Evaluation of a Live Visual Constraint Language with Professional Artists

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Abstract

A qualitative study of the Palimpsest visual language was undertaken to understand how it would be best used by professional visual artists. Previous work found that individuals with high levels of self-efficacy in both the visual arts and computer use are able to use Palimpsest most effectively. An extension to champagne prototyping was used to study whether visual artists find the language more engaging when their own artworks are being used, and when within their own professional environment. It was found that individuals indeed find most utility in the system when manipulating works similar to their artistic style, and approach tasks differently within their own studios. This offers future opportunities for undertaking studies of professional environments.

1. Introduction

Palimpsest is a visual programming language which is "inspired by early data structure-oriented languages including FORTH and LISP" (Blackwell 2013). The technology is intended for use upon Android touchscreen devices, but is currently best accessed through a Java JAR application. The central abstraction that Palimpsest possesses is that everything is a layer, from the introductory textual tutorial, to the menu screens themselves. Artefacts can be rearranged and stacked in a similar manner to a collage, gradually building an artwork from smaller components. Although many of the effects that can be applied would most likely appeal to graphics editors, such as cropping and colour adjustment (Figure 1), Palimpsest does not assume a particular application domain, and possesses functionality for performing calculations, building animations or recording peripheral input. Whilst traditional textual programming languages might present an intimidating barrier to some visual artists, Palimpsest is designed to facilitate exploration and "tinkering" (Beckwith 2006), allowing artefacts to be adjusted and positioned in a similar manner to within the physical world.
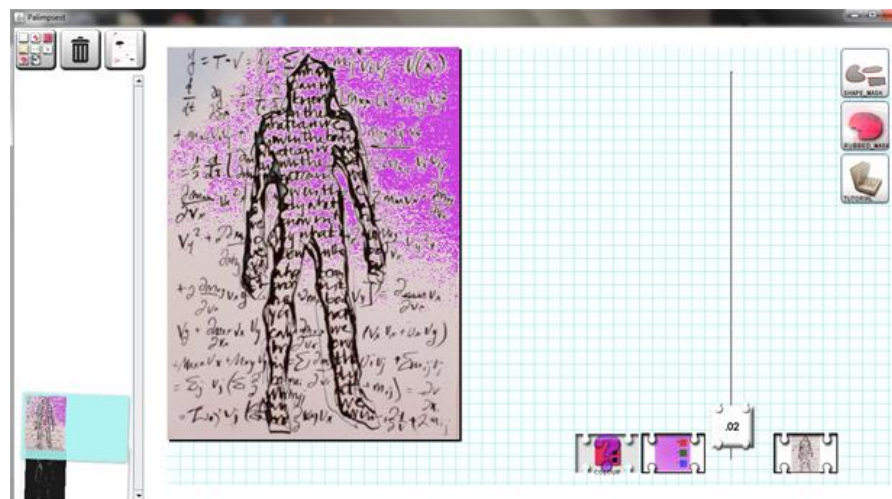
Figure 1 - The Palimpsest system displaying a modified artwork

Previous work by Blackwell and Charalampidis (2013) found that individuals with high levels of self-efficacy in both the visual arts and computer use are able to use Palimpsest most effectively. Within that study, five computer science participants (assumed to possess confidence with computers) and five more artistic participants (assumed to possess confidence in their artistic ability) interacted with Palimpsest as a means of studying which category of user would find the tool most usable. The study was undertaken within the Computer Laboratory in Cambridge, and had participants' first completing self-efficacy questionnaires to assess their confidence in both computer use and art, before proceeding gradually through the 53-stage textual tutorial. It was found that some individuals experienced difficulty with the linear instructions, and so the observer provided a demonstration of the system, which subsequently greatly improved their performance. A free play session followed, where participants could experiment with the tool for up to twenty minutes, before the study was completed with a Cognitive Dimensions of Notations questionnaire (Blackwell 2003).

