such as the “flattening of society” (Friedman, 2005), the world turning into a “global village” (McLuhan, 1962), “liquid modernity” (Bauman, 2000), “the inevitability” the social impact of technology (Kelly, 2016), or an “overheated world” (Eriksen, 2018).

In this context, heritage, “a mode of cultural production in the present that has recourse to the past” (Kirshenblatt-Gimblett, 1995), becomes a contemporaneous phenomenon. The line between heritage (which, more generally, can be said to belong to the past, represent past culture, or exist as a source of historical knowledge) and contemporary culture becomes blurred. Heritage essentially becomes present (Harvey, 2001) – an instrument for contemporary culture, education, the entertainment industry, social identity construction, political communication, and personal inspiration among other things. The efficacy of its communicative function depends not only on individual factors such as the use or non-use of ICT, but on the totality of the features of the changed, digitised society (the network society), and on the personal and collective behaviours of contemporary, networked individuals in this evolving context.

Archaeological and material cultural heritage enjoys a particular status as a form of heritage that, capturing the public imagination, has become the locus for the expression and negotiation of regional, national and intra-national cultural identities (e.g., Lähdesmäki, 2014), for public policy regarding the preservation and management of cultural resources, and for education, tourism, leisure and well-being (e.g., Cleere, 2005; Smith & Waterton, 2009). The rise of public (Merriman, 2004) and community archaeology (Atalay, 2012), the epistemic diversity of archaeological modes of knowledge production, and the rising impact of ICT and digital media within archaeological public communication define new possibilities for the social construction of archaeological meaning (Dallas, 2007). The material presence of tangible objects and structures in the landscape, the range of archaeological collections held by museums, the monumentality of major archaeological sites, and the popular interest in the material past are only a few reasons why archaeology has so often become a lynchpin in discussions on how emerging digital technologies and digitisation can be leveraged for societal benefit. This is especially pertinent at the moment, when nations are making considerable investments in creating technologies, infrastructures and standards for digitisation, preservation and dissemination of archaeological knowledge. In this context when archaeological knowledge can be an important factor in overcoming contemporary societal challenges, knowledge of how it comes into being is crucial for an effective use of digital technologies in research, conservation and protection of archaeological heritage, or cultural resource and land management. More broadly, it is also significant for economic growth and social cohesion, the shaping and negotiation between national, infra- and trans-national cultural identities, public interpretation, formal education, informal learning, development of technologies for managing and communicating archaeological heritage, and cultural tourism and leisure, to name a few examples.

Aiming to contribute to understanding the societal role of archaeological knowledge and practices, our work has been conducted as part of the activities of Working Group 3, “Archaeology and global communities” of *ARKWORK – Archaeological practices and knowledge work in the digital environment*, a COST Action¹ tasked with “bring[ing] together and develop[ing] the current state-of-the-art on the global communities as producers and users in archaeological knowledge production” (ARKWORK, 2016). This article focuses on tracing how archaeological knowledge and practices are enacted by archaeology-related non-professional communities, and on explicating how these communities interact with ICT interfaces and resources to support their relationships with archaeology. “Archaeology-related” (Huvila & Huggett, 2108) most broadly means all possible public interests and relationships to archaeology (immovable objects, artefacts and ecofacts, data, information, knowledge, education, archaeology-connected traditions, practices and another possible intangible objects or things). There are people whose material interests are affected by archaeology (e.g., landowners with archaeological sites on their property), or whose contemporary identity and life is entangled with the meaning of archaeological entities (e.g., members of indigenous and descendant communities). These individuals and groups do not normally describe themselves as “intentionally interested” in archaeology, as they do not see archaeological materials and heritage, at least

1 <http://www.arkwork.eu>

primarily, from an archaeological disciplinary perspective. In other cases (e.g., tour operators who work with archaeological tourism, or publishers), people are related to archaeology because their work draws on its conduct and outcomes. “Non-professional” in this article identifies people who regularly or occasionally organise or engage in an archaeology-oriented activity without having acquired an academic education, training or formal certification in archaeology, and whose day job is not in professional archaeology.² However, these people are involved in archaeology-related activities for exploring personal interests and could be professionals in another fields (e.g. in the creative industries, tourism, or school education). “Communities” identifies the institutionalised and not institutionalised, virtual or “real”, and all other possible groups of people with a common relationship to archaeology.

