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Reviewer #1: You have addressed all of the points I have previously raised and strengthened the paper accordingly. However there is still a need to re-edit it carefully to take account of some of the changes made and to attend to some copy editing issues. I have added notes to the file picking up on most of these rather than listing them here. Do not treat this list as definitive and I suggest you get further 'lay' feedback from someone to help pick up similar issues that I may have missed.

Answer: Thank you for your new review. I have accepted all the comments you have made and the paper has been revised accordingly. The figure numbers have also been corrected. After getting another colleague to read the paper I have made a few minor grammar changes but nothing major. I hope this is all acceptable.

Many Thanks

Tessa berg
TITLE: Rich Pictures: Collaborative Communication through Icons

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Abstract

A visual language of pictures, such as the rich picture used in the Soft System Methodology, offers a way of global communication that far exceeds the limitations of text and speech. Simple graphics can be rapidly communicated, processed and transmitted within a large and culturally diverse constituency. This paper looks at the benefits and interpretative risks when using rich pictures for system understanding. The aim of this paper is twofold; firstly to report upon an observation of a large scale collaborative diagramming workshop and compare the resulting pictures with a previous workshop study. Secondly, to develop further ongoing research which suggests rich picture construction can be aided by providing an icon legend. This paper compares 2 rich picture workshops: the diagramming workshop at the Open University eSTEeM Diagramming Colloquium in March 2012 and a workshop held in Heriot Watt University in February 2012. The comparative results are set against the ongoing empirically grounded rich picture research within Heriot-Watt University in Scotland. Preliminary results suggest there are a set of distinguishable icons and shapes that are generic across all rich pictures regardless of domain. Further analysis of the early results suggests a natural intrinsic grammar is manifested within rich pictures in terms of relationships, icons, context and connectors.

Keywords: Rich Picture, Visual Communication, Language, Icon, Workshop
1. Introduction

This paper reflects upon the use of icons at large scale RP colloquium workshop wherein around 30 attendees were asked to draw RPs on the domain of ‘Teenagers and Technology’. The tables were laid out in a cabaret style seating plan containing a single large flipchart blank piece of paper and coloured pens. Attendees were free to join any table and form any size group. Groups were asked to draw in icons, with as little text as possible, reflecting upon their own interpretation of the domain under investigation. The colloquium workshop icons have then been compared to a recent workshop study at Heriot-Watt University. To distinguish between the 2 workshops the colloquium workshop will be referred to as W1 and the Heriot Watt University workshop shall be referred to as W2. In W2 twenty one undergraduate students, many being teenagers, were asked to draw, in groups, RPs that represented their current university situation. W2 participants were encouraged to include tools, techniques and artefacts as well as highlighting anxieties, emotions and concerns. The students were not being asked to draw under the same heading (Teenagers and Technology) as was W1. This paper will reflect only upon the iconography used in both workshops using an interpretative icon framework of context, emotion and artefacts.

As noted by Bronte-Stewart (1999) previous research has indicated the need for more research into the possible standardisation of RPs. To investigate more fully the validity of such claims, this paper takes a contemporary and more empirical approach to Waring’s icon legend (Waring, 1989). Our research, based upon analysis of the 298 separate RPs, has identified the most commonly used icons regardless of specific domains. Section 1.1 describes this research in more detail. The dominant 30 icons from this research were offered to the workshop during the picturing process. The icons were deliberately unorganised and inconsistent in style and icon type however all icons were taken from recorded RPs (figure 13). In the same style as Waring the legend was offered to W1 on a group by group basis without any pressure to use copy or even acknowledge the icons. In W2 the legend of icons was not offered to these 4 student groups as this was not pertinent to this study.
The resulting workshop pictures have been analysed solely upon the icons that were drawn. The workshop icons have then been compared with the researchers’ databank of previously drawn icons looking at correlations and emergent pattern behaviours.