This study differs in a number of important aspects. Since this previous work presented that those possessing high computer use and visual arts self-efficacy can most effectively use the system, it shall be of interest to observe the utility that professional artists, clearly confident in visual media, can find in Palimpsest. "A central aspect of Champagne Prototyping is that highly credible participants can be used to evaluate the new feature" (Blackwell 2004), which is a key reason for these artistic individuals being selected. Whereas the previous study was conducted within laboratory conditions, this work concerns interactions within a participant's own professional environment, such as an arts studio or workshop. Furthermore, whilst the previous work was rigidly structured and required participants to progress though a linear introductory tutorial, within this study each demonstration is customised to best suit the artistic style of the particular individual. Similarly, during our "free play" stage, participants are encouraged to interact with artworks meaningful to them, whether these embody their typical artistic practice or are artefacts which they have previously created. This experimentation stage makes use of screen capture technology to record the interactions between the participant and the system, which are then played back to the artist during the final interview stage to facilitate contextual inquiry (Beyer 1997). This interview is semi-structured in nature and aims to capture an individual's experience of the system, their professional environment, the meaningful artworks, and their computer use self-efficacy. Whereas the previous study assessed which category of users are most adept with the system, the methodological approach within this paper differs greatly. Interactions with meaningful artefacts within a professional artistic environment are observed, to best assess whether artists can find utility in the Palimpsest system, with the demonstration, location, artworks and questions customised to suit each individual, who is assisted in their interactions by the participant observer (Atkinson 1994). Question customisation results from prior consideration of each individual's artistic field, in addition to the semi-structured nature of the interview, leading to expanded and open-ended responses.

The key research questions to answer comprise of:

- Do those professional artists possessing high levels of self-efficacy find the most utility in the system?

- What features of the system do professional artists find the most engaging, and which require further refinement?

- Did the modification of artworks which represented the participant's artistic style have an effect on their experience with the system?

- Did the location, with the participants using the system within their own professional environments, have an effect on their experience?

2. Related Work

There exists substantial literature relevant to the study. Self-efficacy is an important construct from social psychology and has been shown to influence the decisions which individuals undertake. Bandura (1977) described how levels of confidence affect "whether coping behavior will be initiated", and how long individuals will try to succeed with a task before giving up. Later work concerned the self-efficacy mechanism (SEM), how high levels of confidence might lead to improved performance, and how "collective efficacy" can be developed with certain social conditions (Bandura 1982). Beckwith (2006) also studied the self-efficacy concept, and how "tinkering may yield positive benefits by making the user feel in control of the system". It was shown that individuals possessing low confidence in their own abilities, in this case girls undertaking debugging, can find benefits from playing with their environment. Earlier work, conducted in 1995, also aimed to study the effects of confidence on computer use. Compeau (1995) undertook a seminal study which showed that organisational influences, such as encouragement and support, were important factors in deciding whether users made effective use of computers.

Attention Investment, the balance between the costs of undertaking an action against the potential benefit, has also been studied in great depth. Frequently participants will only find utility within a system if it offers clear benefits over continuing a traditional approach. The artists analysed within this study use physical processes to undertake parts of their professional work; Palimpsest must offer some advantage. Blackwell (2002) considered end-user programmers, those who code for their own use rather than a profession, and the risks they might perceive when deciding whether to manually program a solution. Within the work, participants are presented with the task of correcting spelling mistakes within a document, either through "direct manipulation", likely to be a repetitive process, or the "programming" strategy which is likely to involve a higher attentional cost. It is explained that the length of text and general feel of the document, among other factors, shall influence whether the decision is made to automate or proceed manually. Other work directly focuses upon the Attention Investment model (Blackwell & Burnett 2002) and explores how this might influence the design of functionality within systems such as Forms/3, a novel spreadsheet-based visual programming language by Burnett (2001). The main advantage of this model is described as its flexibility: "it focuses squarely on the user's problem-solving choices wherever they might arise", reflecting that the structure can adapt for the situation the individual finds themselves in. This model shall be useful within my proposed study as a means of understanding the rationale of why participants prefer certain facets of the system. (Eckert 2012) discusses the parallels of design sketching across a wide number of fields, finding that sketches can represent different "degrees of formality". The paper also describes how architects would draw "renditions for different audiences", which can be seen in the case of the Palimpsest visual language. This tool presents information in an informal manner, contrasting with the often viscous text-based formal languages, and tries to allow artistic individuals to design a program on their own terms, rather than forcing them to adapt to methodologies that may be alien or intimidating.

