WORKPLAY: A DESIGN FOR AN IDEATION SKETCHING SYSTEM

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Introduction

This critical evaluation is concerned with the field of communication studies. It proposes a design for a sketching system dedicated to the purpose of idea generation(ideation) and communication. The system provides a specific user group with a better means of communicating information. The study set out to establish firm historical and contextual support for the development of such a system.

The concept to develop an ideation sketching system evolved from experience in the field of technology research and development(R+D), where, in the early stages of product development, known as 'the fuzzy front end', the concise communication of an idea's core values is critical.

This study will show that within the technology sector there is no standard system capable of conveying these values. It will further show that there is no established standard of grammar for a 'visual language', but that these studies have led to a theory and hypothesis for developing one.

The tool is called 'workPlay', because it combines creative qualities of play in a work tool. workPlay is a software system that uses sequences of words and pictures in a format similar to a comic strip to communicate serious stories or scenarios.

The aims of the study are to provide an author of workPlay who may have little or no artistic training with the means to express and communicate ideas in a concise and clear way. The tool further aims to make the information comprehensible to range of people with different learning styles.

The project has been critically reviewed by professionals, academics, and experts working in the fields of science, technology, design and education. Their responses to survey questionnaires in a series of expert reviews, and in particular their comments, suggest that there is a need for an application such as workPlay, that workPlay has the potential to provide value, and that now, they would just like to play with it!

Chapter 1

1.1. Definitions

Picture Space
Picture space refers to the perception of graphical elements and spatial dynamics within certain defined borders of a picture.

1.2. Methodology

To achieve the aims of the study, several methodologies were used in various areas of research.

Since workPlay is designed to be authored in-house by people who may have little or no training in art, design, or communications, the methodology to develop the workPlay visual communication system was shaped by the requirement to develop a graphical system that is as simple as possible, both to use and to comprehend.

It's one thing to determine that a system needs to be simple, but how simple can a graphical system be and still remain comprehensible? If a simplified representation and a highly detailed representation are at opposite ends of a continuum, at what point does the simplification of the representation begin to have a detrimental effect on the reader's comprehension? This 'tipping point' between clarity and ambiguity suggests a point where communication is achieved by the most economical means, a point where it is just-barely-good-enough.

To discover the tipping point, the design strategy took a bottom up approach. It first considering whether a graphical element is necessary. Then, it considered its most simple form, and added levels of detail or complexity only when necessary to enable comprehension. In this way a balance between the needs of the author for a tool that is easy to use were weighed against the needs of the reader for a system that is easy to comprehend.

To create an environment that would encourage the development of new ideas, the methodology included the implementation of a schedule of rapid product development, a strategy used in software development to accelerate production. The strategy stimulates ideation, encourages innovation, and creates an environment that favours 'model surprise' (Schrage).

Unique products come from unique processes; commodity products come from commodity processes.' (PC Designer cited in Schrage 1999, p.29).

1.3. Introduction

A tool that is to provide an environment for creativity and innovation must, itself, be shaped by creativity and innovation.

Aim1 of the Program of Study required the development of a new or 'unique' kind of system. To fulfill this first requirement, the research methodology determined to either, look to places that had not been looked at before in relation to this subject, to look at existing ideation tools from a new perspective, or to find a unique combination of theoretical and practical research that would lead to a unique solution.

Aim2 of the Program of Study requires the development of a graphical system 'that enables a user who has little or no artistic training to convey concepts... and communicate them effectively', a requirement made necessary by the intention to make the visual communication system available as an in-house software application. This 'user experience' requirement is reflected in two design considerations; the ability of the author to create effective communications, and those of the reader to comprehend them. The study began with the assumption that neither author nor reader would have any special training in design, art, or communications. Research was conducted in the areas of semiotics and the analysis of early forms of art and writing, and information communication.

Aim3 requires that the tool provide 'an environment for holistic and creative thinking that readers with different learning styles can comprehend'. It was considered that the holistic and creative environment would be provided by achieving the first two aims, and by research studies in visual and creative thinking. The requirement to accommodate different learning styles suggested research into psychology.

With these aims in mind the historical and theoretical research that would lay the groundwork for the design of the visual communication system and provide it with qualities of simplicity and clarity, began by looking at a simpler time in history.

1.4. A simple system of communication

The pictographic art of ancient Egypt spans more than three millennia. It is a system of communication that has been proven to work. But, how does it work? What principals and devices does it use to convey information? Can it be adapted to a modern system of communication?

Gay Robins has established the extent to which the Egyptians used a square grid to guide the composition of the designs, and by doing so shows a long process of evolution. Once prepared, the grid is used to guide the arrangement of hieroglyphic writing and pictorial imagery that occupies the picture space. The picture space is defined by the graphical elements of frame, border, ground line and registers.

Schapiro establishes the role of the frame as fulfilling a need for clarity(Schapiro 1973, p.11). While Schmandt-Besserat asserts that, around 3,000 B.C., marks used in notations for commerce were adopted by art as ground-lines and registers. Acting as 'organizing principals', registers greatly increased the narrative scope of the art leading to its ability to convey narrative (Schmandt-Besserat 2007, p.1).

The pictorial system of figures, furniture and details of scenery are highly formalized, relying heavily on qualities of shape or contour to convey much of their meaning – a perception that functions at a very high cognitive level(Arnheim 2004, p.29). Robins refers to objects being shown in their 'characteristic form' (Robins 1994, p.3), conveying, what later became for Plato, modes of essence (Neiva 1999, p.79). The composition of pictorial elements followed rules of placement, size and orientation, through which the importance or rank of figures and scenic elements are clearly indicated by a code that appears, even to the illiterate, as self evident(Schapiro 1973, p.16 and Schmandt-Besserat 2007, p.1, 59).

Uspenski provides some detailed observations of the picture space while establishing a theoretical basis for 'the semiotics of the Russian icon'. And Robins reminds us of the treatment of the flat picture space and the attention paid to creating a balanced design(Robins 1994, p.11).

Uspenski also draws attention to the necessity of 'restrictions' within a system, and that it is by them that the reader is able to appreciate what is of importance

and what is not (Uspensky 1971, p.32). Uspenski further suggests that certain design elements have equivalent grammatical partners, such as the duplication of pictorial elements and the grammatical number, plural (Uspensky 1971, p.14).

The same concept of picture space and principals of design used in early Near Eastern art were still in use when the Bayeux tapestry was created in the 11th century. In this narrative depiction of the Battle of Hastings the rules of pictorial 'grammar' have evolved to become more complex. But, the elegant integration of pictorial art, words, and the graphical framework of registers and borders into a cohesive narrative makes it easy to understand.