1.1 Background Research Area

The authors are undertaking research to discover if there is a common pictorial language containing subsequent grammar within RPs. A large scale, empirical analysis of RPs is currently being undertaken at Heriot Watt University concentrating on iconography interpretation and emergent pattern behaviour. This research work might appear to be ontological in structure but it can perforce only be epistemological, reflecting the authors’ particular view. The research is being achieved by qualitative analysis within a grounded theory framework using intercoder reliability indices to strengthen the validity of the findings. The specific aim of the research is to collate, analyse and document a substantial collection of RPs that will build up a databank of non domain iconography for this and future research projects. This widespread anthology has never been attempted within any previous research. Over the last 2 years subjects from various domains have been asked to draw RPs from given scenarios. To date, a total of 91 RPs (group and individual) have been drawn, analysed and stored. These RPs are being added to a national databank of over two hundred previously drawn RPs sourced from books, academic papers and the WWW. So far there are 298 RPs in the collection. Requests have, and will continue to be made to both academic, public sector and industry practitioners to donate pictures from their own personal collection. As such, these donated pictures are giving a truly international scale to this project with RPs from China, Turkey, Bosnia, Spain and Lebanon being donated. This paper will concentrate upon the iconography of the RP workshops and the process and tools that were used in their creation. The background research area as described in this section will be referred to throughout the paper highlighting and giving credence to areas of specific interest.

2. Rich Pictures

As human beings we are able to communicate using pictures and symbols far more easily than with words, enabling us to break down barriers of language, education and culture. Drawings can both induce and record insight into a situation. The RP is an unstructured way of capturing information flows, communication and human activity. Words can be too powerful and open to misuse whereas a picture can encapsulate meanings, associations and non-verbal communication such as unconscious emotion and feelings. Jargon and terminology are often associated with different types of enterprise and specialist group. If a computer scientist was asked to draw a ‘Model’ then the chances are they would sketch out a Unified Modeling Language (UML), Entity Relationship (ER) or even a Data Flow Diagram. A child asked the same question might draw their favourite Lego model, a teenage girl might depict the latest catwalk star and an architect would probably represent a model of a building. In essence, words are often far too restrictive and uncertain in their exact meaning.

The RP is an established tool used to gain multiple perspective understanding within a messy or complex situation (Bronte-Stewart, 1999). The RP supports dialogue and discussion during a picturing process without imposing a prescribed structure or formal relationship notations. The RP offers insight into an ‘organisational climate ’by showing processes, structures, hierarchy, politics and issues. Avison and Woodharper suggest the act of drawing a rich picture is useful in itself because:

- Lack of space on the paper forces decisions on what is really important
- It helps people to visualize and discuss their own role in the organization
- It can be used to define the aspects of the organization which are intended
Darzentas and Spyrou suggest that incorrect terminology and problem avoidance can be corrected through the use of the RP (Darzentas & Spyrou, 1994). Metcalfe studied diagramming techniques and critical thinking. He suggests that when a person is asked to draw a picture from what was originally a particular word, the word will then be taken from the part of the brain that deals with ‘language’ and put to the part that deals with ‘images’. He further proposes that the dissonance that this causes seeks for more understanding and therefore critical thinking is applied (Metcalf, 2006). Some note that the actual size of the images or icons in the picture suggests their actual importance to the problem situation (Wood-Harper, Anthill, & Avison, 1985).

Lewis asserts the dangers of misinterpretation without a source key, “this has certain dangers, for the use of symbolism and pictorial metaphor may lead to ambiguity, particularly if no key is provided for the diagram” (Lewis, 1992, p. 354). Ragsdell observes, “Much of the contribution of RPs to organisational change management arose out of the recognition that the process of rich picturing is more important than the actual RP that is produced” (Ragsdell, 2000, p. 110). She advises that the final result of the picture is of less importance than the understanding informative process. Darzentas and Spyrou state that the RP could give a clear understanding to a third party (Darzentas & Spyrou, 1994). Bell and Wood-Harper propose the need for a key of common illustrations, “it is of value to use a set of symbols that have a clearly defined meaning, in short, to make our final drawings more understandable it is useful to adopt some sort of a grammar of symbols” (Bell & Wood-Harper, 1992). They were not inferring that it is acceptable to homogenise the process as there is to be no suggestion of lessening the flexibility. Others in the late 90’s suggest that pictorial representations are widely considered as lacking in Universal Standards (Coyle & Alexander, 1997); (Monk & Howard, 1998). Sidhu et al indicate the need for a legend; “the analyst has no standardized symbols to work with he/she is forced to use any symbols that he/she thinks are appropriate.....in other techniques each symbol has a specified meaning and use.” (Sidhu, Jani, & Ramesh, 2001, p. 138). However, they further state the advantages of the RP come from the freedom of tools and techniques and the unlimited range of symbols. Checkland notes this in his 30 year retrospective paper, “users need to develop skills in making RPs in ways they are comfortable with” (Checkland, 2000, p. s22). Alan Waring was acknowledged by Checkland (Ibid) for his attempt to structure the RP. Waring made suggestions on how to draw a RP in his ‘practical guide to system methods’ (Waring, 1989, pp. 77-81). He gave an indication of some visual symbols in a table stating, “you can use whatever symbols you find convenient”.