Champagne Prototyping was developed as a means of providing "evaluation techniques suitable for real-world programming environments" (Blackwell 2004), rather than traditional measures that might rely upon laboratory conditions. The paper describes the technique as "an early-evaluation technique that is inexpensive to do, yet features the credibility that comes from being based on the real commercial environment of interest, and from working with real users of the environment", and relies upon the use of credible participants and transcript evaluation. Cheapness and quick feedback are the key advantages of this approach, seen when inexpensive mock-ups are utilised as opposed to full implementations.

Within this paper an extension to this approach is suggested, where both meaningful artefacts and professional locations are used to effectively simulate a working environment, which can then be analysed and studied through participant observation.

3. Participants

The four artists observed within the study were all personally introduced by Alan Blackwell. These individuals were selected due to their proximity, all possessing studios within the immediate Cambridge area (one such example within Figure 2), and for their self-efficacy in visual art, all being professional artists. Although none of the artists were raised in Cambridge, there is a possibility that their views might not be wholly indicative of individuals within other locations within the UK. Their computer use self-efficacy was to be judged from an initial questionnaire, and the levels of confidence would be expected to vary from participant to participant. However, since these artists were known to Blackwell, a lecturer at the University of Cambridge Computer Laboratory, there is a chance that they would be more likely to exhibit some confidence with computing devices. Of the four participants, only Diana had briefly previously seen Palimpsest, whilst the tool was in an intermediate development stage. Although this might suggest that she possessed different initial expectations of the system, this past experience was several years in the past and hence unlikely to have a large effect on her interaction. The introductory process was brief, with myself solely interacting with the artist following their confirmation to view the Palimpsest tool. For this reason it would be expected that the artists' responses would not be significantly affected by the introductory stage.
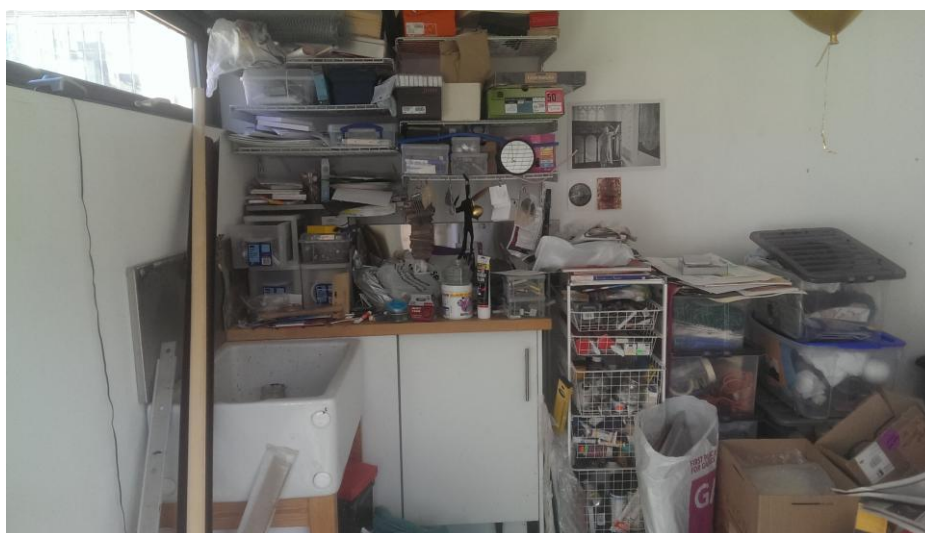
Figure 2 - An artist's professional environment

The four artists that participated with the study were as follows:

Issam is a Syrian-born artist in residence at Christ's College, Cambridge and works predominantly in fine art, collage, physical installations and photography. The latter passion has led to the existence of a dark room within his studio, which also houses architectural drafting boards, computing devices and extensive room for physical experimentation.

Diana is a professional artist and teacher at Anglia Ruskin University, who also provides bespoke classes across a wide range of artistic fields. Her work is largely multimedia, making use of animation, visual editing and photography, drawing, and live interaction. A frequent theme is the juxtaposition of obsolete computing machinery against alternative art forms, such as interpretive dance. In this way, Diana aims to modernise discontinued devices and equipment most frequently encountered within museums of technology.