Uspenski establishes useful concepts for what he refers to as an 'inverted perspective' in medieval art, an illusion to which the viewer adds dynamic movement by changing their position. Gombrich refers to this as 'the roving eye' (Gombrich 1999, p.27). In 'Uses of images',Gombrich, clearly an advocate of the pictographic approach, examines its decline in the early part of the 16th century as it gives way to the growing influence of the principals of linear perspective. He links the reason to the perceived need to show more than just 'what' something is, but also the 'how' of an event (Gombrich 1999, p.19). The point is well made, indicating how deep the forces that drive such changes might be.

Mimetic art – art whose goal is to imitate nature – continues to the present day to be used as a benchmark by which a certain view of 'reality' is judged. Neiva reminds us that Plato 'abhorred perspective' (Neiva 1999, p.79), and provides ample evidence that today people are willfully duped by the appearance of mimetic imagery, just as the birds in the Greek tale of Zeuxis and Parhasius were duped by Zeuxis' painting of grapes.

Visual communication systems based on pictograms or ideograms are in wide public use today, however, the scope of their use appears to be limited to the role of communicating pedestrian information or illustrating texts. None appear to have been developed as an integrated part of a narrative 'language'.

Isotype is a point in case. Designed by Otto Neurath(1882-1994) and illustrated by Gerd Arntz(1900-1988) in the 1940's. The system still stands as a milestone in the evolution of graphic communication systems. Designed to illustrate educational texts, its influence can be seen in public signage. Compared to the consistencies seen in ancient and medieval pictographic art, the series of approximately 4,000 images have many inconsistencies of stylistic

representation. The variations range from silhouette profiles to high contrast three-quarter views. When seen in isolation, these variations are not apparent to the reader, but, when seen in numbers they require what Gombrich has pointed out as 'a different way of looking.' (Gombrich 1999, p.38). The variations suggest differences that have little, if anything, to do with the nature of the object itself.

Sharon Spencer's Full-English is closely styled on Arntz's work, and as a consequence, inherits many of the same traits. There are the same inconsistencies in style. The high-contrast, three-quarter views in particular look dated and have a Continental European feel, like something one would expect to see in a 1950's Graphis magazine. Interestingly, the silhouettes do not carry the same stylistic baggage, which leads one to wonder if the apparent difference has to do with their simplicity? Spencer's work was conceived as a keyboard activated typeface, and although after its creation she shows how it can be used in various ways, including narrative. But there appear to be few 'grammatical' rules available for doing so.

A purely typographic application of pictograms is the font Apocalypso, designed by Jonathan Bambrook. Like Spencer's work, there are stylistic variations, but here they are designed to communicate different types of concepts and are arranged in fonts. There is no pretense of providing a language, they are simply presented as illustrative tools.

1.5. Theoretical framework

From what has been studied of the theory of semiotics, as developed by Charles Peirce, it is conceived as a philosophical system of thought to facilitate understanding. The theory maps the relationships that connect objects, signs, and, through the interpretation of their meanings, people. Of significance to this study is the third branch of Peirce's semiotic, speculative rhetoric, which concerns itself with the transmission and interpretation of information. Also, the concept of the triadic relationship, which has been influential in forming arguments on language in the concluding chapters.

As Roland Barthes suggests in his introduction to 'Elements of semiology', the path of any work that involves semiology will at some point lead to language.

Barthes builds on the linguistic philosophies of Saussure, a structuralist who's semiotic principals differ considerably from those of Peirce. In 1964, Barthes

recognized the infancy of semiology and almost playfully began to map elements of its application to linguistics by turning Saussure's ordering upside-down, considering semiology a part of linguistics. He then proceeded to mold his theories like a sculptor working clay.

Barthes' claim that 'it appears increasingly more difficult to conceive a system of images and objects whose signifieds can exist independently of language.' (Barthes 1964, p.10) may be taken as the opinions of an over-zealous linguist, or as an alternative philosophy to those who believe that all thought relies on the visual. For Rudolph Arnheim(1904-2007), thought is dominated by the visual. He questions whether one can think in words (Arnheim 2004, p.227).

Generally accepted opinion on visual thinking is that approximately 60 to 65% of people think visually, the highest proportion. Of these about 30% rely strongly on visual/spatial thinking. Only 25% of people think exclusively in words. These statistics indicate the dominance of visual/spatial thinking and supports the notion that a strongly visual communication system will ensure that it is comprehensible by a wide range of people. Considered relevant to the development of the workPlay software system, a critical study conducted on the role of imagery in computer program comprehension supports the use of imagery(Raquel Navarro-Prieto).

When considering how a visual communication system will operate and how it will be learned, the work of Howard Gardner(1942-) appears useful. In developing the Theory of Multiple Intelligences, Gardner sought to expand the accepted standards by which intelligence could be measured. The theory was intended for use in education, but in that sector the theory does not appear to have widespread support.

While Gardner's 'intelligences' speak to different learning styles, Edward de Bono(1933-)proposes different thinking strategies. De Bono is probably best known for developing theories of lateral thinking. He has, among other things, dabbled in language systems, devising a system that enables people to create new words by using numbers.

Finally, a popular personality-type indicator called TrueColors claims roots that go back to Hippocrates and traces the study of people's personalities through Carl Jung's publication 'Psychological Type' to the Myers-Briggs' Type Indicator. Similar to Gardner's and de Bono's systems, TrueColors proposes that there is a

finite number of core personality traits, of which everyone has a measure of each, with dominance in one or two.

The value of these theories has less to do with their scientific validation than the fact that they begin to address the fact that people are different; that people think differently, act differently and therefore learn differently. Linking some form of behavioral considerations of this type to the modal functions of the workPlay system might be a strategy for ensuring that a wide range of people can both author and read workPlay.

1.6. Hypothesis

The review of literature led to the formulation of a hypothesis that would be a foundation for the design practice.

That a design for a unique system of visual communication dedicated to ideation sketching may be achieved by integrating the following two elements;

1/ the adoption of principals used in early pictographic art to the development of a visual communication system, and

2/ the development of a mode of use (in this case, a software system), that will serve as the medium by which the visual communication system will be authored and through which communication will be achieved.

1.7. Summary

The qualities discovered in Egyptian art, and in more recent examples in medieval Europe, provide examples of simple, easily comprehensible graphic principals that can be adopted to the design of the workPlay graphical system. It is through these studies that the value of a cohesive multimodal system, a system in which the modalities complement and support each other in conveying information, have been learned. Although pictograms are still in use today, there does not appear to be a modern equivalent of a multimodal, visual communication system with the same qualities as those seen in ancient Egypt.

The philosophical structures developed by Peirce, with their foundation in logic, mathematics and science provide a model for thinking about the importance of relationships at various levels. Barthes provides a good starting point for

understanding the linguistic theories of narrative and grammar, as do Uspenski and Schapiro. Visual thinking or thinking in pictures is the most dominant form of thinking, suggesting that an equivalent reliance on imagery in the workPlay visual communication system will ensure that it is comprehensible by a broad range of readers.