The RP is a tool for learning as well as a tool for understanding and problem solving or, as some would see, a space to support dialogue. A learning tool is a tool that helps to acquire knowledge and skill whilst understanding tools offer a platform to bring forth what is known. The RP is particularly useful as a low tech dialogic tool offering a platform to aid a thinking process. Both words and visuals can be very powerful and open to interpretative abuse but visuals offer additional value by encapsulating meaning associations and nonverbal communication such as emotions and feelings. The RPs do not necessarily convey more meaning than text but they do manage to provide a wide or broad area for capturing all elements of a situation as seen by the creator(s). Bell and Morse note, “A theme arising from the nature of rich pictures is the surfacing and exploratory element” (Bell & Morse, 2012). The particular advantage of the RP participatory group work over other forms of information gathering devices is the element of ‘time’. A RP workshop rarely requires more than 20-25 minutes to share and create as opposed to the more lengthy process of spoken and or written words / visuals. The RP visuals convey meaning rapidly through the use of colour, connections.

The RP can be used to support individual learning (stakeholder to stakeholder) from the differing viewpoints of a messy situation as well as encouraging organisational learning. The RP, used iteratively, offers organisations a tool to see relationships, ambiguities and problem situations. The RP can aid an adaptive system which is sensitive to the environment contributing to a double loop process of learning (Argyris & Schön, 1978) thus being a significant tool within knowledge management (KM). There have been many studies on the subject of KM (Hildreth & Kimble, 2002); (Conklin, 1996); (Seely, Brown, & Duguid, 1998); (Wenger, 1998); (Nonika, 1991). KM is all about finding a way to make ‘soft’, ‘informal’ and ‘tacit’ knowledge ‘hard’, ‘formal’ and ‘explicit’, thereby providing a way of capturing and storing all elements of organisational knowledge. Hildreth and Kimble (2002) consider that not all knowledge can be captured and sometimes only a percentage of tacit

- It can be used to show up the worries of individuals, potential conflicts, and political issues”

(Avison & Woodhaesper, 1991, p. 99)
can be made explicit, however they recognise that it is not always possible to measure and quantify emotions, assumptions, preconceived ideas, beliefs and perceptions. This is where the RP tool has a distinct advantage. By using the medium of picturing there is a shift in cognition to use a ‘whole brain mode’ allowing ideas generated in both the synthetic and analytical mind to receive equal attention. It is widely acknowledged that diagram based techniques are very useful for visual learners (Edwards, 2008); (Yates, 1966); (Paivio, 1968); (Shepard, 1967). The pictorial superiority effect has been well recorded in several empirical cognitive psychology studies (Paivio, 1968). This effect proves that it is easier for our brain to remember pictures than words. Paivo’s work (Ibid) suggests that humans have an incredible visual memory allowing us to remember visuals in considerable detail and retain for much longer time periods than words.

The group RP requires a high degree of collaboration amongst the creators but there are few guidelines on how they are to interact with one another during the session other than the encouragement to draw. Many suggest, as with various other participatory methods, that the expertise and delivery of the process by the facilitator is a key indicator in a successful workshop (Franco & Rouwette, 2011); (Bell & Morse, 2012, pp. 18-36). The complicated area of group decision development and dialogue process is a vast research field. Bell and Morse have captured the current work within this area (Bell & Morse, 2012).