The objectives of this article are, firstly, to delineate and systematise the structure of the field of archaeology-related non-professional communities, and, secondly, to develop a theoretical and methodological framework for further investigation of archaeological knowledge production and reuse in the context of global, archaeology-related non-professional communities. The following sections present, in turn, the methodological framework of this study based on corpus-based linguistics, our collocation analysis of the term “archaeology” in a large corpus of English, Yuri Lotman’s semiosphere theory, and its application for the construction and refinement of a model of the structure of the field of archaeology-related non-professional communities validated by the results of the collocation analysis. In conclusion, we assess the implications of our findings for scholarly knowledge and professional practice. Finally, we point to further research initiatives within ARKWORK WG3 which take forward the work presented in this paper.

To date, scholarly studies of archaeology-related non-professional communities have been performed in the contexts of public archaeology (Merriman, 2004), community archaeology (Atalay, 2012) and open archaeology. Researched communities of interest have included, among others, metal detecting groups (Thomas, 2012; Rasmussen, 2014), “avocational” archaeology enthusiasts (Henson, 2014), and digital volunteers who have chosen to engage with archaeology-related endeavours through crowdsourced initiatives (Bonacchi *et al.*, 2015; Seitsonen, 2017).

2 Collocation Analysis: “Archaeology” in the English Language Corpus

2.1 Methodological Approach

The application of corpus linguistics methods to the study of archaeology-related non-professional communities is based on Lotman’s cultural semiotic assumption concerning the relationship between culture as a structure of the semiosphere and its representational texts, as well as social and communicative functions of the text. The relation of text with cultural context may be of a metaphorical nature, when the text is perceived as a substitute for the whole context to which it is in some sense equivalent; or of metonymic nature, when the text represents the cultural context as a certain part standing for the whole (Lotman, 2001).

In the case of our empirical case study, online and printed texts are treated as possible metonymical representations of archaeology-related non-professional communities: instances of kinds of written text which, in Lotman’s terms, exist alongside visual or other textual structures representing archaeology-related non-professional communities (see Section 3 below). The main limitation of the collocation analysis method is its close connection with written texts. While textual culture has been closely related with the culture and worldview of industrial society, during the formation of the contemporary network society, the cultural centrality of textuality has been questioned. For example, certain studies have captured clear trends of the spread of visual culture and encouraging social networking developers to invest in strengthening the

² “Professional archaeology” identifies people who having acquired an academic education, training or formal certification in archaeology. It includes both scholarly archaeologists and commercial archaeologists.

technical possibilities of visual content sharing (Simo, 2014). Nevertheless, textual, discursive processes remain central in contemporary communication practice, and can be taken to be reliable indexes of cultural categorisation and meaning-making, provided that the corpus used is broad enough and representative of the phenomena under consideration.

The object of an empirical case study is collocation, defined as a manifestation of a syntagmatic lexical relation (Sinclair, 1991; Stubbs, 2001). Collocation analysis studies are distinguished by the use of statistical methods of textual analysis. However, from the point of view of a merely statistical approach (i.e., just looking at the frequency of words appearing together) a large number of potentially meaningless word combinations may appear in collocation. Therefore, another criterion, accounting for the grammatical structure of the expression, is necessary. Only words frequently used together while in a strong grammatical relationship are thus considered as collocates (Marcinkevičienė, 2010), while expressions where other words have a weaker grammatical relationship with “archaeology” are ignored. In the combinations we studied, the term “archaeology” is treated as a node, while related words under consideration are treated as collocates. The most commonly associated collocates are treated as collocations with the word “archaeology”.

