Easy Recording System: Solutions Based on Web Free Apps Databases

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Abstract:
Modern recording systems should be tailored to individual needs and standards. This solution is based on a single stratigraphic unit recording system linked to external data. In 2010 we worked with this simple yet powerful system for recording and organizing information on excavations in Gdańsk. The system is based upon publicly available web-based FreeApps distributed by Zoho with the possibility to include attachments in any format to database records and to store all data on web servers. The application reduced the time to prepare a draft system by several hours. In this article we present the system configuration, modifications and field experience in the recording of data and creating reports. This web-based system supports multiple hardware platforms including the iPads. We propose to integrate all data sources such as text, images, maps, plans, and even video records into one interactive online information solution for a better control and collaboration on archaeological projects.

Key Words: *Fieldwork Techniques, Archaeology Online, Documentation and Recording, Web Apps, Management in Archeology, Data Distribution*

Introduction

Methodological discussion on conducting a proper stratigraphic documentation has been an important methodological issue since Sir E. C. Harris published his rudiments of a model of stratigraphic presentation in archaeology in 1979. The system of stratigraphic exploration recorded using the Harris matrix has been considered by archaeologists as universal and correct. Each archaeological site is a unique relic of human activity and it may be graphically represented with mutual temporal relations between its particular stratigraphic contexts (Harris 1992). This can be done in various forms of two-dimensional and spatial visualizations (Bobowski 2007; Day et al. 2007). Positive layers (deposits of anthropogenic activity which raise the ground level by means of accumulation or leveling) occur most frequently at archaeological sites. Such layers are supplemented by standing features, e.g. walls, timber contexts, or structural contexts

(e.g. pavement surfaces). A particular form of stratigraphic contexts are remains of human activity related to a subsidence of terrain or negative contexts (feature cuts). Properly prepared field documentation results in a comprehensive description of all recorded stratigraphic contexts in textual, graphic and photographic forms. Availability of digital recording tools offers an opportunity to carry out independent documentation within the framework of a defined field standard by many researchers at the same time. A large amount of data (e.g. photos made by various cameras, reports prepared by several people on independent computers, digitalizing of data from stratigraphic context descriptive recording sheets, digitalizing of drawing documentation or gathering of digital plans from various recording devices) leads to a data chaos for the team which prepares an excavation report. Introduction of computers into field sites only apparently improved the opportunity to select and analyze basic data

which are recorded at the archeological site. A development of computer documentation systems resulted in the creation of several good solutions, like ArcheoData (arctron.com/Software/ArchaeoDATA), Intrasis (intrasis.com/engelska/index_eng.htm) or the ARK Internet project (ark.lparchaeology.com). In practical terms, archaeologists do not commonly use dedicated documentation systems for a prosaic reason i.e. their commercial nature. The main deficiency of commercial systems is their overlay nature as applications which run in larger CAD or GIS environments. The open-source ARK – Archaeological Recording Kit is an interesting project. This is a non-commercial application and it enables one to carry out most documentation activities which are available in commercial systems. The server-based nature of the application provides an opportunity to work with several people in a group, without the need to exchange data between particular workstations (personal computers). The system configuration by archaeologists with no experience in computer applications seems problematic. Upon observing the work of my colleagues, I have noticed their reluctance to introduce changes in the way of organizing of digital documentation. I have chosen the simplest program solution which is available online. As the Polish proverb says, it is good to be a carter on a straight road.

Solution

The objective of modernizing the work with computers during our field research was to build a simple documentation system which works as it should do i.e. in a simple and trouble-free manner. "Simple" means that it can be used by any person who knows how to use office applications or the Internet. "Trouble-free" means that it must be an application which does not require installation and which works independently on the local computer terminal (a server system which is available online). I have chosen a universal shareware solution which is available online – the Zoho Creator

application (www.creator.zoho.com). The Zoho service is one of the larger providers of online applications (partially shareware ones) on the Internet. Group work on documents in Web Apps is organized in a perfect way – changes made by users are displayed in real time and several people can work on one text file or presentation. The Zoho product proved to be competitive within the Internet sector. At the time of launching it turned out to be better as it had a fairly good datahbase application. It enabled users to store files in all formats as attachments to particular database records. It also provides an opportunity to export data into formats which are accepted in traditional office applications operating on installed versions of particular computers. The Zoho Creator solution turned out to be an ideal tool for organizing data included in single context sheets, storing files (graphic, text, vector or video files) as attachments to database records, as well as for online control of the progress of work during the course of excavations.

Tool Design

The database project implied the application of a questionnaire describing the features of stratigraphic contexts, based upon the solution that was first presented in 1980 by the Museum of London. The context recording sheets system describes features of unique human activity in the past (MOLAS 1994). A minimum of information concerning a single context should contain (Barker 1994):

- context type,
- site code,
- context number,
- grid & square location,
- stratigraphic location,
- description of context,
- references to finds,
- references to photos, drawings, plans,

- interpretation,
- opinion.