A recognised problem with pictorial representations, such as the RP, is that they can be open to multiple interpretations. The RP is said to be ‘rich’ if it represents all elements of a situation (Armson, 2011). Goldsmith (1984, p. 2) states, “simplicity in illustration is difficult to define: if simplicity means lacking of information a picture could be far from simple to understand”. Vitz (1966) suggests that humans prefer complexity in visuals. What constitutes complexity whilst embracing simplicity in visual illustrations? Goldsmith (1984, p. 270) suggests there are eight factors that attract or direct attention; colour, position, size, isolation, complexity, tone, directionality and implied motion. The human capacity for processing information is actually quite limited. Miller’s Law (1956) of seven (plus or minus two) has long been accepted as a common guideline for the number of objects we can hold in our working memory. More recent studies have shown the correct number is probably around 3 or 4 (Farrington, 2011). The Law of Closure is a gestaltian belief suggesting that objects that are grouped together are seen as a whole. Often known as the law of simplicity, this theory suggests that our minds self-organize information in a standard way that is arranged, symmetric, and simple to interpret. We organize shapes or lines in our mind to a single form that is more than the sum of its parts. The background or blank space in a RP is not a by-product of the graphical object as it has many communicative qualities. The backdrop sets the scope of the picture and provides a frame of reference that can be used to compare clusters of objects, emergent patterns, isolate key elements and guide the reader’s eye in a certain direction around the page. Spatial grouping in the RP can be analyzed to interpret interrelationships. The proximity of objects shows their relatedness which can be further enhanced by lines and arrows. Such connectors offer the reader a holistic understanding of several interconnected objects. Symmetry and alignment of RP icons show pattern relations with boundary enclosures signifying similarity within the domain or sub-domain.

There have been two comprehensive literature reviews on RPs over the last few years, Bronte Stewart (1999) and more recently Bell & Morse (2010). Bronte Stewart gives a broad and complete walk through of academic writings on RPs highlighting the differing opinions on the nature and use of the tool. He concludes,

“there does seem to be a need for techniques that assist the analyst during the early stages of an investigation to make sense of the problem situation and in fact decide what the situation is, before moving on to decide what ‘the problem’ is” (Bronte-Stewart, 1999, p. 102).

Bell and Morse (2010) take a contemporary approach examining the diversity and use of the diagrams observing the variety of published advice for building the pictures. They offer an analytical framework for appreciation of participatory RPs focusing on 4 components, colour, connectors, mood and evidence of drift. They tend to look upon the rich picture as a ‘free standing’ tool developed for wider appreciation by their Systems Group at the Open University as opposed to a tool within the Soft System Method. They see group dynamics being ‘entirely a matter for the group to decide’ upon further stating there are actually only 2 basic rules to the drawing of a rich picture:

1. Paper must be visible to all group members
2. Text to be avoided
The recent publication of Armson (Armson, 2011) demonstrates the usefulness of individually drawn RPs. She is seen to concur with Bell and Morse with their two simple rules but further states a desire to add a title to the picture. Armson offers expert instructions on how to draw a RP.

“Don’t just draw stick figures people, show them doing something and show some of their context- where they do it. Include resources, tools equipment, buildings, ideas, dreams, processes and objects. Use metaphors, Show interactions. Make it rich.” (Armson, 2011, p. 60).

3. The Rich Picture Colloquium Workshop

After a 10 minute presentation on ‘How to draw meaningful Rich Pictures’ the self organised groups were asked to draw pictures on the theme of ‘Teenagers and Technology’. Over 50 delegates in groups of 4, 5, 6 and 8 drew collaboratively on the same topic for 15 minutes. Within the presentation The following list was offered as a framework of RP Principles based upon an extensive review of current relevant literature (Bell & Morse, 2010); (Bronte-Stewart, 1999) ; (Armson, 2011) as well as being influenced by the analysis of the authors own collection. Note, these are not directives but rather suggestions of best practice to take into consideration.