The methodological approach that we used in this empirical case study is based on the creation of phrase dictionaries. Collocational strings were extracted from the four digitised English language corpora: Corpus of Contemporary American English (COCA, 520 million words, from 1990 to 2015), Global Web-Based English (GloWbE, 1.9 billion words, from 2012 to 2013), News on the Web (NOW, more than 5.04 billion words, from 2010 to 2018) and Wikipedia Corpus (1.9 billion words by 2014). The criterion for choosing English language corpora was the significance of English in global information production (Lobachev, 2008). The main criteria for choosing the specific corpora were their size (number of words in the corpus), currency (coverage of language use in the 21st century), and how well corpora represented textual practice on the Internet. We performed collocation string extraction using the online corpora and collocation analysis tools provided at Brigham Young University’s corpus.byu.edu website (Davies, 2016a). To account for the quantitative and content-related diversity of analysed corpora, the frequency of collocations was evaluated using the Mutual Information (MI) score method (Davies, 2016b), which is “expressed in terms of the relationship between the number of times when they are seen together as opposed to the number of times when they are seen separately in the corpus” (Gablasova et al., 2017, p. 160). The study analysed the words which, according to the frequency in a particular corpus, were among the 200 most popular collocates associated with the word “archaeology”. For Mutual Information analysis, collocations with a frequency lower than 10 were eliminated to avoid the MI giving false-positive results when the frequencies are very low.

We carried out further research in the following stages:

1. Extracting the most common collocates, likely to be associated with archaeology-related non-professional communities and not with professional archaeology. The purpose of this action was to select from a general, large-scale collocates array the candidate collocations commonly associated with the word “archaeology”, which are likely to be related not so much to academic archaeological content described in scholarly sources (e.g. Darvill, 2008), but rather to archaeological knowledge that different non-professional communities reuse. At this stage we also eliminated geographical and proper names collocates, and collocations with form-words.
2. Analysing the extracted candidate collocations context (concordances). This stage sought to eliminate the collocates of a weak or meaningless nature, which were unconnected in their own context with archaeological knowledge and/or with archaeology-related non-professional communities (e.g., the words “liturgy” and “archaeology” as collocates in a conjunction that does not imply a direct semantic relationship between the concepts: “30,000 slides for the study of art and architecture, archaeology, palaeography, liturgy, and history.”).
3. Classifying candidate collocations into semantic groups. Through the word “archaeology”, this stage sought to identify collocation presentation contexts in order to link semantically the extracted collocates into groups and identify the archaeology-related non-professional communities which create these contexts.

2.2 Identifying Archaeology-Related Non-Professional Communities

We selected a total of 800 potential collocate tokens (words) for this study. After eliminating potential collocates with a frequency lower than 10, some 596 tokens remained. After selecting collocates potentially connected with non-professional archaeology, and/or with archaeology-related non-professional communities, 121 tokens remained. Considering that a number of words repeated in different corpora, some 49 unique collocates with the word “archaeology”, and thus potentially related to archaeology-related non-professional communities, were finally identified. After analysing the collocation presentation contexts of these 37 unique collocates, we were able to group them into eight classes, each of which was defined by two main variables: the collocate recurrence rate and the MI score (Table 1).

Table 1: Collocations with the word “archaeology” in selected English language corpora.

Collocation group	Collocates	Predominant in corpora	Absent / non-predominant in corpora	Frequency (sum)	MI score (average)
Arts	architecture, art, literature, comics	GloWbE, 6/12	COCA, 0/12	1635	4,31
Identities	punk	GloWbE, 1/1	COCA, 0/1 News, 0/1 Wiki, 0/1	10	4,72
Museums	museum, collections, museology, curator, exhibition, experimental, cultural, exhibits, fascinating, heritage, sustainable	Wiki, 10/30	COCA, 4/30	4195	4,73
Native	aboriginal, Navajo indians, indigenous, decolonisation, racism	COCA, 5/7	GloWbE, 0/7	199	7,52
Amateurs	antiquity, artefact, numismatics, ruins, battlefield, photography, passion, miraculously	News, 7/16	COCA, 1/16	367	4,91
Tourism	adventure, discovery, tourism	News, 6/11	COCA, 0/11	452	4,02
Spiritual	religion, folklore, mythology	Wiki, 3/7	COCA, 0/7	183	4,38
Alternative ³	mormon	Wiki, 1/1	COCA, 0/1 News, 0/1 GloWbE, 0/1	22	4,10