Directing the design of the modal function of workPlay according to a reliable source of theoretical psychology appears to be a good strategy to fulfill the aims of making the authorship of the system broadly accessible and the communications broadly comprehensible.

Chapter 2

This chapter will position workPlay in a historical and cultural context. It will describe the environment within which the tool is designed to operate and establish the path that led to its development. It will identify products and programs that have similarities to workPlay and determine that there is no tool available that has the particular configuration of capabilities that workPlay has. And finally, it will consider theoretical research that may be applied to the development of workPlay's design.

2.1. The ideation environment

Research and development(R+D) labs are the playgrounds of science and technology companies. They are places where people experiment and explore in order to generate new ideas – a process called ideation. Ideation is serious play, an activity that brings elements of the creative process and the scientific method together in pursuit of new ideas and innovations.

'There is no better medium for gaining insight into the ethology of innovation than tools for serious play.' (Schrage 1999, p.3).

In the ideation environment ideas are afforded an incubation period, but they are not immune to global conditions or the pressures of time. The pace of new product development has accelerated in the past two decades, a direct effect of globalization. In developed countries, economies have shifted from dependence on tangible products, such as electronics, clothing and health products, to intangible products and services(Wujec 2002, p.23), which effects the kinds of things people ideate about, and the way they express them. There has also been an increase in collaboration(Friedman 2007, p.8), effecting the way people share their ideas through computers, software, and groupware(software that enables collaboration).

There are many informal mechanisms for the expression of new ideas that can be thought of as sketches(Buxton). Sketches may take many forms; a short narrative, a quick drawing, an ad-hoc construction or piece of video. What qualifies something as a sketch is its economy of effort, very much in the spirit of being just-barely-good-enough, and the intention, made evident by the execution, that it is not a finished work.

‘Sketches and prototypes provide shared points of reference against which we can compare or contrast other ideas.’ (Buxton 2007, p.412).

Whether the particular combination of ideas that will form the next iPod can run the gauntlet of tests, analysts and accountants depends not just on the apparent validity of the ideas, but also on the ability of those who generated them to express their core values and communicate them quickly and clearly to others. Various methods and tools are used to streamline this process: brainstorming helps people generate ideas, mindmapping helps people organize ideas, products like Microsoft Visio and iRise help people visualize ideas, and theories like TRIZ use algorithms to help people identify unique ideas.

As ideas begin to develop, more is invested in them. They are tested against appropriate metrics. Focus group tests are designed to find out what users think.

Typically, information presented in focus group settings take the form of text-based scenarios – stories within which the user experience is enacted. To help construct ‘realistic’ scenarios, ones that describe what typical users might do, profiles of stereotypical users, called personas, are used.

As a vehicle for communicating important information the value of storytelling is being recognized by organizations and corporations. ‘Author and storyteller, Steve Denning, works with the corporate world in an effort to bring the power of storytelling to knowledge management.’(Wujec 2002, p.213). Individual stories may be specific to a particular culture, but according to Barthes narrative is ‘international, Trans-historical, Trans-cultural’ (Barthes 1977, p.79). Well crafted stories have an ability to clearly convey a range of concepts with which people can identify so that concepts that might otherwise be incomprehensible are made clear through analogy, and further, through metaphor, simile, and allegory.

The use of text as a format for developing stories and scenarios is convenient, it is accessible, and it utilizes skills that most people have. But, as a stand-alone mode of communication it has limitations. It’s ability to trigger conceptual images and thereby fix an idea in the reader’s mind is limited by the skill of the writer and the limits of the reader’s imagination. This is an issue of particular importance when the subject of the story involves human activity, nuances of which can require a lot of text to explain.

'The use of pictures to record, to instruct and to amuse is ancient and instinctive.' (Gifford cited in Bedenham 1997, p.14).

Pictures are not linear. They do not engage the same mental capacities as text. They display information instantly and provide the reader with a constant anchor for thought. When pictures are used in combination with words, the communicative power of each can to be magnified. Now multimodal, a dynamic interplay takes place between the 'picture-meaning and text-meaning' (Pullman cited in Bedenham 1997, p.11).

'Words and pictures belong together. Viewers need the help that words can provide.' (Tufte 2001, p.180).

When a scenario script is combined with sequential imagery it takes on a familiar form, that of the comic strip or storyboard. The general term that will be used to describe this media will be 'visio-textual narrative'. The term that will be used to refer to scenarios that have been illustrated will be 'graphic scenarios'.

The key benefit of graphic scenarios is that, for the reader, they are quicker and easier to understand than text-based scenarios. They have been used successfully in usability testing and high-end presentations. The key drawback for companies wishing to use graphic scenarios is authorship. Currently, the creation of the images, and often the development of the final graphic scenario, can only be supplied by a expert graphic artist – someone to whom the work has to be outsourced. For technology companies, and any organization that values their intellectual property(IP), one major drawback to this arrangement is the risk of disclosure. Others include; inconvenience, cost, and loss of time.

Attesting to the effectiveness of visio-textual narrative, Kevin Cheng uses a traditional comics approach to help enterprises 'focus on the users' experience and determine the story around how users will interact with a product.' (Cheng cited in Spool 'Jared' (2007) WebRef.2). In collaboration with Bill Buxton, Principal researcher at Microsoft and a pioneer in human-computer interaction(HCI), Cheng tested the effectiveness of the comics approach against traditional 'wireframe' presentations. The response was 'overwhelmingly positive'(Cheng cited in Spool 'Jared' (2007) WebRef.2).

One of the reasons for making a distinction between graphic scenarios and comics, is style. Comics have a 'comic' tradition based on humor. Cheng's

work may be considered a typical example of comics art. In isolated instances the style may find a use, but it is generally not appropriate for the ideation environment.(see chart).

element	Traditional comics	workPlay
mood	humourous	serious
colour	juvenile	mature
characterization	caricature	idealized
framing	informal(cropped)	formal (uncropped)
figure proportions	exaggerated	realistic
poses	dynamic	restricted
perspective	linear perspective	Axonometic

A comment made by a Technology panel member in response to a question regarding the role of workPlay, hints that style can be an issue.

'when I used this technique with the Europeans, the feedback I received was that the cartoons trivialized the problem and the proposed solution. The same images were well received in US/Canada.'

Self-authorship of comics is accessible through online software applications called comicMakers. Those reviewed in the research were found to be designed for the purpose of amusement. Many are promotional supplements for characters made popular in other entertainment media, such as Dr. Who, Futurama, and Garfield. A few are quasi-educational. One(WebRef3), provides graphics that appear to adhere to the principal of being just-barely-good-enough. The simplified, pictographic environment is not unlike the one proposed for workPlay. A comparison study was conducted (see appendix 3)

Easy access to comicMakers does not make everyone who uses them a comic author. The ability to tell a good story eludes most people who have an inclination to create comics. The fact that it might elude authors of workPlay is considered later in the study.

