

Scribblr: Back to the Future of Visual Document Mark-up

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Abstract. This paper describes our approach to the design of *Scribblr*, an internet-based tool to support mark-up of images in the course of creative work. The mark-up, which may be textual or freeform sketches, forms a conversation between remote collaborators which is archived and can be revisited at a later date. This paper considers the ways in which two key spaces are transformed and extended through the use of the *Scribblr* tool. The first is the non-place space, exemplified by the airport lounge, which becomes an extension of the collaborative studio; the second is the space of traditional paper-based mark-up. They are transformed through their overlap with a third space: the space of the remote, but universally accessible, database, the active collective repository that transforms the workflow of practitioners working together.

Keywords: mark up, annotation, image-based online tool, distant collaboration

1. Introduction

This paper reports research through the design of a tool to activate two *spaces* to create *places* of social interaction and production through reintroducing a surviving traditional paper-based practice into a virtual online space. These two spaces are: the non-place space, exemplified by the airport lounge, which becomes an extension of the collaborative studio, and the two dimensional drawing space of the traditional paper-based mark-up.

1.1 First space: the airport, a non-place space

How we define the terms space and place can be a contested area between those that believe that space is the empty container in which places occur, and others, such as de Certeau, who argue that space is not a fixed or empty location, rather it is a place that is a fixed position and space is the construct of our practices. [2] It is the practices of everyday life (humanity) that facilitate the dialogue between these two entities. [3] (p 7, 8). In this discussion we are building on de Certeau's focus on the importance of inhabitation as a means for making the locations that we live and work in, in particular through a consideration of the airport or transport interchange as the non-place.

'... the word 'non-place' designates two complementary but distinct realities: spaces formed in relation to certain ends (transport, transit, commerce, leisure), and the relations that individuals have with these spaces.'
[4]

Within and through virtual tools, the interface becomes the space of the studio, the place of practice, which is located within the broader physical space of the airport and the non-place is transformed into being the site/place of habitation and professional practice.

1.2 Second space: mark up, discussion of a traditional practice in a digital medium

The second space that is central to locating the *Scribble* is the traditional space of the artist and designer, the two dimensional picture plane or the space of the image. In relation to this space we are interested in the traditional practice of mark-up. This is the layering of visual information over a partial or incomplete visual proposal (an image of a model, a graphical lay-out, an image of the current state of somewhere or something). It is a reactive means of reflection and a more effective means of communication that translating intention in relation to visual media into natural language- and text- only media.

Mark-up can contribute to auto reflective practice in the same way as sketching, support an open conversation between equals (collaborative model) and a more linear process in a typical line management situation (cooperative model).[6] It also gathers immediate and direct feedback from key individuals whose decision-making role is pivotal but whose time contribution is small.

1.3 Image mark up

This research considers work that is visual and *image-* rather than *text-* based for both the content and the feedback/markup/annotation/commentary. It considers marks that are directly related to layout and document production but also the marks of collaborators engaged in a design conversation [7], through the document as a representational medium for other subject matter. It encompasses the brief meta- instructions issued through markup but it also makes a place for queries and tentative proposals to illicit interactive feedback: a medium of external thinking.[8]

In the technical process of developing and testing the new environment, it is the record of the marks, their provenance, layered order of creation and *subjective* graphical qualities that are of greatest concern. *Mark up* is taken here in the broadest sense of marking up paper drawings to include drawn suggestions and queries that engage and even *create* the content as well as the layout.

1.2 Layering

In a paper-based process the marks of different team members might be distinguished by colour and style, or overlaid on individual sheets of tracing paper. The layered approach is very familiar to digital producers and more generally as a conceptual model of production in many areas of design. In this context tracing paper is an annotation layer.

In this proposal this idea of layering is extended by digital translation to a database. The paper conventions of distinguishing colours and pens for different participant identities are possible, and each new markup session has a layer that can be shown or hidden, shared or discrete, retained or deleted and captures the identity of the team member and time. This layering is time- and sequence- based to become a visual communication thread. Thus it can be viewed as a time based sequence, in effect replaying the asynchronous conversation of a team at one stage of a process. This layering is also extended through archiving versions of each page in the online document so that it is conceptually possible not only to flick through the progressive addition of marks to the image but to flick back through the versions of the image itself. In this way it is a powerful tool for knowledge capture (with team wide access) and for individual, or collective review of the collaborative design process.