Melissa is a professional artist practising in Cambridge, who works predominantly in sculpture, whether stone, metal or wire in nature. Rather than focusing upon structures in a representative manner, Melissa aims to present her material artefacts through suggestive and emotional approaches. She possesses a degree-level qualification in Physics, and has been seen to juxtapose mathematical calligraphy with the human form within some of her works.

Bettina practices at the Wysing Arts Centre, Bourn and has produced numerous site-specific pieces for local government, architects, and the UK Arts Council. Her works concern experimentation with language, whether rendered through textual representations in metal and stone, or purely the spoken word. Although she classes her pieces as contemporary, her training derives from a traditional background.

4. Experimental Procedure

The study comprised of several tasks undertaken within the participants' own context, in order to facilitate the most natural and accurate artistic environment. The four locations used differed greatly, two artists possessed studios within their homes, whilst the other two made use of external facilities. A brief, informal script was prepared in advance in order to most effectively control the system information that was presented to the participants. Approximately an hour and a half was taken to record all the data required for each study. The tasks followed the structure of Champagne Prototyping and included:

A. A brief ten-minute initial stage to better understand a participant's artistic style and what it is they wish to receive from using the Palimpsest system. This included the completion of a short questionnaire to judge the level of self-efficacy each participant showed towards computer use. This artefact, found as Appendix A, was the 2006 adaption (Beckwith 2006) of the Compeau and Higgins questionnaire (Compeau 1995), with only the ethical preamble modified for this study, in order to maintain the validity of the document.

B. A demonstration was presented to the participant, being chosen specifically to suit the individual interests of the artist. This ten-minute stage acted as a brief introduction and tutorial of the language for features of the system that might be of most interest to this participant. The artwork modified within this stage was submitted by each artist several days prior to the study, in order to ensure that the materials were personal to each participant. The artefacts submitted were works previously created by the individual artist, which were sent via email so that the images could be imported into the system when necessary.

C. The participant was asked several questions about the transformation and how they understand it to behave (included as Appendix B), as a means of gauging their level of comprehension. This stage only took approximately ten minutes but helped in both understanding the self-efficacy levels of this participant and recording their first impressions of the system. Audio recording was undertaken, with the permission of the participant, to assist eventual data analysis and to allow the observer to concentrate wholly on the responses received.

D. The participant was allowed up to twenty minutes to interact freely with the system, using artwork individually meaningful to them, whilst asking questions and receiving encouragement from the participant observer. Features were encountered predominantly by discovery rather than encouragement, though on occasions the participant would ask for advice in how to begin a task. Although it is arguable that twenty minutes is a short amount of time for an individual to fully explore the system, in all cases the entire period was not used and the participant felt comfortable to proceed to the final semi-structured interview. This task intended to allow the artist to interact with features of the language they found the most interesting, whilst giving the observer the opportunity to make recommendations. Visual screen recording and audio capture was used to record the actions undertaken during this stage, both for the purpose of analysis and for replaying the footage within the final interview to facilitate contextual inquiry. Once again, the artists were able to modify their own artefacts which they previously submitted. The selection was constrained to the images that they previously submitted, though further files could be downloaded from the Internet and imported to the system if they presented their artworks online. The key task of the process was this exploration period, rather than the final semi-structured interview, giving the artist's an opportunity to directly interact with a novel system.

E. A fifteen-minute final interview was conducted (included as Appendix C) to assess the participant's understanding of the system, the components they found the most useful, and any alterations they might recommend. Upon all occasions this stage exceeded the fifteen-minute allotted time, though this was consistently due to the participant offering detailed, extended responses which were of use within data analysis. This process was semi-structured, customised to suit the individual artist, and aimed to capture qualitative data. Sections of the visual records were replayed to the participant, similar in style to contextual inquiry, so they could explain their motivation and whether modifying their own artworks led to any changes in their emotions. Once again, audio recording was undertaken to assist data analysis.