Descriptive sheets are a perfect tool for computer analyses and data management. Typical online applications are not popular yet, apart from the aforementioned ARK project. A creation of a universal scheme for a new database, which would allow for information on all categories of attributes of archaeological contexts can be considered as an impossible task at this stage of the designing of a database. Practically, the simple and easily configurable Zoho Creator online database enabled us to edit the list of features of the questionnaire (context sheet) and to supplement the existing scheme with new attributes which occurred in the course of preparing the field documentation. All this was possible without a need to employ a programmer. Assuming that single contexts with given attributes (e.g. type, shape, dimensions, chronology, stratigraphic position, etc.) will be entered into the database, a digital questionnaire may be used in order to describe them. It will contain repeated selection fields, selection lists and traditional text fields. A form chart should be concise in its shape and should have a maximum screen resolution of 1024x768 pixels (default tablets screen resolution). It should be displayed in the window of a web browser operated by portable devices (tablets) e.g. iPads, which are used directly at the site (Macworld 2011) or even experimental web browsers devices like e-ink readers. In this solution it was particularly important to secure a universal access via multiple platforms using the interface of an ordinary web browser. Additional information in the form of files (e.g. photos) should be easily attached to the database and stored on a safe external server. If one makes use of this simple solution the result of digitalization of data from charts will be reports including basic information on particular stratigraphic contexts. Such reports may be exported for example to a table form. At any moment we will be able to view files referring to particular contexts without the need to search in various data storage devices (memory cards of several cameras, recording devices or computers). A condition for an efficient operation of the system is the mobile internet access.

Creating Application

Our system is based upon the idea of online databases. The Zoho Creator tool eliminates the need to purchase a hosting server with the SQL database service function. A graphic interface enables people with no programming experience to build their own databases. The first step is to create a user account with the www.zoho.com service. We then select the Business Apps / Creator option and switch on *Create Application*. A question concerning the way of designing the application appears ("How do you want to create the application?"), so we select the *From Scratch* option and enter the name of the application and the form. We select the *No Template* option and switch on *Create Now*.

Forms

After the Form Builder turns on, we switch on the Forms tab (Fig. 1). On the left side of the screen we find fields for entering data (Basic Fields). Usually, we will be most often using the field to enter data in one line (Single line), the list of expanded data which are predefined by the user (Dropdown), the Checkbox, the Date, the switch which enables us to add attachments to database records (File Upload) and possible the Add Notes field. We drag selected fields one by one to the right side of the work screen. We can modify attributes of particular fields (Fig. 2), with regard to:

- edition: field name, required field option, blockade of duplication of data in the field, access terms for users, attributes and the field name in the script, field view in the form – original value and widths; we can also add

Figure 1. Form builder drag and drop interface.

instructions for persons who will be entering data,

• script operation: actions performed by the script when entering and saving data (the edition of options is not recommended for inexperienced users),

• deleting fields in the form.

Views

After the form for entering data is created, the next step is to configure the data view. We switch the *Views* tab on. On the left side of the screen we find fields of view settings options (*View Configuration*). We can select a convenient window of data display (*Display Properties*):

• list – the most often used view,

• grid,

• summary – a context sheet, with a possibility to define the number of cards displayed within the width of the screen,

• calendar – a possibility to display records in the form of a calendar, according to the criteria of date of entering into the database, date of the last modification or date of preparing the context sheet.

The *Column Properties* option is used to decide whether a given field of the form (*Label Name*) is to be displayed in the presentation. Additionally, one can change the name of the form field (*Display Name*), which will be displayed in the presentation view. The *Set Column Widths* field is used to set the width of the presentation columns. We can select a default width, depending on the amount of data, or define the width in pixels or percent. In the group of configuration options concerning database records (*Records*) we can set criteria of the presentation display:

• Set Criteria – selection of all data for presentation, or only of data subject to filtering as defined by the user (in the default option all the records are displayed).

• Set Filters – it enables the user to predefine filtering.

• Set Grouping – data can be grouped for better information according to the number of the stratigraphic context.

We can set user privileges and limit their rights to add, edit or delete data (*Set Permissions*). We can also apply a non-standard action (*Custom Action*), which allows for an e-mail to be sent to
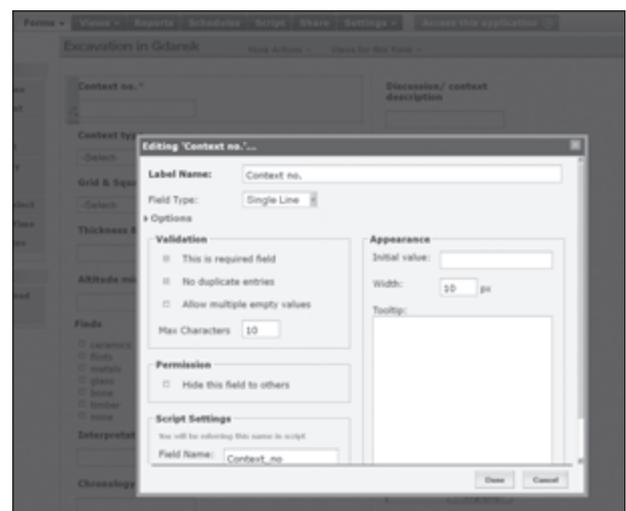

Figure 2. Modify the form settings.

the administrator after a new record is added to the database.

