Multi-Disciplinary Creativity and Collaboration: Utilizing Crowd-Accelerated Innovation and the Internet

S. Cunningham, D. Berry, R. A. Earnshaw, P. S. Excell, and E. Thompson
Glyndŵr University
Plas Coch Campus, Mold Road, Wrexham, LL11 2AW, Wales, UK
{s.cunningham | d.berry | r.earnshaw | p.excell | e.thompson}@glyndwr.ac.uk

Abstract— The growth of the creative industries has been a national trend in the UK over the last 5 to 10 years, despite global trends of economic downturn, and has been mirrored on the international stage. A distinguishing feature of the creative sector is its make-up of practitioners from a broad spectrum of disciplines. In addition, creative processes often benefit from the collaboration of partners. Established models and challenges of creativity are assessed and contextualized against the contemporaneous creative industries, which feature multi-disciplinary teams, supported by current technology. Crowd-accelerated developments and creative collaboration via social media are having a transformative effect on the creation, distribution, and exhibition of creative works. They are also having an impact on traditional art and design processes. Multi-user interaction enables location-based art works to be transformed into new kinds of interactive and dynamic experiences for global viewers. Current opportunities, issues and challenges that arise are discussed, and a number of questions are identified for further discussion.

Keywords— creativity; enabling technology; virtual environments; online collaboration; multi-disciplinarity; creative teams; crowd-accelerated development; social media; creative works; art and design processes; metadata

I. INTRODUCTION

"Nothing new that is really interesting comes without collaboration," [James D. Watson, co-discoverer of the double helix, 1953.]

This work explores the opportunities and experiences that occur in multi-disciplinary scenarios where the product of collaboration fits broadly within a definition of the creative industries. The primary focus is upon the real world implications and incidents of integrating people and practice across two axes: creativity and technology.

Moore’s Law states that overall processing power for computers doubles every 1.5-2 years, or less (Fig. 1). This also applies to telecommunications. Although a general guide rather than a fundamental law, it has proved remarkably consistent since the implementation of the first semiconductor integrated circuit in 1960.

Thus for the immediate future, Moore’s Law indicates that computational power will continue to increase at current rates, bringing more speed and capacity to handle more sophisticated applications and end-user requirements. It enables online collaboration to take place in a seamless and instantaneous manner, and at lower cost.

II. COLLABORATIVE RESEARCH AND DEVELOPMENT

Where a variety of inputs are needed from different disciplines in order to further a research area, then mechanisms for collaboration are necessary. In addition, the norms, concepts,
and practices of research in each discipline need to be understood across the boundary.

Multi-disciplinary, inter-disciplinary, and trans-disciplinary research, are identified by Holzbaur et al. [7] as different aspects of collaboration across boundaries.

It is generally accepted that new disciplines tend to emerge at the boundaries between existing disciplines. This is particularly relevant for computer science and its interaction with other disciplines, and for art and design and its interaction with science, technology, and medical areas. Thus research across the boundaries is important for the future. In addition, such research areas tend to be applicable, that is, they have relevance for real-world applications and finding solutions to current problems.

Page [8] claims that cognitive diversity enables groups to find better solutions and also facilitates finding solutions when the problems are complex. