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The Education of Little Archaeologist? Reflections on the Digital Education and Training of Archaeological Professionals

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Archaeology and computers have penetrated archaeological research and practice during the last two decennia. The current development in the state of the art of archaeological computing and its penetration into the practises of everyday archaeology is a matter of concern. The present paper discusses the problems and risks related to the current state of affairs in training and education of academics and professionals in digital methods, and presents some measures on how to counter the impending digital divide.

Introduction

The developments in archaeological computing during the past fifteen to twenty years have had an enormous effect on the every day practise of archaeology. Technological advancement has produced a spectrum of new tools and possibilities for documenting, analysing, storing and publishing archaeological materials, information and knowledge. Theoretical considerations on the effects of the emergence of the digital era have been somewhat more elusive, but have still emerged such concepts such as virtual archaeology [7], archaeological computing [6] and digital archaeology [5].

But where is the digital archaeology? In spite of the brave visions and attempts to bring the digital archaeology out of the closet to the bright sunlight of everyday archaeology, digital methods remain still very much within the confines of specialist circles. The annual Viennese workshops and the CAA conferences gather computing-oriented archaeologists and archaeology-oriented computing and information specialists together. Most of the participants remain the same however, year after year. Therefore it may be argued that digital archaeology exists within these small circles, but is only slowly penetrating the wider archaeological community outside.

The slow pace of adaptation is a consequence of multiple factors. The constituent role of education and training is, however, rather evident in the process of successful adaptation of new technologies and methods. The present paper discusses the emerging and potentially critical issue of the education of digital archaeology professionals. Computing skills are already not only an asset, but a necessity both for a competent practitioner and an academic researcher. The practice has, however, demonstrated that establishing appropriate curricula and training schemes for the archaeologists of the digital era is far from being a simple matter. The process of developing the curricula is not going to be a solemn enterprise comparable to the Education of Little Tree, but rather it risks providing the different groups of archaeologists with unequal opportunities, the problem of identifying the essential contents and context of learning, and indeed the problem of actuality and reality, which has been constituent in the (in)famous literary debate on the book [1][2].

Archaeological work in the digital era

The digital era has changed and is capable of changing archaeological work in a considerable manner. Even if the premises of archaeological thinking and the sense of purpose of archaeological work have escaped the direct influence of computerisation, the archaeological practise has evolved considerably after the introduction of first information systems and computer applications (ref. e.g. [6][8]).

Even though the basic manual skills of surveying and excavating are still valid in the present context, the level of required and potentially beneficial technical skills has raised substantially. The 19th century image of gentleman archaeologists in their white suits is equally outdated, as is the image of archaeology as a romantic profession, which combines scholarly pursuits and manual labour, but holds an adequate distance to anything which is too technical. And yet the first-hand observations made at the Department of Archaeology at the University of Turku indicate that alarmingly many of the first year undergraduate students cherish the idea of archaeology as a career, during which there is no need to know anything about the computers or new technology.

The complexity of archaeological practise has obviously increased. The new technical skills are required in addition to the basics of archaeological work and research. Beyond the scope of actually being able to master something, an archaeologist needs to have a broad knowledge of a broad range of techniques and technologies. The computerisation of the work procedures is penetrating the whole process of archaeological work from the preanalyses to the field work, post-excavation duties, reporting, preservation, maintenance and publication. The benefits become most apparent there where the traditional patterns of work are stretched to their limits and essentially moved beyond the traditional scope of archaeological interest. At the present archaeological research, administration and publication X increasingly the same skills in information management, natural sciences and digital media, to mention few, due to the broadening scope of archaeological work.

Archaeological computer literacy

An archaeologist can not escape computers any more. The constituency of 'computer literacy' [4, 102] grasps even the theory and practise of working with the past. Even though a computer would be considered to be a mere tool, the changes of work practises and opening of new approaches and possibilities profoundly does affects the understanding of archaeological work and its motivations. The difference is whether archaeology is discussed from the premises of computing or the computers from the premises of archaeology. The latter would likely be the choice of an archaeology professional and would help to achieve the state of affairs where the application of computers and the consequent changes are steered principally by archaeologists and archaeology. To be able to assume this preferred position, the archaeologist has to be familiar with the domain of computing. A 'digital archaeologist' needs to understand the potential benefits and drawbacks, limitations and premises of digitalisation before they can be applied to the archaeological practise.

In digital archaeology, there is high quality research and high quality practise. The problem with expertise is its uneven distribution. The benefits of digital archaeological research are rather far from being in the public domain of all archaeologists. They are confined within the walls of specialist research centres and the

property of the rather few experts working in the domain. According to a tentative survey, the outstanding majority of the academic staff working at the Nordic archaeology institutions seems not to be familiar with the state of art in digital archaeology, nor may be considered active in referring to the digital archaeological methods in their research or teaching. In short, digital archaeology has not penetrated to the academic establishment. In spite the arguably limited scope of digital archaeology, the use of computers and digital methods is penetrating the everyday practises of archaeology on a very profound level all over the developed world. Computers are used in everyday tasks, in documentation and multiple other tasks without any special scholarly consideration of the effects of computerisation.

The colloquial kind of computer use is not a flaw, but rather a symptom of the problems of setting out on the path of investigating and producing suitable solutions for everyday archaeological work. Far too often any projects discussing the use of „open source“ and developing sustainable applications for general use fail due to inadequate financing for finalising the products for public distribution, or to the level of complexity and customisation of configurations, which range from technical to the archaeological issues. When these issues are combined with the prevalence of factors such as the unavailability of resources for promoting change and potentially high costs, it is not surprising that the penetration of computer applications remains sporadic.

Availability of suitable solutions and the economic factors of commissioning their deployment are of consequence. Yet it is possible to argue that the constituent problems are ones of mediocre readiness for change and the often understandable doubts of the eventual benefits. The pressure and drive to computerise is low, because the benefits tend to remain obscure and abstract in the eyes of the practitioners who have never had the opportunity to acquiant themselves with the applications. Similarly, an academic archaeologist is hardly able to see a reason to go digital, if the awareness of available possibilities remains low.

Considering the present situation, it seems that a constituent issue of archaeological computing is to find a way to develop an understanding of the concept of computer literacy in the context of archaeology. Every archaeologists should possess a basic understanding and proficiency in regular computing routines, including the basic tasks, database concepts, digital imaging and mapping. Besides the basic skills, a broader understanding of the premises and implications of computerisation is needed to be able to evaluate and consider new emerging technologies, analysis methods and applications. In addition an archaeologist needs to be able to communicate with computer specialists and information specialists in the same way that it is necessary to be able to discuss with specialists in palaeobotany, dating methods or geology. The expected level of computer literacy for an archaeologist does not need to consist of a thorough technical competence in diverse applications such as computational statistics, GIS, CAD, database design, information management, programming or 3D modelling. A necessary level of competence would instead be a sustaining level of awareness of the current possibilities and the level of basic proficiency to be able to deepen the expertise according to any eventual needs.

Challenges of education and training

Archaeology risks facing a digital divide similar to that which has been observed on a societal level between the developed and the developing countries, and the computer literate and computer illiterate people around

the world [3][9, 81-92]. Like the information society level divide between the digital and not yet digital societies, the archaeological divide between 'digital archaeologists' and 'manual archaeologists' may lead to severe consequences. The competence of individual archaeologists is in risk of becoming highly unequal. The integrity of research processes and results may become compromised as well as the communication between the two different communities of archaeologists. As a result of the divide the emerging benefits of computerisation and digital archaeology may be lost altogether if the applications and adopted practises remain individual cases.

This gap, the digital divide is not unique. There are many other apparent gaps in the archaeological discourse. Cross-thematic discussions have been noted to be relatively scarce as has been the convergence between theoretical and practical orientations of archaeology and - to a degree - between academic and professional non-academic archaeology.

Bridging a gap, is a question of managing resources, but - even more than that - it is a question of communication, education and training. It is clear that the pace of change also make the life-long learning a highly relevant notion in the context of archaeology. A more than haphazard planning of continuing education is needed to maintain professionals and academics basic level of competence in the current state of affairs in digital archaeology.

Besides the organisation of continuing education, the problem of adequate education and training relates to the initial education of young undergraduate and graduate archaeologists. University curricula tend to consist of academic studies complemented with the basics of archaeological techniques and methods and a varying amount of obligatory practical training in various field projects within the university department or in some other organisation. The increasing complexity of archaeological methods and techniques is clearly a challenge to this traditional layout of studies. The need for specialist technical skills such as computing is increasing, but it is doubtful whether there will be room for the new topics. Another question is whether there could be enough expertise at one archaeology department to cover - for instance, the different aspects of archaeological computing.

Digital theory and educational practise

The critical challenges of digital archaeology seem to crystallise into two questions. How the new digital methods could applied better and faster to practical archaeological work, and how new methods could be taught to the present community of professional archaeologists and integrated in the education of the future generations. The questions are reflected here by referring to three examples of currently on-going e□orts of educating archaeologists and of the transfer of digital archaeological expertise.

Most archaeologists are interested in archaeological issues, not in computing. This is quite reasonable as the computer is merely a tool for the archaeologist, not a subject of primary interest. With this particular majority in mind, it is important to inform archaeologists and archaeology students of the current trends and the state of the art in digital archaeology. Individual lectures and short courses as a part of the regular curriculum aim towards this end. To catalyse the transfer of the awareness of usable methods, somewhat more indepth efforts are needed, however. Archaeology Department at the University of Turku is currently

involved in arranging a doctoral workshop under the auspices of the „Dialogues with the Past“, the Nordic Graduate in Archaeology [11], which aims to collect together a group of archaeology students with some preliminary interest in digital archaeology, and especially with research questions, which might benefit from the use of some digital archaeological method or approach. In the workshop, the students learn about the current state of the art in archaeological computing and get an opportunity to receive tutoring from the senior researchers and their peers. The workshop also serves an awareness raising function as the participants could be expected to report their experiences at their home departments and share their insights.

The short courses and workshops are sufficient for providing instrumental understanding of the digital archaeological methods and for keeping and raising general awareness of archaeological computing. Education of specialists requires different kinds of measures. The Marie Curie funded CHIRON project [10] provides research training fellowships for graduates wishing to start a research career in the field of IT applications for the research, conservation, and presentation of tangible cultural heritage. The fellowships last for one year. The basic idea is to employ and train a graduate at a prominent institution specialised in some aspects of research, conservation, and presentation of cultural heritage. The action exploits the possibilities offered by the existing centres of excellence and is likely to be an efficient way of educating future specialists in the area of cultural heritage informatics. The scope of the educational effort like CHIRON is, however, always somewhat limited. Such measures are indispensable, but call for complementary measures to attain wider influence within the community of professional archaeologists. In a typical situation without the special institutional support of a local centre of excellence, the excellence need to be gathered from different places to form a collaboration.

The authors of the present paper are involved in a combined research and educational collaboration with an aim of simultaneously producing leading edge innovations in digital archaeological simulation techniques, to document and publish new information on an archaeological site, to develop new work methods and techniques, and to educate future professionals within the confines of a closely integrated collaboration, which involves researchers and students from several universities and research institutions around southern Finland. The project „Through the Castle Gate A Simulation of the Medieval Environment and Its Change“ [12] combines education and academic research and practical archaeological work with an aim of contributing to everyday archaeology and the everyday skills and competence of the participants during their forthcoming professional career in digital archaeology, and in archaeology which will benefit from digital methods without being pronouncedly digital. „Through the Castle Gate“ is a multi disciplinary research project combining the latest achievements of the humanities, the natural sciences, the information sciences and teleinformatics. The project combines research results from history, archaeology and the natural sciences to produce simulated models of the Middle Ages. Research results from different science faculties are to be simulated within the framework of their historical context. The multivariate utilisation of the different source types will provide an excellent basis for the study and understanding of both long-term and short-term phenomena and processes.

Conclusions

It would be tempting to declare that digital archaeology has come to age. It would be tempting, but - as discussed - some rather definite measures are needed to make it a sustainable part of the archaeological mainstream. The approach assumed in the project „Through the Castle Gate“ is seen as an example of a complementary measure to achieve a critical level of penetration and diffusion of digital archaeological methods. Training networks, short courses and eventual establishment into the basic training and education is required for a practical level break-through of the methods. In this longer process of European and world-wide scale, e□orts like the EPOCH (Excellence in Processing Open Cultural Heritage) network of excellence [13] are needed to establish and nurture the infrastructures necessary for collaboration and cooperation in the field of digital heritage to emerge and thrive.

On a practical level, a variety of measures the understanding of the digital methods need to be communicated and distributed to the archaeological community in a manner, which penetrates to the practises of everyday archaeological work, not merely to the academic debate. At the same time it is important to tender the excellence in research and development even further. Considering both dimensions, the agenda should consist at least

- the integration of digital archaeological methods into the university curricula and individual courses
- ensuring the existence of mechanisms to provide continuing education for professional archaeologists
- measures for enhancing convergence between the academic archaeological research and professional practise
- the active promotion of increased awareness of the state of the art in digital archaeology among the professionals, undergraduate and graduate students
- educational curricula and training for future digital archaeology specialists
- the development of collaborations bringing a diversity of relevant specialists and students together for working on combined research, development and educational efforts anchored both to the scholarly and professional scopes of interest.

Altogether it would be preferable if the education of a 'little archaeologists' could resemble the virtues of the education of Little Tree and avoid the impending political and cultural controversies in the process. The education of digital archaeology may turn out to be a project of possibly pious motives, but eventually of biased outcome. It is important to consider the education and training in their correct order, but also to recognise the existence of controversial debates. The political nature of computerisation, archaeological research and education, and the differently perceived priorities make the discourse on digital archaeology and digital archaeological education an arduous, but critical enterprise.

References

[1] Forrest Carter. The Education of Little Tree. Rider, London, 1991.

[2] Clayton M. Darwin. □now, this is a true story. ERIC, ERIC ID ED408117, 1995.

[3] Jan A. G. M. Van Dijk. The Deepening Divide: Inequality in the Information Society. Sage, Thousand Oaks, CA, 2005.

[4] Tom W. Goad. Information Literacy and Workplace Performance. Quorum, Westport, CT, 2002.

[5] William Kilbride. Digital data and digital archaeology: Needle 1 haystack 0 . The Archaeologist, 38:21□22, 2000.

[6] Gary Lock. Using Computers in Archaeology: Towards Virtual Pasts. Routledge, 2003.

[7] P. Reilly. Towards a virtual archaeology. In CAA90 Proceedings of the 18th conference, Southampton, UK, March 1990. Tempus Reparatum, 1991.
[8] Julian Richards. Information technology in the Humanities, chapter Archaeologists and the Computer, pages 159-169. Ellis Horwood / Halstead Press / John Wiley & Sons, Chichester - New York, 1987.
[9] Rob Shields. The Virtual. Routledge, 2003.
[10] Chiron - cultural heritage informatics research oriented network: http://www.chiron-training.net/, 13.1.2006.
[11] Dialogues with the past: http://www.dialpast.dk/, 13.1.2006.
[12] Läpi linnanportin - hämeen linnan mallinnettu menneisyys: http://www.hum.utu.fi/arkeologia/suvi/lapilinnanportin/, 13.1.2006.
[13] Epoch - what is epoch?: http://www.chiron-training.net/, 16.1.2006.