Additional settings

Additional functions which are less used in the creation of a documentation system are:

• report creation options (Reports) – these are useful for preparing reports for numeric data using the Pivot Table and the Pivot Graph,

• Schedules,

• Script,

• Share – this functions enables us to invite users to co-operate and to define the nature of the application (Public / Private),

• Settings – it enables us to set the view of the application panel,

• Customize – to set basic data concerning the name, the domain where the application is available, the way of logging on to it, access via encrypted connection, indexing permission for search engines and the system time for applications.

Access to Application

After we are done with the basic steps concerning the design and the configuration of the application, we can start entering and browsing data. We switch the *Access to Application* on. In the standard view of the system there is the *Home* window on the left side of the work screen. It contains the name of the designed form and the presentation. As we did not create a *Report* for example as a Pivot Table, the Reports section remains empty. There is no problem with entering the data. We can add (upload to the server) any number of attachments to each record, e.g., photos. Due to data transfer speed and a low capacity of the free version (1000 records, 200 Mb of space for data), I recommend reducing the resolution of graphic files before they are sent to the server.

Figure 3. Form view.

It must be remembered that a given record may be saved after all the fields defined as required are completed, e.g., the number and the type of the stratigraphic context. Data can be entered manually (e.g., using the tablet) or imported (More Actions) from Excel, CSV and TSV formats.

If we select the presentation icon in the Home group on the left side of screen, the display will be switched to data presentation (Fig. 3). I have earlier defined the list as the presentation view. The presentation is used for browsing the contents of the records and it enables the user to complete and edit them. Under the name of our application we find access to the following functions concerning particular records:

• *Add*,

• *Bulk Edit*,

• *Duplicate*,

• *Delete*,

• *Search* – this also offers an opportunity to set advanced filtering.

A significant function of the application is a possibility to bulk import the data which are saved in popular formats (*More Actions/ Import Data*). Reports can be prepared in

Figure 4. List view.

Figure 5. Selected Record View.

several ways. The easiest solution is to export data and edit them using offline applications on a local PC (*More Actions/Export Data*). The application enables the user to export text data in many popular formats: Excel, PDF, HTML, XML, JON, CSV or TSV. Binary data can be downloaded to a local computer by simply launching the reference in the list of presentation. An interesting and a very practical solution is a separation of the text data and the binary data, which enables the system to work efficiently even in the case of a low speed of the Internet connection.

Advantages and Disadvantages of Outsourced Online Systems

Easy Recording System is based on a simple GUI configuration. This solution uses outside resources (servers – storage - software). It is a completely different type of solution in comparison to server applications (for example ARK). We work without a personal server. The philosophy of this system is to work on devices not intended for an application installation. We are testing e-ink book readers (Amazon Kindle) with display perfectly readable in bright sunlight. The main disadvantage of outsourced online-based systems is the security and the pure adaptation of an universal solution

for specialized tasks. Software designed for archaeology allows for more options that universal applications. I proposed a simple but very limited system. In practice, we can only create context registers with the ability to add attachments. We can organize work in a Cloud, but can not do all the field tasks without additional desktop applications. We can not create a Harris matrix, plans or edit photos. The system works very well for simple tasks and is flexible in configuration by non-programmers. The communication between our net device and servers is encrypted using strong 128-bit keys (256-bit keys in many cases). Data backup can be performed in two ways on the server side: classic backup of the application and a copy of the application. In practice we have duplicate of the data or we are ready to restore a full backup. The best way to protect data is to export files in a supported format (for example xls) to a local or web storage. Data can be then imported back to the web application.

Conclusions

Data gathering at the archaeological site in the course of exploration is the most important research process in field archaeology. Archaeologists gather data in a proper way during the fieldwork, however, there is no

consistency and proper decision concerning the classification of information scattered in various sources. In practical terms, in the post-excavation phase an arduous and counter-productive process of gathering data from various sources takes place. The selection of photos and plans and the digitalization of paper descriptive sheets take the majority of time that is necessary for the post-excavation research work. Reports are often of a schematic nature and they often cannot be supplemented with the necessary data which is already lost after the actual fieldwork. I want to stress the danger of the overload of unordered information which may lead to the loss of essential data from a properly documented archaeological site. The only way is to put the data in order in the gathering stage. We cannot force field archaeologists who are not expert programmers to know and learn new and considerably developed documentation-archiving applications. I recommend using the simplest form of a safe database, which acts as a folder binding scattered information in one central place. Well-ordered data which is stored on a safe server will considerably shorten the process of preparing fieldwork reports.

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