It is reasonable to claim that extracted collocations classes are associated with different archaeology-related non-professional communities. The corpora we analysed cover colloquial rather than professional archaeological texts (news, Wikipedia, web-based language), which are associated more with communication streams about archaeology in non-professional contexts. We can assume, therefore, these streams to be, at least to a certain extent, associated with (primarily) non-professional communities of some kind.

The analytic variables (collocate recurrence rate, and MI score) act as markers of the two important communication features of these collocations (and, hypothetically communities related with them): communication frequency, and intensity in the overall communication stream. According to the frequency

³ In spiritual archaeology, knowledge/objects are used as sources for different (here, religious) identities and inspirations. In the case of alternative archaeology, a system of belief outside the scientific paradigm (including religion) forms the background for scholarly-like interpretation of archaeological knowledge; we follow Shadla-Hall (2014) in adopting the descriptive term “alternative archaeologies” rather than value-laden terms such as fantastic, fringe, cult, lunatic, or pseudo-scientific archaeology (cf. Hansson, 2008).

of communication, the most common collocations with the word “archaeology” are with the “arts” and “museums” collocation groups, but, perhaps not surprisingly in the contemporary cultural context, the most intensely communicative collocation of the word “archaeology” is with the “native” collocation group.

We also note another feature of collocations: the relationship of different intensities between the word “archaeology” and the related collocates. Based on Göran Kjellmer’s (1991) three-steps classification, we can distinguish fossilised phrases, semi-fossilised phrases and variable phrases. In the case of fossilised phrases, one element of a phrase will suggest the other with great consistency, the word combination in collocation is very strong, established, and operates in both directions. Variable phrases, however, consist of independent words for which word combination is not very strong; one of the words in a sequence might be said to predict the other, but “prediction” will have to be interpreted more loosely. And in semi-fossilised phrases one word predicts a very limited number of words (Kjellmer, 1991; Marcinkevičienė, 2010). Fossilised phrases can be easily distinguished in text without the use of a complex scientific method (essentially *de visu*). Meanwhile, variable phrases are not noticeable in the text without studying their use frequency. In our study, we can use this classification to assess the degree of social establishment of the collocation associated with the word “archaeology” (and perhaps hypothetically related with an archaeology-related non-professional community), defining how profoundly and clearly this community is identified by other members of society. We could classify such phrases as “museum of archaeology” or “archaeological heritage” as fossilised, while “punk archaeology” could be classified as variable.

3 Archaeology-Related Non-Professional Communities as Semiospheres

To identify boundaries and define an outline structure of archaeological knowledge production among archaeology-related, non-professional global communities we draw from semiosphere theory, originally developed by Yuri Lotman (1922–1993), the leading figure of the school of semiotics associated with the University of Tartu, Estonia (Lotman, 2001; Kull, 2011, 2014). Lotman’s model is introduced here as a basis for the theoretical elaboration of the structures and relationships connecting professional archaeology and archaeology-related non-professional communities. Applying semiosphere theory as the theoretical framework for this research allows us to capture salient dimensions of the use and reuse of archaeological knowledge in archaeology-related non-professional communities, hinging on the communication process (with specific sources, channels, destinations, information needs, “reading”, interpretations, noises) as theorised by the semiotics approach in communication theory.

Lotman defines the semiosphere as a spatial mechanism, the primary functions of which are used to communicate existing information, to generate new information, and to preserve information. In this sense, the semiosphere may be conceived as a global semiotic system that integrates all possible signs, texts, interpretations, symbols, information, knowledge, representations and their relationships, including their interaction with the non-semiotic elements from outside of the semiosphere (and functioning, thus, as an open system). The emergence of the concept of the semiosphere was prompted by the understanding that the starting point of any communication system is not a separate and isolated sign, but a semiotic space (i.e., a semiosphere) which affords a communication interface between at least two signs (Lotman, 2005). In this sense, only thanks to semiosphere is communicative interaction between sender – message – channel – recipient possible, as sender and recipient can communicate only if they share certain cultural experiences: in other words, they must inhabit the same semiosphere, or be competent in the “language” of the bordering area surrounding a semiosphere).