There is a commercial product on the market, the visio-textual narrative format and software architecture of which, is identical to that of workPlay's. Storyboard Quick is a software program that enables self-authoring of storyboards. The similarities between Storyboard Quick and workPlay confirm the integrity of

the workPlay software design, and that there is a market for ideation tools. Storyboard Quick and workPlay are dedicated to different tasks in different markets, consequently the visual communication systems have evolved along significantly different trajectories.(see comparison study appendix 4).

Since comics theory applies itself to a visio-textual narrative system similar to the one being developed in this project, it may reasonably be applied to the design practice.

Yuri Engelhardt has a PhD from the dept. of Cognitive Psychology at the University of Amsterdam. In his dissertation 'The Language of Graphics' (J. von Engelhardt, 2002. The Language of Graphics. PhD. FGw/FNWI: Institute for Logic, Language and Computation)Engelhardt addresses issues of visual grammar, syntax and many other aspects of language. It is a thorough study that draws on a broad range of research and influences. It also appears to be well grounded in its practical application.

Neil Cohn is a student of Ray Jackendoff, an American linguist. Cohn has developed a number of linguistic theories that describe the grammatical structures of various aspects of visio-textual narrative, in particular, comics. Straddling the comics and academic cultures, Cohn strives to bring clarity to the hotly debated subject of 'visual language'. In a series of columns for comixpedia.com, Cohn writes 'on a theory that sequential images can actually be called a language -- a visual language -- which emerges along with text in comics'(Cohn), and comments on such topics as framing(see also Schapiro p.6), visual poetry, and closure.

In 'The language of comics' Bedenham considers several narrative analysis formulas in order to complete his research, including one developed by Barthes, before settling on Longacre. Bedenham explains the reasons for his choice as; its ability to accommodate short story narratives, textual considerations, and it's ability to include imagery as part of the formula.

Cohn and Bedenham both analyze comics from a linguistic perspective, and each claims that comics are a visual language. Engelhardt proposes that graphics are a visual language. The extent to which these claims might be considered correct is addressed in Chapter 5.

2.2. Summary

In the process of ideation within the technology sector there are many 'formal' tools that provide a limited ability to visualize certain types of information. However, none convey the user experience in a visual way or offer a creative environment within which ideas can incubate and evolve. Within this environment there is value in storytelling and there is value in an appropriate medium within which ideas are allowed to float and form around stories. Graphic scenarios are recognized as having value for certain tasks, but outsourcing the artwork component causes issues of accessibility, timing, and IP protection.

Research suggests that people's perceptions of the graphical styling used in an ideation sketching system needs to be considered in the design. Precedences for self-authoring visio-textual tools are identified in comicMakers and in Storyboard Quick. Both support certain design directions that have been taken in the development of the workPlay software system. And finally, it is found that because of the similarities in format, comic theory may reasonably be applied in the development of 'grammatical' theory and a set of standards for the workPlay graphical system.

Chapter 3

This chapter describes design processes that have been shaped by the second aim of the project, namely, 'To develop a comprehensive plan for a graphical system that enables a user who has little or no artistic training to convey concepts related to dynamic human activities and communicate them effectively to others.

3.2. Picture space

As has been mentioned, in its day ancient Egyptian art was instrumental in helping to establish the formal framing and sub-divion of the picture space. Those principal now appear to be deeply entrenched in the modern psyche. Framing of the picture space is a convention that is used in many of the models on which this project is based, including; storyboards, graphic scenarios, and comics. The design directive for this project, that of creating a system that, for users, is as simple as possible, demanded that each element under consideration for inclusion in the system be evaluated for its impact on the complexity of the system and its value in facilitating user comprehension, and, that each element accepted into the system be user tested.

Research on Chinese scroll painings and the Bayeux tapestry suggest that the absence of a frame enhances continuity from scene to scene. Design concepts were implemented in the first pilot survey, StarTrek Generations: the storyboard. The results of the survey suggest that the design was generally acceptable. The design also appeared to be well suited to the subject, adding to the impression of space and time.

On re-reading Bochi, a connection was made between her observations and the results of the recent survey.

'..figures typically occupied a space that was ill-defined, which imparted a neither-here-nor-there quality to the scenes, hence, by analogy, a space free from time.' (Bochi 2003, p.55).

This lead to the hypothesis that there might be a direct conceptual connection between the use of framing, the perception of space within the frame, and the notion of time.

With no formal 'container' to hold the picture information, other ways to define the space for the reader were investigated. Influenced by the positioning of text

in the Batuex tapestry, it was found that the placement of narrative text and keywords above the picture space helped to define the picture space without the need for a formal, drawn frame. Also, the introduction of a ground line, a device used in Egyptian art and the Bayeux tapestry, was found to play a dual role of providing a base for the main figurative elements in a scene, and marking the lower limits of the picture space. The remaining scenarios used in the research were successfully presented in this way. When asked how well these features worked, in separate presentations the two expert review panels rated the feature at 85% and 86% successful.

Another device adapted from the research on pictographic art – registers define a space within the picture space. Through experimentation it was found that when smaller figurative elements were positioned slightly above the ground line it created an illusion of distance, a principal similar to that used in traditional chinese paintings known as 'Chinese perspective'. When positioned on registers the same figurative elements appear to occupy a space separate from that defined by the ground line.

The ground line defines the primary space of a scene. Following the convention of using size to denote importance, on it the most important figurative elements rest. Elements that play a supporting role to the main events of the scene are represented smaller and, as mentioned, are located at a fixed point above the ground line. In addition to these two scales of size, a third, and smaller scale of size is used to show pictograms or icons that support the narrative. The concept for these, again, has been derived from the Egyptian pictographic arrangement, where hieroglyphic writing, sets of pictograms, are arranged around the main pictorial elements of the scene.

Registers are positioned in the picture space on a grid. In the design process, the grid, based on the nineteen-quare grid described by Robins, is used to define and standardize the proportions of the figures.

3.3. Text

'pieces of text, then, can simplify, complicate, elaborate, amplify, confirm, contradict, deny, restate or help to define different sorts of meanings when they interact with images and objects.' (Hall 2007, p.98).

workPlay uses text in three forms; a narrative storyline, dialog, and keywords. The convention of using a combination of narrative storyline and dialog is standard to comics, storyboards and graphic scenarios. The addition of keywords adds an interesting dynamic. The concept to incude keywords was influenced by a presentation made at a special interest group(vizThink) meeting, and a demonstration of how a paragraph of writing can be read in a few seconds by emphasizing keywords throughout the text. Could the same effect of simplifying the message be achieved with kewords integrated throughout imagery? Studies of the Bayeux tapestry re-inforced the value of keywords and provided an example of how to integrate them with pictorial art. The concept was tested in the second pilot survey, 'Jamie and the Rosetta Stone'. In the expert review; 'Introduction to workPlay' , when asked to rank the use of keywords, the average response was 78% good.

'I though the combination of the figurative system and key words was used very effectively to aid understanding'

The position of the narrative text was explored. It was found that in the case of a simple story, one where the picture conveys much of the message, the narrative text works well below the image where it serves to confirm and support the pictorial action. In the case of a complex story, narrative text positioned above the image serves to introduce and explain the scene.

When asked to rate how well the narrative text worked positioned above the image the Technology Panel response was 87% positive.

'Unless deliberate obscurity is sought, avoid surrounding words by little boxes, which activate negative white spaces between words and boxes.' (Tufte 1990, p.62).

The principal of not using a frame around each scene was logically extended and applied to the dialog text. This treatment of the dialog can be seen in some comics. The absense of a dialog box limits the text to areas of the composition that are free from any pictorial elements, a limitation for designing a composition but one that ensures that the design remains flat and simple to comprehend.

3.4. Figure

The limited range of movement and formal poses used to depict figures in Egyptian art suggested that any figurative system based on it would be relatively easy to author. Also, although limited in its ability to represent a wide range of dynamic movement, the style would lend itself to modularization, an important consideration for this project.

The methodology used to ensure that the figurative system was as simple as possible followed the same bottom-up approach used elsewhere, keeping the number of poses and body parts to an optimum size that was just-barely-good-enough. From the initial set of adult male poses, sets of female poses, Asian figures, and then sets depicting five key age groups in each gender were created as needed.

3.5. Colour

The design for the personas used in the first pilot survey were rendered in a full range of colour, including natural skin tones and clothing that was faithful to the original. There were found to be issues of identification. The limited size of the figures had the effect of limiting the number of visual cues available to a reader in identifying one persona from another, and the use of full colour drew attention from them further.

On the subject of the use of colour in graphics, Tufte had this advice: 'Above all, do no harm.' (Tufte 1990, p.81).

It was decided to try tinting the figures, and several schemes were tested. The outcome was to implement a two-teired system of tinting; a primary tint applied to an entire figure to identify it with a certain group, and an optional secondary tint applied to certain parts of the clothing to denote differences within the group, in the case of the StarTrek storyboard, rank. Tinting grayscale figures became a graphic standard throughout the project.

One of the benefits realized by limiting the colour palette to tints was that it left the spectrum of more saturated colours available for the resolution of design issues that would arise later, the depiction of emotion being a point in case.

3.6. Summary

With the goal of finding design solutions that for the user are simple to understand and the directive to use a bottom-up approach in order to do so, elements identified in the research on pictographic art are analysed and considered for adoption into the workPlay system. In this way, the picture space, the texts, the figurative system, and colour palettes are defined, tested, and refined to become the graphical standards of the system.

Chapter 4

Design Findings.

This chapter presents findings that address aim3 of the Program of Study. They are divided into two sections; those that address the requirement 'to provide an environment for holistic and creative thinking', and those that address the requirement to provide information 'that readers with different learning styles can comprehend'.

4.1 An environment for holistic and creative thinking

4.1.1. Sketching

The essence of workPlay is to provide a means to sketch ideas. Ideas can be fleeting, hard to pin down, and harder to express. The speed with which ideas can be expressed by a given media effects the author's ability to form or reshape them on-the-fly. All current sketching media account for this need to respond to the flow of ideas. A pencil responds instantly to the movement of the hand to shape a design on paper. Can workPlay respond in a similar way?

The software configuration consists of two separate components; a software engine that enables the author to write scenarios, create personas, compose scenes, and manage multiple scenarios; and graphics libraries that provide the author with sets of styled clothing and props to make the imagery in the scenarios more presentable. Research on technology industry standards that was being conducted in preparation for the series of expert reviews touched on the need to develop classes of users as an important step in defining use cases(WebRef.1). The concept of persona classes and how they might be used to offer workPlay authors various authoring options emerged. Whereas the original process of developing a scenario involved the author first creating a cast of personas by linking to various graphics libraries, then working with them to compose scenes for scenarios, the new concept involved the author using only the core softwrae engine component and a basic set of figure manikins that it provides. With them the author can sketch scenes quickly. When they are satisfied with the results the scenario can be 'dressed up' by connecting it to any one of the available graphics libraries.

The value of providing this capability was tested by describing the process in the last scenario presented to the Technology panel. When asked if the 'quick

sketching capability added any value', the response was 100% yes, with the following comments:

'It allows the user to quickly try out ideas'

'To be able to sketch different scenarios quickly, to try out different ideas and send for review electronically, is a real strength - decreasing development time and reworking. You can get the essence of the message before adding the higher level of graphics. I think it makes a great storyboarding tool.'

4.1.2. Seamless Integration of information

The observation that workPlay was capable of presenting different types of information seamlessly was made during tests of an early version of the 'Introduction to workPlay' presentation. It was unexpected.Unplanned. The regime of creating and refining designs on a schedule of rapid development enabled the observation to be tested in the next iteration. The following synopsys describes the process of discovery and the hypothesis derived from it.

The first two pilot surveys communicated typical narrative information, stories from beginning to end. The 'Introduction to workPlay' scenario was different. It performed a task that workPlay was not specifically designed to do. In a style that might typically be associated with a Powerpoint presentation, it described the features and benefits of a product; workPlay. To do so, it used two different types of information, narrative and diagrammatic. Typically, when these two types of information are presented in the same presentation they are rendered in distinctly different styles, often because the visual material is cobbled together from different sources. These inconsistencies throughout a presentation cause the reader to continualy adjust to, what Gombrich refers to in reference to in a similar conflict of styles, require a different way of looking.

'...decoration, sequential narrative, and dynamic evocation each demand a different way of looking.' (Gombrich 1999, p.38).

This imposition to change ones 'way of looking' from slide to slide, or in the case of the workPlay presentation, from scene to scene, did not occur. The narrative and diagrammatic information flowed smoothly as if it they were of the same 'language', which indeed they are.

An satisfactory analysis of how workPlay achieves this level of integration, appart from the obvious continuity of pictographic style, was not evident until by chance a connection was made with research that was being developed on the framing of imagery. Diagrams are never cropped, and rarely need a graphic frame to contain them. Narrative scenes in workPlay also do not employ frames or allow cropping. It is considered that the similarities in the use of these very basic compositional in combination with the consistency of style, accounts for the phenomena. After noting the effect, the next version of the questionnaire asked the respondents to rank its value. It was rated 73% good.

4.2. An environment....that readers with different learning styles can comprehend.'

4.2.1. Native modalities

The native modalities of the system include; imagery, words, and interactivity. According to Gardner's theory of Multiple Intelligencies, each of these modailties addresses a different intelligence. In terms that are acknowledgedas overly simplified: imagery accommodates visual-spatial; words accommodate verbal-linguistic; and interactivity accommodates bodily-kinesthetic. The addition of sound, animation, and media would extend the range further to accommodate an even broader range of user types.

4.2.2. Layered learning

The potential benefits of layered learning were discovered in the early stages of primary research. A scenario had been developed with the purpose of identifying an optimum level of graphical detail for the visual communication system.
The scenario was presented three times. With each reading the level of detail increased and the respondent was asked to provide feedback on their ability to comprehend the story. The following response triggered the idea to test the application of the process for another purpose:

'Its very interesting in that I preferred the first version because it stimulated interest by being more obscure than the second. On the other hand the second left much less to the imagination so was more boring but more affirmative and educational.'

Mike Pickard, Research Fellow

The hypothesis is; that when a reader is provided with a minimal level of narrative information it engages the imagination. By doing so it involves them experientially and therefore more deeply. The addition of information thereafter either confirms or refutes initial concepts; an activity that is also highly engaging because it involves simple comparisons with recently experienced memories. In this way, interest is hightened and knowledge is built incrementally on a solid foundation.

The principal was tested a second time. The response was as follows.

After the first viewing of the story understanding appears to be remarkably high. The core value of the story comes across with very little information provided. From the similarity of the brief descriptions of what people thought the story was about, it is clear that much of the story can be conveyed with very little information.

4.3. Summary

Findings that address aim3 of the Program of Study have been discussed. Studies conducted in order to prepare scenarios for the series of expert reviews lead to the discovery that the two main components of workPlay can be configured in several different ways. One configuration enables the author to quickly sketch scenarios using manikins, then 'dress' them later, a capability that is considered valuable by the expert review panel members.

A phenomena is observed, that different types of information; narrative and diagrammatic, appear to be completely integrated when combined a scenario.

To address a wider range of learning styles, the existing, native modalities of the system may be expanded to include others, such as sound, animation, and media.

An potentially valuable approach for presenting information is discovered while conducting a test to determine optimum levels of graphic complexity. A hypothesis is put forward, tested, and through primary research partially confirmed.

Chapter 5

This chapter shows the extent to which the research practice has been altered or confirmed by the process of conducting primary research and that of the analysis of design findings.

5.1. The most significant change saw the hypothesis, which had been devised to achieve the development of designs for the ideation sketching system by integrating two essential systems, evolve to encompass a third essential system and be repurposed to establish a theory.

Several comments received during the series of expert reviews expressed concerns that, regardless of the simplicity of the workPlay system, a workPlay author may not posses the storytelling and communications skills to successfully convey the values of their ideas. This spoke to an issue outside the scope of the research methodology and the hypothesis, which had anticiapted providing the mechanical means for communicating stories, but not the narrative structure with which to tell them.

Could workPlay authors be provided with guidelines to help them compose scenarios? Or, could the principals of narrative structure be integrated directly into the design of the workPlay system? How would these options impact the direction of the study?

Aspects of the existing research, those that dealt with language and grammar, in particularly Barthes, and Bedenham, who's thesis, 'The language of comics' makes a passing case for the legitimacy of comics as a language, came to mind.

'...the successful application of a recognised model would add weight to my suggestion that there is more to comic strip stories than stereotyped characters and banal plots.' (Bedenham 1997, p.65).

More research was conducted in three main areas; semiotics, comics theory, and visual literacy, and as the study progressed the realization grew that what was being contemplated would add a third essential element to the two cited in the hypothesis. The three essential elements then provide, what might be considered, a fully-functional visual language, one that has a mode of communication(com bination of sequential pictures and text), a medium of communication(software with a graphical interface), and a grammatical structure(a hybrid grammar with linguistic and pictorial values).

There is no claim to have identified the essential elements of a visual language, for none of the lements are complete. Only that if the elements are assembled it might work. It is a theory. It is not the first or the only theory about visual language.

5.2. What might constitute a visual language

The issue of whether comics and various other graphic media can be considered visual language is a hotly debated issue in the vizThink(visual thinking) community. For comic creators it is a case of legitimizing an artform that suffers from not being taken seriously.

Language facilitates a broad range of discourse, which requires as a mimimum, communication to flow back and forth between two people. A system that is capable of conveying information in one direction only, is a communication system, not a language. It may use various languages, but it is not, in itself, A language. This theory proposes that workPlay has the capacity to be A language

The rationale for the theory, a hypothesis, and a critical analysis of various systems that applies the hypothesis can be found in appendix 2

Conclusion

This study has achieved some of the aims stated in the Program of Study.

Aim 1

Sound historical and theoretical contexts to support the development of a unique system of visual communication have been established in the following way.

In the pictographic art of ancient Egypt and the later art of the middle ages, the study found long standing fundamental principals of information design, the qualites of which are shared by such notable authorities on the subject as Edward Tufte, and the value of which is evident today in the breadth of use and the importance of information graphics. The study has also established that in the ideation environment there is a need to visualize and share ideas specific to the user experience, and, that currently there is no tool available for effectively capturing and conveying that type of information.

A plan for a graphical system that enables a user who has little or no artistic training to convey concepts related to dynamic human activities and communicate them effectively to others has been established in the following way.

Aim 2

The same research that helped to fulfill the first aim was also instrumental in establishing the qualities of design which would fulfill the second aim. Using a design approach based on the principal of being just-barely-good-enough, it is considered that the means to achieve an optimum balance of simplicity of design and reader comprehension was established. The designs reflected this approach and the primary research tested them. However, whether the optimum balance has been sufficiently defined, tested or confirmed by primary research to be able to claim that the aim has been fulfill is an open question. At this time, the question can only partially be answered, for it has only been posed to workPlay readers, not workPlay authors.

The Program of Study anticipated the development of a working prototype for stage 3, which would have provided the means to test a users ability to author workPlay material and convey concepts successfully to others. The complexities of developing two parallel systems simultaniously, a graphical system and a

software system, negated the posibility of developing a working prototype. In an attempt to circumvent the lack of a prototype, a simulation of the process of authoring workPlay was integrated into the final scenario presented to the Technology review panel. The questionnaire asked for feedback on the usability of the system and graphical user interface, but the responses indicated that without a hands-on test, no-one could reasonably comment. This aim, then has only partially been achieved.

Aim 3

This aim addresses the provision, to the reader, of an environment for holistic and creative thinking. What proof can be offered that an environment such as this has been established? One can look in the responses to the questionaires for ideas that suggest an appreciation for the Big Picture, and for clues that the respondents imagination has been engaged by the presentation.

The volume of comments, particularly those from the Technology Panel(motivated potential users), were consistently high, their length, on average, surprisingly long, and their quality, uncharacteristically heigh. With these general statistics and the following two examples, which indicate the construction of novel ideas, one might conclude that workPlay provided an environment that stimulated holistic and creative thinking.

'Because you are depicting scenarios you could have branching / choices in the story line that depict different outcomes from different decisions. This would be a great Tutorial tool, especially for "behaviour" based training.'

'The main positive aspect for me is that workPlay would allow people with little graphic design knowledge to develop effective communications for sales, teaching/training and idea/concept sharing and development. The key learning aspect here would not be how to use the software but how to design effective workPlay scenarios. I'm sure you have thought of this, but for any marketed workPlay product, design tutorials would be very useful. As would library packages designed and directed for different user/groups or applications. Different tutorials / examples for different potential applications /markets would help people see how workPlay could be of use to them. With respect to the reviews, I occassionally felt I did not have enough information to give very accurate feedback but I guess this will come from any beta testing you do.'

Appendix 1

Overview

Primary research was conducted between October 31, 2007 and June 21, 2008.

The first two surveys are considered pilot surveys. Detailed descriptions can be found in appendix y. The first was conducted October 31, a single-page questionnaire given to seven MA:DMG students after watching a 51-frame storyboard presentation of Star Trek Generations, the movie.

The second survey was prepared as a PDF e-mail. It was completed by one research fellow on December 3. The design of the survey presentation and questionnaire was later adapted for use in the series of critical reviews.

From the lessons learned by preparing and conducting the pilot surveys, a plan was formulated to conduct a series of online critical reviews by academics, experts and experts working in the field. Additional secondary research was conducted to achieve this.

The series of three Design Reviews was duplicated, and the duplicate set was used to collect additional research from students and online participants (The data from these surveys was kept separate from that of the expert surveys). To increase the number of participants in the student reviews, two survey parties were organized. The first was staged March 19 and the second on May 14.

Finally, on June 25, a meeting with Mark Gamble, Principal Product development Manager at Sage (UK) Ltd., was arranged. Mr. Gamble had participated in the workPlay technology Reviews. A short, taped interview has added depth to the comments made during the review process.

Introduction

Who to surver?(Unless this can be relocated elsewhere!!)

workPlay evolved in the technology sector, but it was unclear whether that sector was the only potential user of workPlay, or the best one in which to test and launch it. Research was conducted to find out. Since workPlay is closely related to scenario development, indications of scenario use suggest a high probability of workPlay adoption. Based on statistics of scenario use across all sectors, those

that used them the most were found to be education and technology.

A comparison study (appendix y), revealed that there were considerable difference between the way in which workPlay would be used in each sector. In deciding which sector to target, consideration was given to the fact that more was known about the technology sector and its culture, and therefore it was chosen as the primary market, with education as a probable secondary market.

The Expert Reviews

The expert reviews were developed to test hypothesise, to focus design directions, and to address various issues raised through secondary research and through the analysis of feedback from the pilot surveys.

Two parallel series' of three reviews were scheduled to be conducted over six weeks. The Design Series, addressed design and communication issues, while the Technology Series, addressed user experience(UX) issues. Two panels of academics, experts and experts in the field were sourced, the Design Panel, and the Technology Panel(list of participants appendix x).

Methods

The nature of the project was considered in the decision to use Mixed Method Research – a combining of qualitative and quantitative research methods.

Statistical data was required to support certain fundamental questions and issues, but ideas are not communicated through statistics, they are communicated through rhetoric, discourse and narrative. Since workPlay is a tool intended to communicate ideas and stimulate discourse around them provisions to show indications of this in the results of the questionnaires was needed. To achieve this, after each question of a quantitative nature, the respondent was encouraged to engage in discourse by providing comments or feedback.

A method of presentation was employed to introduce the more complex details of usability gradually and in context. The series of reviews presented to the Technology Panel were designed to address three key questions in a specific order. They are; what workPlay does, what workPlay is, and how workPlay is used. As the scenarios address each of these questions in turn, the view of

workPlay progressively tightens from a broad overview, as presented in the 'Introduction to workPlay', to specific details of application, as presented in 'The Usability Architect's story'.

Interpreting the results

The questionnaires addressed aspects of workPlay in two different ways. Since workPlay was used as the presentation tool to conduct the reviews certain questions addressed workPlay's performance in that capacity, addressing issues of speed, clarity, and appearance, while others addressed a range of workPlay features as described IN the presentations. This dual presence of workPlay meant that the findings could be interpreted in two ways; through the extent to which the answers and comments of the respondents are positive, the usual criteria, and through the extent to which respondents understand the message, a factor indicated by the degree to which the answers show comprehension of the questions, assuming that the question is not at fault.

Survey 1: Introducing workPlay

The first scenario introduced workPlay. It was presented to both Review Panels on the same date. Of all the scenarios presented to the Panels, this was the most critical. If it did not communicate its message quickly and clearly, the main benefits of workPlay would be suspect. In addition, panel members would not understand workPlay and it would be hard to engage them in subsequent reviews. It took two months and four distinct versions to create a seven-frame scenario.

The iteration process was instructive. Test results suggested design and functionality issues which required further research to resolve, and research opened the designs to new possibilities.

The purpose of this Review is to test; the speed and clarity with which workPlay conveys information, the capability to present layers of information, the capacity to integrate different types of information seamlessly, the benefits of being able to author workPlay in-house, it's ability to convey human behavior, and to test certain aesthetic and functional aspects of workPlay's design.

Conclusions

That workPlay communicated the information clearly, concisely and quickly confirmed the most important aims of the system. Also, the figurative system was considered acceptable, which confirmed the notion that story is more important than style.

Responses to several other features were mediocre, but the level of engagement as indicated by the number and nature of comments, was good, suggesting that overall the system worked well in communicating the storyline.

Responses also suggested that for people who had no prior knowledge of workPlay, the scenario was probably too short to provide enough information on which to base answers to some of the questions. These questions were reintroduced in later Reviews.

The Design Series

Design scenario 1.

The first Design scenario (details appendix b) addressed issues of storytelling, specifically that ability to convey a problem and a solution. The questionnaire solicited responses on: clarity and speed, workPlay's ability to convey the benefits of a technology, and certain design features, including; the limited range of movement in the figures, the use of colour, photographs, text, dialog graphics, and the absense of frames.

Design scenario 2.

Using the story and methodology developed for one of the pilot surveys, the seconds Design scenario addressed two things; the search for an optimum level of graphical simplicity – the point where comprehension is achieved by the most economical means – and the hypothesis that when narrative is conveyed the reader's imagination is engaged more actively when it is furnished with simple cues(an effect at use in childrens books).

Method. The scenario uses a jeuvenile theme to present the respondent with a story told at three levels of graphical complexity. After each telling the respondent answered questions designed to indicate their level of comprehension.

Conclusions

The level of comprehension of the story for both the Design scenarios was high, confirming the storytelling ability of workPlay. There were no serious concerns about the limited range of poses used in the telling of the stories, which reinforces the findings of the introduction scenario.

There were indications that several design elements could be improved, particularly those of text and colour.

Results from the second scenario suggest that the first reading of the story, which provided the lowest level of semiotic detail, conveyed the storyline sufficiently for indications of consensus from the respondents of what the essence of the story was about. For one-third of the respondents, the hypothesis that the imagination is engaged more actively when it is furnished with simple cues, is confirmed, leading to the conjecture that the effect may be linked to types of intelligence(Gardner) and/or learning styles(de Bono?)

It is clear that by using this system key values of a story can be conveyed by using very simple visual cues.

The additional information appears to have been more valuable to the reader in relation to personas than to things. It enriched respondent's understanding of characters roles and motivations, but did little to encourage interest in the Rosetta Stone.

The Technology Series

Research and method

The series was designed on the principals of a focus-group – an exploratory process designed to assess user requirements.

The Review Panel comprised of people working in the technology sector who had been identified as being potential workPlay adopters. The scenarios feature workPlay personas – hypothetical workplay users – that personify particular technology personnel who's positions have been identified as ones that would

adopt a tool such as workPlay. Since real technology personel were going to be reading stories about hypothetical people fashioned on themselves, it was critical to get the stories and details of characters and their actions correct. It was also critical to present the stories using recognized industry standards.

Research was conducted to learn more about use case scenario development. Classes of users were identified(see appendix x). Company structure and personnel were studied, including; job title, job description, responsibilities, colleagues, approximate age range, gender, and personality traits(see appendix z). Personas were created to represent the most likeley adopters. These were used in the development and creation of scenarios.

Technology scenario 1

Product Managers ranked the highest score in user analysis tests(appendix x), and were therefoe chosen to feature in the first Technology scenario. Real Product Manager stories were researched to gain an understanding of typical issues that they face. From this research, several scenarios were developed, modified, and finally merged into a single 'typical' problem scenario.

The purpose of this Review is: to better understand the primary uses of workPlay in order to inform the design of the following Review, which would address how workPlay is used; to test workPlay's ability to communicate a story with the narrative elements of a problem and a solution; to ascertain workPlays ability to support the formulation of decisions; and to compare opinion on design issues with those of the Design Panel.

Technology scenario 2

Joe, plays a cameo role as a usability architect in scenario 1. Scenario 2 takes-up his story, adding a layer of technical detail to scenario 1, and providing it with an alternative reading, considered a primary function of scenarios.

The purpose of the scenarios is to addressed issues of clarity, collaboration, problem solving, the ability of workPlay to adequately reflect human behavior, and certain design features, this time in the context of very specific circumstances. It also addressed some, as yet unaddressed, issues; that of it's design being dedicated to the R+D sector, and some of its communication and presentation capabilities.

SAGE: Mark Gamble Interview

Mr. Gamble was a member of the Technology Review Panel. His deep interest in the subject and insightful comments given during the reviews prompted a call to request an interview.

The main purpose of the interview was to get first-hand information about ideation practices, what might be considered market research. The secondary purpose was to further explore some of the ideas Mr. Gamble had put foreward in his responses to the Reviews.

Conclusions

Both the quantity and quality of comments were very high. The presentations and questionnaires stimulated a great deal of response suggesting that, as a tool for presenting ideas and stimulating discourse, workPlay appears to work well.

That the system appears to present problems and solution very well is important, since most scenarios are structured this way. Responses indicate that workPlay is suited to certain tasks over others, which will help determine certain features of the design.

Concern was expressed that regardless what capabilities workPlay may provide to an author, an author's ability to tell an effective story lies elsewhere. An issue that supports the need for future research(see concusion).

Suggestions for different ways that workPlay might be inporoved or provide added user benefits, included the provision of story templates, ready-made story structures; and figurative stylesheets that anable a story to be mapped to more than one graphic style.

Appendix 2

Robins, Schapiro, Uspenski, Neiva, Scmandt-Basserat, etc. derive their theories from what they have learned by studying or deconstructing existing imagery. Cohn, Engelhardt, Bedenham, derive their theories from what they have learned by studying or deconstructing comics, visio-textual narrative, and graphics. Scott McCloud has developed non-academic theories derived from his experience in constructing comics, as have many others. No-one has developed sound academic theories on visual language that are based on the construction of the language.

Restricted to the study of things already created, to borrow a concept from Gombrich, all these researchers have concerned themselves with the 'what' of what a visual language is or what the meaning of an image might be, but not the 'how' of how a visual language can operate in an environment that is independant from it's original author or how an image or imagery system can be constructed to fit those same requirements.

Neurath, Spencer and Bambrook have each designed graphical communication systems but none have developed a broad theoretical basis for the grammar that would govern their narrative appliction and adoption to a self-authored system, conditions that would ensure a living, evolving language.

This funademental difference in methodology is considered to be an important finding captured in the following hypothesis:

Hypotheses

That for a fully funtional visual language of discourse there needs to be three inter-dependent elements;

1. a multimodal communication system with the capacity to convey a wide range of conceptual information in a range of forms, lets call it the 'langue';

2. a graphical framework and media that 'carries' the langue and enables ubiquitas authorship (equivalent to a pencil and paper or speach), lets call it the 'medium'; and

3. a grammatical structure, a set of rules, which governs the langue and is comprehensive enough to provide self evident governance; lets call it the 'grammar'.

If this hypothesis proves true, then it will be possible to categorically say whether this or that is or is not a visual language. Example.

Comics are not a visual language. They are of visual language, but they are not a language. They qualify on items 1 and 3, but not on item 2, where the graphical framework to author the language, to engage in discourse through it, resides on one end of the equation only, not on both.

ComicMakers are not a visual language. They qualify on items 2. item 3 is dubious but perhaps allowable, but they do not qualify on item 1.

inforGraphics are not a visual language, for the same reasons that comics are not.

Storyboard Quick is not a visual language. It qualifies on item 2, provides little, if any guidance on item 3, and is not flexible enough in its offering on item 1.

workPlay will be *a* visual language. It qualifies on all counts, and provides the conditions for a self-evolving, fully functional language.

Appendix 3

ComicMakers comparitive study

Appendix 4

Storyboard Quick/workPlay comparitive study

Comparison Study - Storyboard Quick and workPlay

Name	Primary market	The graphics system	What it communicates	How it communicates	What the reader experiences
Storyboard Quick	Entertainment industry; movies	3D rendered, game-style graphics that attempt to mimic 'reality'. Establishes linear perspective environment.	Designed to reflect the dynamics of actions and situations intended as directives for movies and ads.	Standard linear sequential narrative.	A mix of standard storyboard sequences and shorts.
workPlay	High technology sector; research and design.	2D environment with stylized, pictographic or infographic imagery.	Designed to communicate commercial concepts and serious scenarios in business presentations.	Provides a linear sequential narrative stage to anchor the reader to the subject, then provides dynamic non-linear features that extend the communications.	Provides simple, clear visual cues to enable quick comprehension of subjects, and interactive features that provide a rich media experience.

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