• Try to represent everything you know about the situation
• Artistic ability not required (no need for preliminary sketching).
• Title the picture.
• Everyone should draw.
• Draw people doing things, give context and include objects and processes.
• Show interconnections and relationships.
• Make observations about culture, emotions and common beliefs.
• Text to be kept to a minimum
• Use colour

Figure 1 Icon legend offered to W1

Out of 8 groups drawing RPs 7 groups accepted a copy of the icon legend (figure 1). The legend was offered to the groups 5 minutes after the session started. It has to be noted however, that although one of the groups decided to take a copy of the legend the decision was not unanimous resulting in an individual group member being overridden in his decision to reject the legend.
Figures 2-5 are a selection of the RPs drawn in the workshop.

![Figure 2](image1.png) rich picture A  
![Figure 3](image2.png) rich picture B

![Figure 4](image3.png) rich picture C  
![Figure 5](image4.png) rich picture D

4. Discussion on the Colloquium Workshop Outcomes

Even without syntax and rules being enforced on the RP there are distinguishable enablers that improve correct readability. Position, size, isolation, complexity, tone, directionality, implied motion, colour, connectors, mood and evidence of drift all help to interpret correct meaning from the picture (Goldsmith, 1984); (Bell & Morse, 2010). Accepting that an interview or discussion it is always required after the picturing process it is still interesting to analyse the actually icons people have drawn in the workshop. This research suggests there is plenty to learn from the icon elements that will aid the wider understanding process. Divorcing icons from their original picture is not advisable but exploring their meaning when coupled together, or in essence looking at potential grammar structure, could bring more enlightenment to the whole picture.
Figure 6 represents the duplication of icons across all eight RPs drawn during W1. Perhaps it is not particularly remarkable that certain icons (computers, mobile phones, games, earphones, worlds) repeat when drawing a specific domain. Is it not to be expected that new technologies and internet relationships are likely to be a strong theme when depicting teenagers and technology?

Notably at W1 there were no teenagers in the 8 groups so perhaps there was unfairness in the lack of inclusionary representation. What can be acknowledged is the universality of some icons. Face book, and Twitter, were popular icons within the workshop clearly showing their common understanding and link to the domain (figure 10). One of the major criticisms of the RP is the problem of interpretation. The background research at Heriot Watt University suggests that human icon interpretation is considerably better than it was 30 years ago due to exposure of symbols. Humans constantly get bombarded with graphical symbols such as signs in airports and on roads, buttons on kitchen appliances, icons on computer screens and logo advertising. Technologies seek to instruct, advertise and provide information using icons and logos that are becoming universally accepted. This research claims that these images are noticeable within the modern RP and hence construction and interpretation is becoming widely comprehensible. Grammar provides the rules and syntax and order that govern a language. These results suggest that the RP can provide enough context within the domain and boundary to allow certain iconography to be understood with universal acceptance (Berg & Pooley, 2012).

Figures 7-13 are individual icons extracted from W1.
4.1 Context

Concepts, facts, emotions and complexity can be portrayed within simple drawings in a RP (figure 2). Context will come from the adjacent icons, boundary and sub-boundaries and other supplementary stimuli such as colour, size, text and facial expression. Examples of this can be seen in figures 2-5. Figure 2 shows how one group depicts technology as a drug to teenagers with a syringe being focal to the picture. A common theme emerged from the pictures depicting the lack of face to face interaction, segregation and isolation teenagers are seen to have with society (figures 7 & 12). Figure 17 of W2 is a good example of the isolation and concern of independent study wherein the student surrounds the icon in a solitude sub-boundary. Orientation or angling an icon in the RP offers even more insight towards interpretation (figure 7). In previous RPs the angled CCTV camera or watching eye icons are common features (Berg & Pooley, 2011). RP interpretation enablers can also be background space, lines and arrows demarcating direction, consistent style and size of neighbouring icons. Issues of health and lack of sleep due to overindulgence in technology had numerous repetitions. An example of this is shown at the bottom left of figure 2. Another common theme drawn through the icons was the lack of sport and outdoor interaction with sporting/ outdoor play equipment (figure 11). In W2 there was not a single reference to any form of physical exercise. Adults were depicted in many of the RPs looking sad and even angry regarding the young people they depicted (figure 3). The constant upgrading of new technology was a recurrent icon theme with examples in figure 2 & 4. Negative acknowledgement was made to the way teenagers use text language (figures 8 & 9). In W2 figures 15 and 16 indicate the frustration with technology when failure occurs and data is lost.