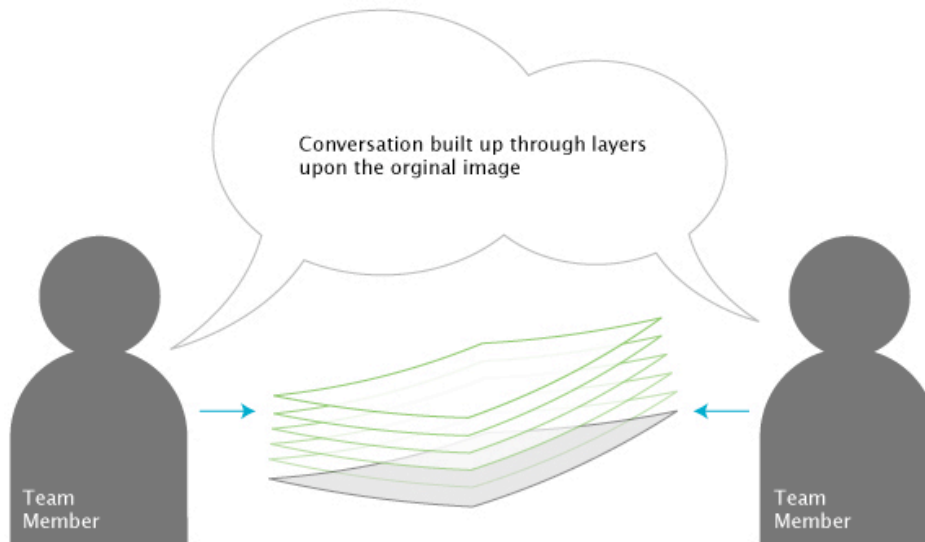


Diagram 1: An illustration of a layered conversation

1.3 Syntax and content- levels of inference

The markup environment is different from a primary drawing or modeling, creative environment. It begets brevity, speed and simplicity: potential strengths for communication. It is a useful venue for quick decision making, moving primary design activity to the next step. This proposal selectively mixes communication modes: graphical (sketch), image and text. This is a combination that gives rapid assimilation [9, 10, 11] promotes commitment (compared to speech and gesture) and most closely apes traditional paper based workflow for visually-based design. It is a focused environment rather than an immersive one. It is distinguished from traditional text-based shared interactive web spaces by allowing a range of levels of visual symbolism from figurative sketching, to diagrammatic overlay that links or relates existing content, to development of visual/graphical shorthand notation. These are complementary to the range of semantic levels also available in text.

2. The *Scribblr*: design

2.1 Brief

The conception of this tool or medium came about in response to a very clear client or organizational brief.

1. A visual communication environment was needed that did not rely on any particular software or platform but could be opened in any browser.
2. It should have 'three click' access (the first click being to turn on the computer, the second to open the web browser, the third to open the tool with information loaded ready for annotation) and be usable with a mouse or tablet.
3. It should be able closely to simulate or resemble the documents/object in production (drawings or panels for architectural competition submission, document layout for a graphical design commission etc.).³⁵

4. It should permit sketching and hand or typed annotation over the image, linking the input to the image or object itself.
5. The marks might ideally be clearly attributable to a particular hand, the architect or the engineer for example, and time of interaction - the order of presence is critical to making sense of the marks.
6. It should be able to archive the individual pages of the document or object as past versions as the intent of the marks are incorporated into new versions of the base image.
7. Least important, but on the desire list: the information in this web-based environment should be able to be used directly in the production of the final presentation object promoting clear digital workflow.