In this light, we can conceive contemporary archaeological professional activity as a semiosphere structure situated in the context of a specific contemporary culture, as open and constantly changing, but also as coherent and systematic. This semiosphere structure interacts dialogically with other contemporaneous sign structures: for example, with other scholarly activities and disciplines, as in the interaction between archaeology and physical chemistry in radiocarbon dating, and, also, with fragments of past semiotic structures, such as when interpreting the meaning and function of artefacts of past cultures.

The archaeological semiosphere, like any other sign structure, consists of a centre and peripheries. From an epistemic point of view, its centre may be defined by canonical scientific paradigms, such as post-processual archaeology, prevailing within a given period. Such emerging canonical paradigms may displace previously dominant scientific paradigms, theories and methodologies (such as processual archaeology, in this case) to the periphery of the archaeological semiosphere. Periphery is not meant here at all as a theory dump. It is, rather, the creolisation space in which, usually through interactions with other disciplines, new paradigms appear: for example, the digital archaeology paradigm, formed through the interaction of archaeology and computer science, where some of the ideas and discursive structures of processual archaeology have been formative. The new paradigms, created in the creolised periphery, might migrate to a newly-formed centre, and thus become canonised and dominant in the future.

Another important aspect of the archaeological periphery consists in the interconnections and creolisation of professional archaeology with other, culturally more distant sign structures which lie outside the realm of scholarly knowledge (e.g., in the domain of the arts, entertainment, religion, or business), on the basis of which various archaeology-related non-professional communities can emerge. These non-professional communities can be either institutionalised or non-institutionalised, may operate in the virtual or physical realm, and can consist of any people with an interest in archaeology. Non-professional communities may have all kinds of possible public interest in professional archaeology (i.e., in heritage assets, artefacts and ecofacts, data, information, knowledge, or archaeological research practices) and, on the basis of this, may use their own signs and codes to create their own texts as messages, ranging from public communication of scholarly archaeological knowledge and archaeological education to *belles lettres*, artistic, advertising, political or even alternative archaeology meaning production.

Interestingly enough, these aforementioned creolisation processes differ with regard to text comprehension, or language in a broad sense. Lotman (2005) suggests that for “our own” and a “foreign” semiosphere structure to interact, there must be a blurred boundary between the two semiosphere structures, which usually takes the form of inhabitants of one (internal) structure “learning” the language of another (external) structure. In this way, archaeological creolisation with other culturally distant (non-professional) sign structures takes place when people inhabiting those structures learn the language of archaeologists. Archaeology acts as an external structure from the viewpoint of these non-professional archaeology-related semiosphere structures, which may be referred to as internal.

Thus, the existence of professional archaeology becomes a catalyst, and learning the language of archaeologists an enabler, empowering the members of these non-professional communities to use and reuse archaeological data, information and knowledge, and to create new archaeology-based information and knowledge. This process is conditioned by the knowledge-related needs, motives, goals and aspirations of each specific community (e.g., for learning, identity formation, social capital, entertainment, creativity, branding).

4 An Outline Model of Archaeological Knowledge Production and Reuse by Non-Professional Communities

Our outline model of archaeological knowledge production and reuse in the context of global, archaeology-related non-professional communities (Table 2) is based on Lotman’s concept of creolised peripheral spaces, and substantiated by the findings of collocation analysis on selected English language corpora, and analysis of additional documents and scholarly literature

Archaeology as a discipline (including scholarly archaeological data, information and knowledge; archaeological intangible and tangible immovable monuments and movable assets, archaeological methods and practices and also commercial applications) is connected with various fields of reality. On the borders between professional archaeology and these fields of reality, culturally creolised peripheral spaces take shape, where archaeological data, information, knowledge and heritage are used and reused in the process of creating new objects of reality. In the context of archaeological knowledge production, global communities, and pertinent theoretical considerations, we could describe this process as a process of archaeological “knowledge creolisation” between archaeology and “outside-archaeology” disciplines.