4.2 Emotion

Hard lined rectangular speech bubbles deliver hard comment, exactness or technical process instruction whereas the softer the shape of the speech bubble the more the message becomes opinion or conceptual in thought. Nobody in the workshop drew hard speech bubbles but instead created round soft speech bubbles. Other rounder
shaped icons, such as faces, time, handshakes, clouds, thought bubbles and hand drawn question and exclamation marks are seen to represent abstract concepts such as time, happiness, unhappiness, agreement, concern, anger and query. They are perhaps not as rigid as the hard line drawings but offer understanding on more tacit emotional features of the problem situation. Sharp and jagged shapes are powerful icons in the RP that radiate noise waves or broadcast raw feeling and reaction. Within both workshops icons such as fire, jagged speech bubbles, crossed swords and crossed out icons all signify sharp shapes. They denote strong emotions or genuine beliefs such as conflict, anger, unhappiness, disagreement, tension, and dispute.

4.3 Artefacts

There are various outlines, orientations and natural relationships to RP icons that offer intuitive interpretation without the need for expert analysis skills. Objects such as buildings, servers, tables, beds, computers, transport, injection needle and mobile phones are mainly drawn with hard straight edges suggesting a mechanistic manmade structure of an object which is fixed and rigid in structure. A noticeable icon in W1 was the texting fingers or thumb (figure 13). Certain workshop RP icon meanings were depicted as litotes which, in simple terms, is the negation of its opposite to portray meaning. For example, in figure 11, the stick figures showing sporting exercises were crossed out. Synecdoche is frequently seen within the RP. The Synecdoche is a familiar sign to represent a whole object or a concept, for example knife and fork pictures for the food court or a musical note to represent sound. From the background analysis of 298 RPs (section 1.1) there are many examples of synecdoche. Such as; Ties to represent management, Flags for countries, Beds for accommodation, the shopping basket for retail outlets and mortar boards for academia (Berg & Pooley, 2011). Synecdoche can be seen in the workshop pictures through the icon representations of beds, wastepaper bins, burger & drinks and musical notes. The most common artefacts seen in W1 RPs were the mobile phone and the gaming/music device icons. In W2 the common icons were money, food, transport, computers and data loss.

4.4 Colloquium Interview comments

Discussions with individual members during and after W1 highlighted a number of issues and resulting perceptions. One of the group members purported he was not given a choice to walk away from the workshop and also felt the theme (Teenagers and Technology) and information that was given to the groups was too prescriptive and leading. One group member asked for more colours than the 5 separate colours that each table was given. One interviewee noted that in her group the females took to the picturing with ease whilst the men were hesitant and unmotivated to draw. This concurs with previous research on gender difference within RP drawing (Berg & Pooley, Technical Report Series, 2011). Another interviewee talked about the relief felt by the group when it was discovered that they had an artist in their group. One group member pointed out a particular icon (figure 7) which was unanimously agreed upon to be an excellent representation of their group opinion (figure 3). An interview with a group member a week after the workshop resulted in his ability to remember with ease what was drawn and why specific icons had meaning but he had little ability to remember the names of the people in his group. This was also the case with all the other interviewee’s. As such this concurs with the retention assistance within the pictorial superiority effect as discussed on page 5.
4.5 Icon Legend Acceptance in the Colloquium

As previously stated 7 of the 8 colloquium groups accepted the icon legend (figure1). Each group were offered the legend individually around 5 minutes into the picturing exercise. Previous research in this area indicates that giving the legend at the very start of a workshop limits the width and scope of creativity (Berg, 2012). It was explained to all groups that the legend represented the most common RP icons from a research experiment within Heriot-Watt University and are not specific to any domain or theme. One person stated, “So, you are adding structure” and was immediately informed that the legend can be refused. The legend was then accepted without further comment.