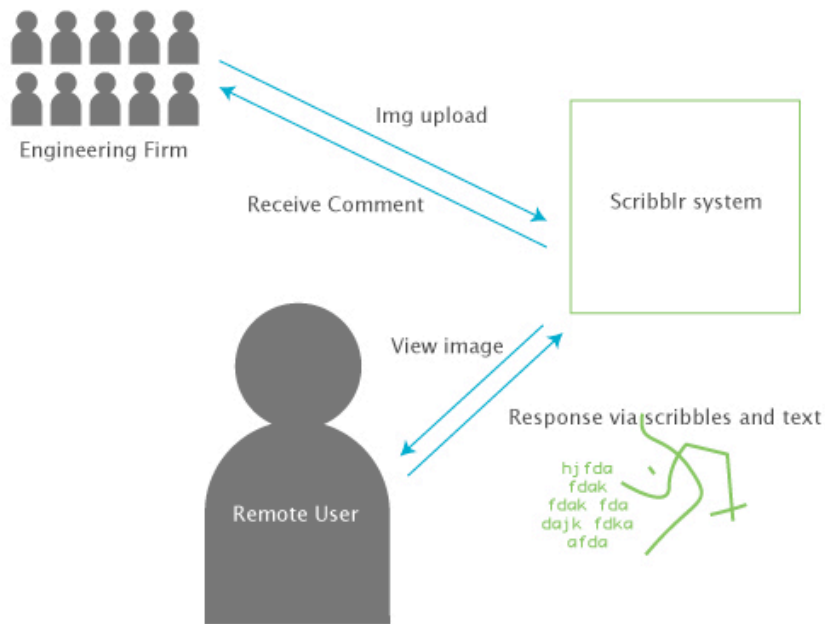


Diagram 2: Illustrating the communication requirements of our client

This is an interesting spatial proposition. It is a hybrid environment in which each image is a snapshot of some aspect of the development of the project over time and versions of the images can be layered in time but each version also carries a layering of markup added over time and physical distance.

The third requirement in this list imposed further layering in the guise of a widely and simply customizable interface style if this environment, as conceived, were to serve many organizations and specific types of product and workflow.

2.2 Precedents

Research showed that this proposition was not fully satisfied by any existing software. There are other web-based tools that support annotation, for example, early versions of Mosaic also had an 'annotate' feature to allow collaborative work. You could pick up a Web page from anywhere and add your own annotations. These could either be for your own personal use or for the use of a well-defined group of collaborators; they could be linked in as a hyperlink at the bottom of the page. This idea was partly inspired by the Usenet news system, which allowed people to post messages as replies to others so that threads of messages on a certain theme would build up.[12] DrawnHere is a web-based service that allows people to draw directly on any web

page.[13] It uses a painting metaphor, with much of the publicly viewable annotation taking the form of graffiti or compositions in their own right. Diigo takes a more text based approach, mixing social networking with bookmark sharing to create what is called "social annotation".[14] The emphasis here is on sharing comment about the elements of web pages (text, images, etcetera). This more traditional approach to annotation or commentary, or the ability to leave comments about the writings of others, is increasingly widespread in the practice of blogging and social recommendation sites such as del.icio.us .[15] *Scribblr* extends such systems by supporting a very rapid interaction style and, as we describe below, brings the annotation process much closer to that of traditional visual mark-up.

2.3 Translation from brief to specification

There were a number of key translations from the client desire list to the guidelines for the technical specification. In the database, the image should remain unchanged even when marked-up. This is an important part of archiving, versioning and knowledge capture. It is also the key to retaining the mark-up information in vector format and potentially usable in subsequent production information output. The data for the mark-up is stored relative to the client user interface. In this way the image and mark up information are always collocated, independent of monitor resolution. In line with the final consideration in the desire list of streamlining digital workflow, with a further click, it should be possible to output the object in pdf format with the image in bitmap and the mark-up still readable as layered vector data or as email output with the scribble (mark-up) as bitmap on the image. There are also opportunities for a system of notification between collaborators and for logging metadata such as which pages in the document are subject to most mark up.

3 The *Scribblr*: interaction characteristics

3.1 Asynchronous

Scribblr annotation data is stored in a database which can be accessed equitably by any authorised user of the system at any time, from any location. As the annotations are stored separately from the image, many people can be working on aspects of the same image simultaneously. They can choose whether to observe annotations made by other users and there is no wait for another user to finish and cede control of the drawing interface in order to work in it. The annotation data is made available to others as soon as the user marks the comment as 'published'. Alerting of the publication of a new annotation to interested parties is also possible. Where *Scribblr* contrasts with paper based practice, faxing, or software that allows users to comment in a document and pass a copy, is that there is no single entity (the faxed drawing or digital document) that is passed from one person to another like a token. Instead, all parties have equal access to both the original image to be marked up and the annotations previously made by others.

3.2 Technical description

The *Scribblr* tool is a web based application built around a MySQL database, with an interface that provides a space for writing and drawing upon a selected image. PHP and XML provide the gateway between the interface and the database. As a web based application, the tool can be deployed across platforms, and can be accessed from any computer that is connected to the internet.