Although this task did not directly study interaction with the Palimpsest visual language, it was also required:

F. A contextual inquiry of the participant's professional environment was undertaken, with photographic evidence. Whilst this stage took only approximately five minutes, it was valuable for later analysis of the qualitative data and connecting facets of an individual's environment to their experience with the system. Generally it was found to be of more interest when the participant described and explained their environment themselves; anecdotes were provided for the positioning of certain artistic tools and rationale was given for the placement of technological equipment.

As previously mentioned, the introductory demonstration presented to each participant varied based upon their artistic style and the artwork which they personally submitted. The structure of these demonstrations is described below.

When presenting the system to Issam, several graphics were modified which he had provided. Based upon his interests in collage and layering, a masking effect was applied upon a silhouette image of several household keys, one of his previous artworks. The cropped pieces were then resized with their transparency adjusted so that underlying artefacts could be viewed. A large image of Christ's College was then imported, the location the artist's studio is situated, with strong colour adjustment and quality reduction effects applied which appeared to intrigue the participant. The original key artefact was then placed atop this background as a means of placing the product of the environment within the environment.

Since Diana frequently used graphics editing software, it was important both to display functionality that was familiar, and actions that Palimpsest could perform which existing tools might not. For the demonstration an image of an old communications receiver was used, in an attempt to modernise archaic technology in a similar manner to her work. Firstly, simple visual editing effects were applied, such as changing the hue of the image and applying a shadow outline. More advanced functionality was then displayed as an attempt to differentiate Palimpsest from proprietary editing packages. Examples of this included spin effects, where an image could be set to rotate automatically, or recording mouse movements across the screen.

Melissa frequently experiments in wire sculpture, and for this reason attempts were made to produce similar effects. An image of a humanoid figure was selected, where its size was increased so it filled the entire screen. As a next stage, a strong effect was applied which removed several pieces of the artefact, leaving a thin frame remaining. The colour of this construct was then adjusted to a golden hue, producing a metallic appearance. Within further interaction with the system, Melissa experimented with other visual editing effects and basic animation.

Bettina commented within the study that she was interested in exploring animation effects, and that these could be of use in her professional work. For this reason, a supplied image of the moon was imported and cropped the artefact so that only the central shape remained. As the next step, a large circle of similar size was created, then coloured entirely black. This was placed a layer above the moon image and experimentally increased and decreased in size. A recording was then taken of this shape slowly moving across the moon graphic, as an attempt to mimic the waxing and waning of the celestial body. Bettina particularly enjoyed experimenting with this effect and saw utility in using the tool as a means of creating quick, simple animation effects.

Ethical considerations were important when conducting a study which both is performed within another's environment, and modifies their artworks. The participants were all informed that they were free to withdraw from the study at any point, and that they did not have to provide demographic data if they did not wish. Permission to edit the artworks was acquired from the copyright-holders, as was permission to capture ethnographic photographs within their professional environment. Similarly, permission was granted so that audio recordings could be taken of the interviews, to assist data analysis, and so that screen recording could be used to replay the actions undertaken within the free play session.

5. Data Analysis

Data gathered from the four individual studies comprised of:

A. Four initial questionnaires, including demographic data, which aimed to assist analysis of the computer self-efficacy level each artist possesses.

B. Four audio files containing:

a. The participants' responses to the post-demonstration interview. These were valuable in assessing initial interpretations of Palimpsest and how challenging the tool is to understand.

b. The participants' descriptions of their professional environment and why it is structured in a particular manner. These assisted understanding of whether their location affected their experience interacting with the Palimpsest system.

c. The participants' responses to the final semi-structured interview. These were valuable in gaining a comprehensive understanding of each participant's opinion of the system, its utility for their professional work, and whether they believed the artworks chosen for the study were appropriate. The general interview template was prepared in advance of the studies and modified dynamically depending upon the responses given by each participant.

C. Four screen-capture video files illustrating their interactions with the system during the free experimentation stage. These assisted understanding in what facets of the tool certain artists found the most and least interesting, and were presented to the participants during the final interview stage.

D. Four sets of photographs taken within the respective participant's professional environment. These also aided understanding of whether the studio might affect a participant's interaction.