Another group member from a different group said, “perfect timing, we were just wondering what sort of pictures we should use”. One person commented that they felt it was a bit like using a ‘cheat sheet’ and it would be wrong to copy or use however, that person did say that the icons were useful for getting ideas. The legend was seen as a ‘conversation stopper’ by one group who all studied the legend but decided to not use/copy any of the icons. One person revealed that she found the icons very useful for getting creative ideas but she had to steal a surreptitious look at the legend whilst no one was looking. The person felt there was some embarrassment to needing to see the icons and did not want to be seen as uncreative by her group.

In reflection, overall, whilst most groups studied the legend the icons were rarely copied directly. This concurs with the background research being undertaken at Heriot-Watt. This research suggests icons need to be more specific to the domain to be relevant or usable (Berg, 2012). For some, a legend seems to clarify the understanding of the picturing exercise which in turn speeds up the ability to start drawing. For those who have never drawn collaboratively or those who have had little instruction on RPs the legend does, however, seem to prompt a willingness to apply abstraction and model, the perceived, essential components. This can reduce complexity and increase efficiency of the working group. This theory would need to be tested on a wider sample to confirm implicitly.

5. Comparison to Previous Workshop (W2)

W2 was conducted at Heriot-Watt University in 2012 wherein 21 undergraduate students, many being teenagers, drew RPs that represented their current situation. A dominant theme from the W2 groups showed icons depicting concern over study, relationships, money, alcohol and partying. Figure 14 is an icon drawn by a 19 year old representing his difficulties in managing his varied pressures. In this study the young people were seen, through icons, to use technology to aid their busy lives. Technologies were shown in a positive light, being used as a platform for social networking. The strong theme occurring from W2 was the problems of data storage, retrieval and data loss (figure 15 & 16) with another common theme being slow bandwidth and processing.

Unlike the icons drawn in W1, participants drew icons representing the usefulness of technology as long as it had good storage capacity. The young people did not draw images of isolation and segregation, as suggested by W1, but rather produced icons showing the diversity and adaptability of using technology to assist and facilitate their lives. The only icons that were seen to be representing isolation was within the area of independent study (figure17) but this was seen as a skill to be cultivated rather than a lonely issue of anxiety. A common theme of W2 was the lack of money for basic necessities such as transport, food and rent (figure 18) but noticeably issues of this nature were rarely reflected in W1. Very few of the W2 types of iconography were seen to be replicated by W1 wherein there were no teenagers in any of the groups. What does this tell us? Perhaps the answer lies in ‘fair age representation’ regarding all stakeholder groups. There appears to be age related apparent differences in the two workshops iconography. It is suggested in the conclusion that this requires further exploration. Perhaps it is fair to surmise, that gaining a climate understanding of a problem situation requires acknowledgement to all those who work within or are connected to the system and not just asking those who have the power to implement change.
6. Conclusion and Further Work

The RP expresses group-mind through a symbolic language therefore allowing comprehension without the need for specialised knowledge. A RP icon is not conventional as it is not rule bound in both form and content. The authors are not constrained by standardisation or conformist norms but are instead encouraged to add subjective interpretation to the picture. The resulting picture is a collaborative collection of related icons that represent a mutual faith or belief on their interpretation of the whole. The RP icon is rarely complete in itself, it gains meaning from the borders, relationships and proximity of other icons. A RP icon does not represent something new, original or exceptional and it is unlikely to be autonomous. Those icons that are seen to be alone and unlinked are often the authors conceptual thoughts that are, at that time, still subjective feelings as likened to doodling or unconscious dreaming. Meaning is only derived from these icons when they are linked in some way to the whole RP. Together the icons are strong but the whole RP is always going to greater than the sum of the icons, as it is with all languages.

The RP is multifaceted in its usefulness. This tool has the powerful capacity to recreate in the present what has happened in the past, represent the now and offer insight into the future. The RP icon provides a reminder of what it portrays; it is a consciousness of the past in the present. A RP mediates knowledge about a belief with the capacity of stimulating emotions that arise to an inner arousal of the belief. The RP, which resonates above the personal or singular when picturing collaboratively, can be also be seen as illustration tool with an educational goal. The RP will never be repetitious or bound by tradition because it has to constantly be adaptive to new domains, concepts, ideas and icons.