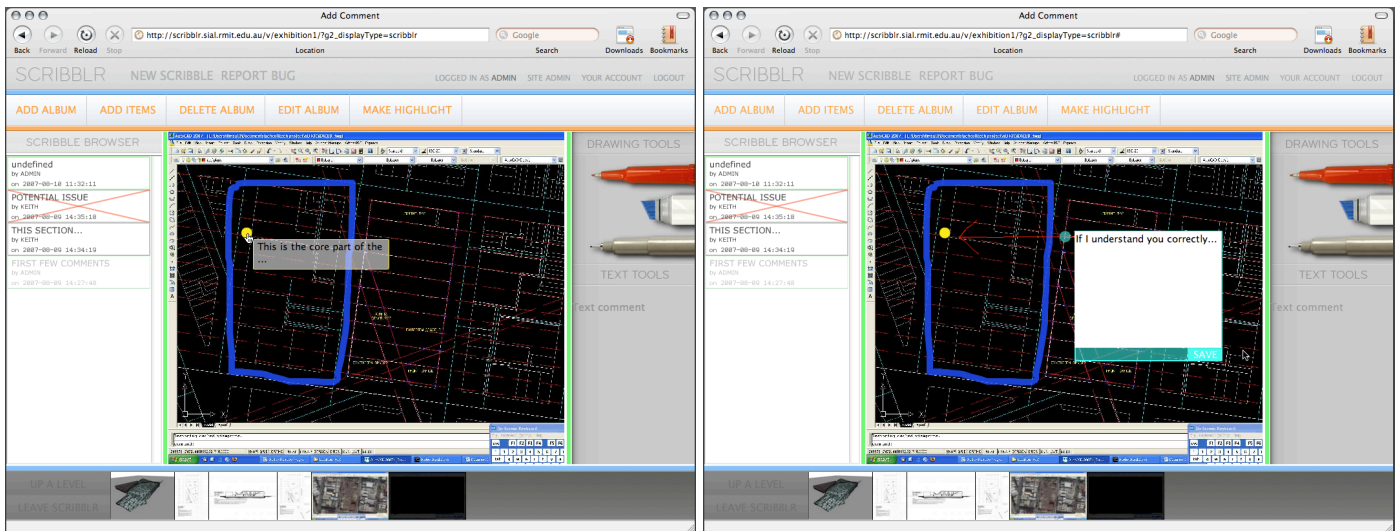
The co-ordinate and text data that makes up the freehand lines or words of an annotation are saved independently of the image data. The conversation can be recreated at a later time and it is also possible to recreate a single person's annotations or to combine comments from, for example, just two people. The line data is stored using a co-ordinate system that is relative to the image size. This overcomes bandwidth or specific local device limitations, as small file size, low resolution images can be downloaded and annotated and the vector annotation content will scale correctly when viewed elsewhere in relation to the image at high resolution.

3.3 Interface

As the *Scribblr* tool is aimed at people who may be operating under time pressure, in unfamiliar places, universal access and *usability* are at the fore; the need for a simple interface and tool set that is dedicated to one particular activity or mode of interaction in the space: annotation via scribbling. The interface design sets the rules for interaction with the aim of supporting fast, responsive movements that maintain the focus of the user on their comments. The potentially confusing array of tools and methods offered in many drawing and painting programs would not be appropriate for this purpose or environment. The initial brief that no more than three actions (including turning on the computer) should be required to move into the act of scribbling and making comments has been embraced in the tool design.

Activating the tool and loading the image, provides the user with a default pen and a new 'overlay page' to scribble on. They are ready and focused.

The image is the core aspect; a working space, rather than a reference space. We draw, write, and read within the image. By doing this we find that our conversations are located within the space of the image, in particular in that part of the image on which the comment is centred.



Scribblr interface, showing a person viewing a scribble and then adding a comment in response

3.4 Database

Beneath the interface lies a database. The database offers us a place to store and retrieve the information that makes up each piece of the conversation. It also provides an automatic framework for archiving activities and viewing a historical timeline of activity.

In the deployment of *Scribblr* we find a location for a conversation. The conversation is stored and located within the database that is created upon deployment. The form of the conversation is found within various types of data. This data expresses both the written and the gestural marks of the commenter.

These data objects are a reflection of the form and nature of communication that is mediated through, and stored within virtual places. In the case of *Scribblr* the conversations are stored as text and numeric objects. The data that represents the gestural marks of the conversation, the scribbles, are stored as floating point numbers that scale automatically to the image in the user's interface and remain as vector information that can ultimately be incorporated into the finished work flow. This format provides a flexible framework for distribution and re-distribution of each scribble.

In keeping all the data in both text and numeric form we are then able to create an array of formats for re-distributing the comments. For instance, we are able to produce layered PDF's that can be opened within standard desktop publishing systems. When opened in a program such as Adobe Illustrator we are then able

to edit and manipulate the scribbles as vectors. This example of re-distributing the comments shows how we have positioned the intentions of the *Scribblr* tool to fit within current design work flows.