Table 2: Knowledge creolisation at the periphery of professional archaeology.

Creolised peripheral space	External domain connected to archaeology	Themes and points of interest	Examples	Key studies
Archaeology in arts and design	Arts, design, architecture, literature, comics, video games, films and other creative industries	Inspirations and/or (dis) advantages of making reference to archaeology in contemporary creative production	Fiction, <i>belles lettres</i> (Christie, 1936); cinema (Vikings, 2013); arts (Van Eyck, 2017); architecture (Souza, 2010)	Holtorf, 2005; Clack & Brittain, 2007
Archaeology in travel and tourism	Travel industry and tourism	Using archaeology for leisure and recreation; impact of archaeology and heritage management on tourism (e.g. World Heritage tourism, archaeological sites as added value to hospitality and tourism marketing; challenges between thematisation and cultural enhancement).	Archaeological monuments as tourist attractions (Lisbon..., 2018; Acropolis..., 2018; Cave..., 2018)	Ross et al., 2017; Barranha et al., 2017
Archaeology in branding	Business and marketing	Using references of archaeology in building brand identity and marketing communication, including advertising; impact of archaeology on building business sector, brand statements, destination brands.	Supermarket (Akropolis..., 2018); business company (StoneAge..., 2018)	Holtorf, 2007; Hayward & Kuwahara, 2014; Foxell & Trafford, 2010; Poor & Snowball, 2010; White et al., 2016; Adie et al., 2017; Hosany et al., 2006
Archaeology and crime	Organised crime	Illegal trade of archaeological artefacts, looting, unauthorised excavations, including underwater ‘treasure hunting’, illegal metal detecting, falsifications, fakes and forgeries, academic complicity in supporting the illicit trade in antiquities, deliberate destruction of archaeological heritage.	Illegal trade of archaeological artefacts by ISIS (Pauwels, 2015); Purchase of unprovenanced antiquities by museums (Brodie et al., 2009)	Grove & Thomas, 2014; Kerr, 2017; Raja, 2017; Brodie, 2011
Archaeology and identity work	Indigenous cultures, postcolonial discourses, religious communities, ethnic communities, contemporary subcultures related to nationalist/romantic ideologies and ideas, and new spiritual movements	Role of archaeological remains (as “identity building blocks”) in the construction and support of cultural, national, regional or local self-awareness, identity and alterity negotiation and contestation, and impact on identity-related cultural policies	Indigenous archaeology (Bruchac et al., 2016); neo-paganism and archaeology (Rountree, 2014); punk archaeology (Richardson, 2017)	Matten, 2012; Castells, 2009; González, 2008; Pezzini, 2013