Analysis of this data was undertaken through the process of Grounded Theory, where concepts are identified within qualitative data, then grouped into categories and collected to form a theory (Glaser 1978). Firstly it was required for the audio transcripts to written in a textual form so that the opinions of the participants are easier to study. In a similar manner, screen capture recordings and ethnographic descriptions were also converted into text. Connected concepts were then highlighted and collected so that correlations could be studied between computer use self-efficacy, the artworks modified, the environment the software was used within, and a participant's experience with Palimpsest. Transcripts were made whilst the data is being analysed to locate at which points ideas are developed, with "memoing" a key concept (Glaser 1998). Once initial findings were drawn from that, the generated hypotheses were refined, with effort taken to critically analyse the theories which are being developed. The study followed Glaser's approach of induction and that "all is data", rather than Strauss and Corbin's systematic approach (Strauss 1994).

Qualitative data was extracted from many sources, including audio transcripts of the post-demonstration interview and final stage, footage captured by the screen recording tool, and the participants' ethnographical descriptions of their professional environment. In performing a Grounded Theory analysis of this data, the audio transcripts were transcribed and key concepts for were collected for each participant, as presented in Figure 3. In the case of Artist A, it repeatedly seemed apparent that they considered Palimpsest to have a "clean interface" and so this was noted. As a

following stage, instances where the clarity of Palimpsest was mentioned within the textual transcripts were highlighted, as a means of understanding whether this view was consistent. Once a fully formed opinion had been understood, it could then be connected to their self-efficacy levels and experience with the tool.
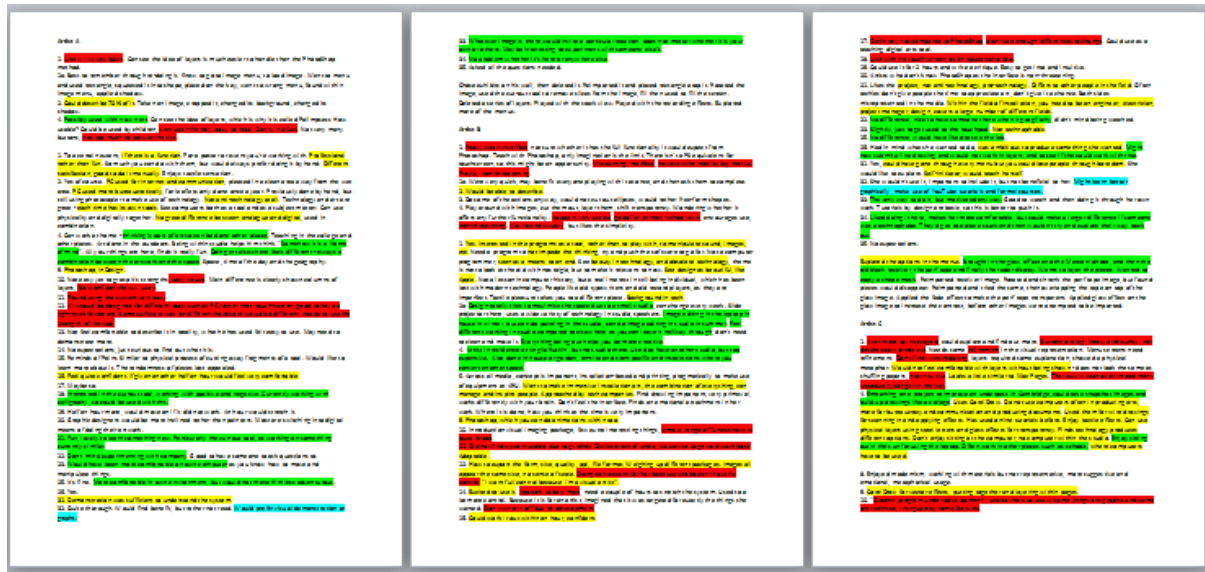
Figure 3 – Concept highlighting as part of Grounded Theory

6. Conclusions

The conclusions for this study focus upon numerous topics, both methodological and practical. These findings shall be divided in the following manner.