Analysis of the workshop RPs, based solely upon the icons, yields interesting results. Yes, of course, it is far better to engage the groups in an ‘after picture’ discussion to better understand what has been drawn and why. This would have been a natural next step to the process if time had allowed during the workshops. The RPs without undergoing this process are NOT meaningless however. There is an array of tacit thoughts, strong emotions, underdeveloped and truthful concerns within the icons that are perhaps more conceptual in thought. They need no words or dialogue because they represent a method of thinking that can be best elicited and most powerfully presented by using a visual representation. Just by analysing the icons and their relationships it is possible to make powerful deductions.

There were verifying degrees of what was deemed as most relevant over the eight W1 groups on the subject of ‘Teenagers and Technology’. An overriding theme of sadness and isolation resonated throughout all the pictures. This was occasionally overtaken by icons showing annoyance or even envy. Some icons depicted teenagers as lazy and obsessed whereas others where seem to segregate them off into isolated sub-boundaries separating them from what was perceived to be the norm. The dominance of social media and communicative technologies for young people was a common and widely held assertion throughout all groups. The workshop was seen to draw icons that represented teenagers in a detached world unaware of what is reality. Based solely upon the iconography there was a collective leaning towards technology being seen as a powerful drug that is not good for their health, schooling, social lives and possible future work? The icons give a cultural collective belief structure that resonates from those who attended the workshop. Comparison of the colloquium with W2, illustrated by the iconography, confirms contradictory worldviews showing differing outlooks and attitudes depending upon the position of the RP creators. Technology, on one hand, can be seen to be all encompassing, leading to unhealthy social interaction whereas another group of participants, coming from a differing position, sees the diversity, adaptability and assistance of such technologies to facilitate their lives. An overarching theme emitted by both workshops was one of concern and negativity. This is, of course, to be expected when asking groups to highlight areas of concern. What was noticeable however was that W2 showed concentrated areas of anxiety surrounding artefacts such as money, work, and travel but instead of a despondent overall gloom to the pictures, as seen in some of W1 RPs, there was lightness and a more positive optimistic mood to the pictures.

Full acknowledgement is made to the subjective nature of this paper and the potential mistakes in interpretation. What can, however, be derived is an atmosphere, mood or sense towards the environment or domain being...
discussed. Such an awareness or impression gives clarification to areas were more investigation is required, perhaps engaging with more traditional elicitation methods.

A generic legend of icons does not seem to aid an RP process unless the icons are specific to the domain under investigation. Icons can be useful for some to assist upon the types of icons possible and offer creativity ideas but they are not to be forced or used in a prescriptive way. The use of an icon legend is purely a decision that should be left to the collaborative drawing group and facilitated with caution by the workshop practitioner.

A key element within this paper highlights the constraints to gaining a full and clear understanding of the problem situation when only asking a specific domain group. Further research needs to be undertaken to look at age related issues within groups. To gain a better and fully appreciative understanding there must be a fair representation from all those who are part of the domain. In a complex, messy situation it is paramount to find out how the situation is viewed by multiple stakeholders. These different viewpoints on what the problem is offer a starting point to better understanding and further investigation. The RP as a dialogic device requires further work. Bell and Morse note the suggestion of post rich picture textual analysis using qualitative software looking for potential patterns of agreement or discrepancy (Bell & Morse, 2012, p. 83). Other areas of research include the recording and transcribing of dialogue during the RP process. This has been recently investigated by Bell and Morse (Ibid, p. 89-96) looking at group dynamics, behavioural characteristics and group work quality using Symlog questionnaires. Other areas of further research on what influences icons and process behaviour might include asking workshop participants to begin with a 10 minute conversation before drawing commences.

Further work is also required in the process of facilitation of the Icon legend. To date, the legend has only been offered to participants at the start (Berg, 2012) and after 5 minutes (W1). It would be of interest to discover if an icon legend dispensed at a later point of the workshop might influence group reaction.

In conclusion, visuals have the unique ability to overcome issues of correct wording and cultural difference giving a clear and rare insight into unsaid, implicit and the often unarticulated conflicts and political issues. Thus, the RP is a powerful and valuable tool for understanding complexity from multiple stakeholders.

Bibliography