Creolised peripheral space	External domain connected to archaeology	Themes and points of interest	Examples	Key studies
Alternative archaeologies	Astrology, parapsychology, alien influence on Earth movements, religious text accounts of archaeology	Statements, interpretations of the past and/or practices from outside of the discipline of archaeology that lay claim to truth but do not adhere to disciplinary norms of reliance on empirical evidence, prior scholarly knowledge, use of research methods, and rational argumentation	Bosnian pyramids (The Archaeological..., 2018; Harding 2006); Latter Day Saints (Mormon) archaeology (Nutscholls, 2008)	Hanson, 2008; Holtorf, 2005; Fagan & Feder, 2006; Williams, 1987
Archaeological museums and heritage agencies	Museums and galleries, heritage attractions, museology, heritage studies, communication and information studies, heritage conservation	Institutions, processes and methods of appraisal, acquisition, collections care and management, documentation, study, communication and public interpretation of the archaeological heritage	ICOM ICOMAH (ICOM-ICMAH, 2018); ICOMOS ICAHM (ICOMOS, 2018)	Pearce, 1990; Skeates, 2017; Sebastian & Lipe, 2010
Amateur archaeology	Personal leisure, personal hobbies, volunteering, history hobbyists, metal detectorists	Unpaid, often untrained, communities of interest engaged working with culturally significant tangible and intangible archaeological objects in a long-term perspective; registered archaeological artifact collectors and metal detectorists.	The British Numismatic Society (The British..., 2018); Great Excavations: Volunteering on Archaeological Sites Worldwide (Great..., 2018); ICOM COMCOL (ICOM-COMCOL, 2018)	Roued-Cunliffe, 2017; Koskinen-Koivisto & Thomas, 2016
Archaeology in education	Formal and informal education and training	Non academic (“outside of Universities”) learning of knowledge, skills and competencies in archaeology, including training programmes for touristic workers (guides), amateurs. lifelong education and school pupils’ education.	Scotland’s Rural Past project (Scotland’s..., 2018); Adopt-a-Monument (Adopt..., 2018)	Soininen, 2017
Archaeology and public policy	Government, public administration and management	Forms and debates of public policy, public administration and management, based on or connected to archaeological heritage, artefacts or knowledge, including policies, procedures and decisions on Intellectual Property Rights, archaeological heritage protection, administration and Cultural Resource Management, museum archaeology, and archaeological tourism.	The National Planning Policy Framework (Cowell, 2013)	Brown, 2005; Lowenthal, 2005

5 Discussion and Further Work

The English language corpus analysis of collocates connected to the word “archaeology” allowed us to identify a number of potential creolised spaces between professional archaeology and other cultural domains of reality, all viewed as semiospheres, and, in this way to outline a conceptual landscape of potential archaeology-related non-professional communities. The boundaries of these communities are relative to one another and non-exclusive: for instance, travel and tourism intersects with branding, destruction of heritage at times of conflict relates to both crime and identities, and the group associated with the notion of identities intersects at several points with museums, and with alternative archaeology. Semiosphere theory affords us with a theoretical basis to chart the differences between these communities, and to develop methodological instruments for further research.

An interpretive approach aimed towards deeper understanding of specifics and differences in use and reuse of archaeological knowledge by these archaeology-related non-professional communities may be developed on the basis of theoretical models concerning the cycle of information and knowledge management (Choo, 2002; Evans et al., 2014). It may be argued, in fact, that creolised peripheral spaces mainly differ, and are defined by, participant information and/or knowledge needs (e.g., archaeological evidence as inspiration for creative work in the arts, or as an “identity building block” in identity practices). Connections between environmental challenges and information and knowledge needs of particular communities, whereby “organization members recognise the volatility of the environment and seek information about its salient features in order to make sense of the situation, and to have the necessary information to take decision and solve problems” (Choo, 2002) is a crucial factor in determining how archaeological data is used and reused, and how new kinds of archaeology-related knowledge production emerge from members of these non-professional communities. Knowledge work could thus be described as a cycle of identification, storage, sharing, using, learning, improving and creating new information or knowledge within (and by members of) specific archaeology-related non-professional communities, which differs from what is created by professional communities. While, from the point of view of semiosphere theory, knowledge production in professional archaeological communities depends on professional archaeological practices situated at the relative centre of professional archaeology as defined by canonical scholarly paradigms (e.g., post-processual archaeology), knowledge and information creation in non-professional communities does not necessarily refer to similar practices but rather to *strictu sensu* non-archaeological “requests for knowledge” (e.g., related to identity construction, entertainment, creative inspiration, or branding) connected with ideas, theoretical considerations, and paradigms outside of professional archaeology.