Retrieving all the scribbles at the start

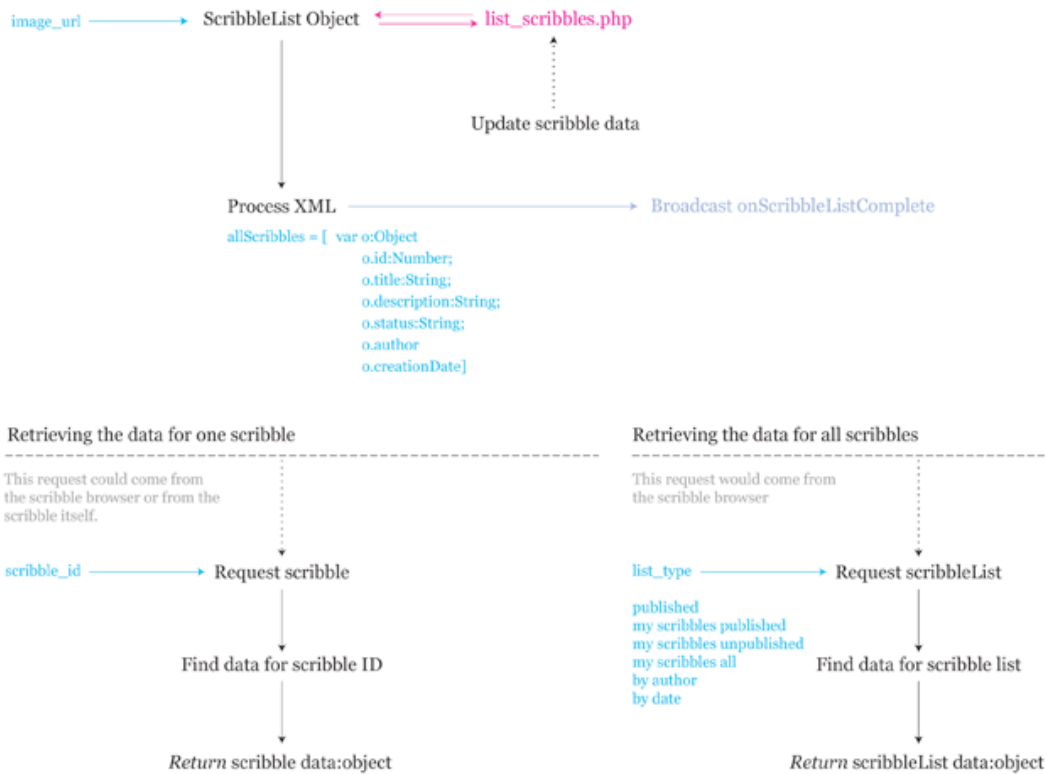


Diagram 3: Basic interactions between scribblr interface and the database

4 Discussion/Conclusion

Online interaction through secure web locations, transforms non place space such as airport lounges into places of habitation and professional practice, where identity is maintained and reinforced. Auge argues that we mediate and position ourselves within non-places by means of ‘words, and even texts’ and we find that words and text have indeed been the principal media of online interaction by annotation to date. [4] Even where images are the subject of interaction, commentary has been added as text. In this research, through the design of the *Scribblr*, we consider expanding this language of mediation to that of *images* and *sketched commentary*.

Hand markup has communication subtleties that typed text comment lacks with regard to translating tactile and visual communication cues and intent. [10] There are the same syntactic clues - the addition of a question mark to a statement to indicate that it is a point for discussion, for instance - but there may be additional visual clues through the weight or precision of drawing, the visual linking of ideas.

Markup and annotation allow multilateral, bilateral and auto-reflective comment about an object inside the object. This proposal extends this to permitting the markup to become part of the object or document, by stripping away a further level of inference, to be part of the partial object in design that is the subject of the document. The team discussion and decision-making is not so much *around* the contents of a document as *creating* the contents. It is, in this sense, a highly engaged form of thinking and communicating.

Through expanding the language of mediation within on-line places to *image markup*, that traditional two-dimensional space is also transformed. It maintains its virtues as a space of rapid and direct interaction but the token object (image and mark up) melt into discrete objects within a database, providing for simultaneous multi user interaction and temporal as well as spatial, version, and identity layering.

The principle challenge in the tool design to achieve these transformations in the space of practice has been to maintain the simplicity, not only of annotation itself as a focused activity, but in the interface: digital interaction as immediate as accessing the 'Web place'[1] itself.

Future research: *Scribble* is now sufficiently robust for testing and feedback within a range of creative professional contexts.

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