6.1. Self-Efficacy

The four self-efficacy questionnaires displayed highly differing levels of confidence concerning computer use. Whereas Artist A did not feel confident that they could use new software without assistance, and primarily used computers for more bureaucratic purposes, Artist B strongly believed that they could understand a novel package, having undertaken programming before and made use of editing tools. Neither Artist C nor Artist D confessed to enjoy experimenting with computer tools, but whilst the former only used devices for bureaucratic tasks, the latter made use of image editing software and saw the utility in artistic programs, but believed there were too many different packages to learn. All participants felt far more confident in completing a task if they were able to ask another for assistance, though the removal of time-constraints generally did not seem to affect their self-efficacy. Those who enjoyed tinkering and displayed confidence in computer use were able to interact with Palimpsest with greater ease during the free experimentation stage, requiring less assistance and being more assertive with their choices.

In comparing our findings to the previous study, there exists many instances of contrast. Whereas the 2013 work presented that those possessing the highest levels of self-efficacy in both visual arts and computer use found the most utility in the system, in this case a different result is seen. Artist C experienced several usability challenges with the system and therefore did not make meaningful progress during the free play period; the same participant explained they did not enjoy experimenting with software and possessed a relatively low self-efficacy score. However, although Artist B saw utility in the tool, they also experienced difficulty through attempting advanced functionality which was not present within the system. This individual was thoroughly acquainted with graphics editing tools, possessing high self-efficacy, but became frustrated that Palimpsest often could not undertake the same actions. In hindsight it would have been preferable if entirely novel functionality was presented to the participant, rather than some graphical editing effects in attempt to capture their interest. Both Artist A and D enjoyed making use of the system, believing there were possibilities for

it to be used within their own work. Although neither participants possessed very high computer use self-efficacy, they were experienced with technology, and therefore not intimidated by the tool. It appears that in these cases, where individuals both are not confused by the software and also understand its limitations, that participants see most utility in the system.

6.2. Professional Environment

All four participants believed that their professional environment is an important part of their art. Artist A believed that the studio is "somehow a frame of mind"; Artist B liked that artworks could be left out which assists the creative process; Artist C possessed numerous studios and believed the environment had a great effect; and Artist D confessed to feeling different within their studio, despite the portability of a laptop. Interestingly though, opinions differed whether the location of the study affected their experience with the system. Artist A felt more comfortable within their own environment, but did not believe it made them more adventurous, whilst Artist C confessed to wanting to view the interesting location of the Computer Laboratory. In contrast, Artist B enjoyed performing the study within a more personal environment, believing that "technophobic" individuals might be daunted in an alien location and less likely to experiment. Artist D described themselves as not a "typical studio artist", and did not think this task would differ greatly in another location, but that larger efforts might be affected. They also mentioned that for creative ideas it is preferable to not be observed, representing that a typical studio environment might be beneficial. It should be noted that this question was posed after the Palimpsest free experimentation session was completed and, although the artists might openly state that they would not have objected to an alternative venue, it is challenging to predict whether they actually would have acted in a different manner.

6.3. Meaningful Artwork

The studies also concerned interactions with artwork meaningful to each individual artist, ensured by requesting participants submitted a selection of images that reflect their artistic style. It was seen that most of the participants appreciated interacting with specific artworks, as a means of making the experience more engaging. Whereas Artist A stated they might have enjoyed using another artwork as a means of viewing an interesting new artefact, Artist B believed that their image allowed them to begin the task with a clear objective. Artist C differed slightly in that they thought that being challenged to replicate a completed project might be more instructive, but Artist D found that interacting with their chosen art was inspiring and revealed more possibilities than using simple shapes. Unfortunately Artist C encountered numerous difficulties regarding the Palimpsest user interface, expressing that they felt constrained, being unable to interact with their artwork in the way that they wished. If a higher computer use self-efficacy was possessed, it might have been possible for this participant to perform the actions they desired, and hence possibly regard the task as more similar to their professional work. It should also be noted that neither Artist A nor Artist C undertake graphics editing within their own work; therefore it is likely they would not experience a connection so readily as those who perform these actions on a daily basis. It is arguable that artists shall possess strong emotions regarding their artworks and therefore this might have had an effect on their interaction with Palimpsest. Whilst this is true, individuals could react in highly differing ways: embarrassed to use their personal artefacts, unwilling to modify a precious piece, intrigued to see how their work could be developed, or proud to present their favourite artwork. For this reason, it is not obvious to conclude that interacting with personal artworks shall assist a professional artist to engage with Palimpsest to a greater degree.