Collocation analysis and conceptual modelling of knowledge creolisation related to the use of archaeology among non-professional communities, and the scoping of scholarly work addressing particular themes within the thematic categories identified through an informal scoping study (Table 1), provide a background for further research. A twofold research activity is currently underway within ARKWORK, to identify and analyse publications on the boundary between the archaeological semiosphere and social media communication and interaction. Firstly, a systematic literature review has been conducted on publications dealing with archaeology-related social network sites (Boyd & Ellison, 2007; Kaplan & Heinlein, 2012). Initial analysis indicates that the greatest interest within scholarly work on archaeological social media is on archaeological blogging and open publication using online platforms, and in the use of Twitter which functions both as a social networking platform and as a microblogging platform, while only some publications address aspects of identity work, social capital, community affiliation and meaningful engagement with archaeological objects and evidence (Dallas & Kelpšienė, 2017, 2018). Secondly, a qualitative study of the practices, attitudes and beliefs of a dozen administrators of archaeology-related Facebook sites from different European countries is being conducted, based on qualitative data analysis, conceptual mapping and interpretation scoping interviews and focus group conversations, and aiming at identifying key roles, processes and activities, motivations, goals, digital affordances, and engagement with archaeological entities and digital information objects involved in the life of archaeology-related Facebook pages and groups. Preliminary findings show how pervasive digital infrastructures such as Facebook accentuate phenomena of multiple creolisation

involving at the same time more than two semiospheres: for example, testimonies which intermingle traits of the scholarly language of archaeology, the affective language of volunteering and public contribution akin to amateur work, the language typical of brand-making and marketing, and that of policy on archaeological heritage protection (Dallas & Kelpšienė, forthcoming).

The boundaries and systematic structure of archaeology-related non-professional communities could be better understood by implementing additional bibliographic studies (e.g., literature reviews), qualitative research (e.g., participant observation, interviewing, focus groups), document analysis (e.g., analysis of academic curricula) and/or as a part of comparative studies with other research areas (e.g., Marx et al., 2017). Expanding on the work on archaeology and social media mentioned above, several teams of ARKWORK WG3 members are currently planning to conduct qualitative interviewing and focus group studies on archaeological communities and semiosphere structures spanning the boundaries between professional and non-professional archaeology, such as metal detectorists engaged with archaeological heritage, archaeology in country branding, marketing and experience of tourists in archaeological site museums, archaeological museum visitor photography, archaeology and the nation, contract archaeology and CRM, and the activity of city archaeology.

In tandem with such evidence-based scoping studies of creolised peripheral spaces to professional archaeology, further work may focus on the development of a robust shared formal specification of a conceptualisation, i.e., an ontology (Guarino et al., 2009), amenable to representing adequately archaeological knowledge work outside of archaeology and involving archaeology-related non-professional communities, as outlined in the present study. A potentially fruitful approach towards this goal may be to establish a conceptual domain model based on CIDOC CRM, an event-centric reference ontology for cultural information which “intends to provide a model of the intellectual structure of cultural documentation in logical terms[...] explains the logic of what they actually currently document, and thereby enables semantic interoperability[, and may] serve as a formal language for the identification of common information content in different data formats; in particular to support the implementation of automatic data transformation algorithms from local to global data structures without loss of meaning” (Boeuf et al., 2017). A CIDOC-CRM based model could be used for the dynamic conceptualisation of processes of use, reuse and creation of existing and new archaeological information and knowledge inside of each non-professional community by using standard ontology constructs typical of ontologies: classes, identified “a category of items that share one or more common traits serving as criteria to identify the items belonging to the class”, and properties, which “serve[s] to define a relationship of a specific kind between two classes” (Boeuf et al., 2017).

Even if such an ontological domain model might not be able to capture all salient aspects of dynamically changing and emerging forms of information and knowledge work among archaeology-related non-professional communities, the process of domain modelling by itself will be highly useful in elucidating and making explicit key characteristics of archaeology-related non-professional knowledge work, and will facilitate comparative analysis and elucidation of salient differences between information and knowledge work in different types of communities. We expect, nevertheless, that an event-centric domain model capable of representing the semiotic dimensions of knowledge and information interaction at the multiple, potentially overlapping, creolised peripheral spaces connecting professional archaeology with archaeology-related non-professional communities will provide a useful operational framework for the representation of qualitative evidence-based research on different practices outside professional archaeology, and for the elaboration and empirical validation of the outline model of archaeological knowledge production and reuse presented in this study.

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