6.4. Palimpsest Utility

Participant opinion on the Palimpsest system differed across many topics, but also displayed consistent similarities. Artist A found the interface "clear" and "basic", finding the arrangement of layers easier to understand than within commercial graphics editing packages. They also believed that the "cut-out" function of the system offered benefit and possessed similarities to actions undertaken in their non-technological professional work. Artist B also praised the "clean interface" and believed it "non-threatening", but found the lack of advanced image editing functionality an issue. They accepted

that the tool could perform complex actions which other packages could not, and believed the system could be useful as a niche product for touchscreen devices. Artist C stated they did not find the interface intimidating, but disliked the aesthetic presentation of both the layers and menu buttons. Artist D similarly regarded these buttons as "clunky", but appreciated the clear feedback, "direct" interface, and believed the product to be "very accessible". Both Artists B and C commented upon the lack of "undo" functionality as negatively affecting their experience, but all participants stated they could see some application within their own professional work. Artists A and B both believed the system could be used to teach graphics editing to children, whilst D saw the tool as valuable for mock animation. Opinions appeared to differ based upon computer use self-efficacy levels and background: Artist B was confident and hence found the system constraining, whilst Artist C disliked experimenting with technology and therefore regarded the unfamiliar interface to be confusing. Artists A and D did not possess particularly high self-efficacy levels but were not intimidated by the tool, and hence were able to both make progress during the free play session and see real opportunities for the system within their own work.

It was also found that three of the four artists admitted that they often learned the most effectively through graphical means or demonstration. Artist B and D both admitted to using YouTube tutorials for learning complex concepts, whilst Artist A disliked text-based instructions and preferred graphs. Currently the Palimpsest tutorial is provided through a linear, 53-step, textual process, and several participants commented that they might prefer an alternative approach. Artist C, who experienced difficulties interacting with the system, found the help menu lexis to be "confusing", and expressed that they would have responded more favourably to examples. These findings suggest that artistic users might learn more effectively if graphical or video-based instructions were included within the Palimpsest system. Though the exploratory period was only twenty minutes, therefore making a complete understanding of the system challenging, this study reflects upon artist's initial reactions to Palimpsest and the utility they believe it can bring to them. A far longer demonstration and free-play period would be required to establish total understanding; less feasible when studying professional artists working within their own professional environments and looking to emulate the practice of working rather than tuition.

6.5. Champagne Prototyping Extension

The key methodological concept within this paper was the development of a novel Champagne Prototyping extension. To best analyse the utility which real artists found within the Palimpsest tool, participant observation was undertaken within their own professional environment, and using artefacts which they regarded as typical of their artistic style. All participants stated that they felt comfortable within their studios, with Artists B and D also believing that modifying their own artworks assisted them in seeing a clear objective for the task. With all artists also seeing some utility for the tool within their own work, it is possible that this methodological extension assists participants in viewing the actions within the study as not greatly dissimilar to their own professional tasks.

Further Work

Further work could be undertaken to explore interesting concepts from this study. One user commented that they would have been able to evaluate the system more comprehensively if the software was distributed in advance and then participants were asked to create an artwork which they found interesting. Palimpsest could be emailed to participants with the tutorial included, and two weeks later asked to present their product and explain their experience of the process. In this situation an artist would be less constrained by temporal pressures and have a greater opportunity to fully explore the system; it would be of interest to study the utility that was found in this situation. To test the learnability of the software, a participant could be presented with a demonstration of the system, and their recall on how to perform a task could be assessed at varying time intervals; perhaps immediately, one day, one week and one month. As a means of further exploring whether the environment in which an action is undertaken, or the customisation of an artwork, has an effect on participant experience, it would be possible to assess ten artists within laboratory conditions with

general tasks, and ten artists within their own studios and using their own art, before comparing their responses.

Acknowledgements

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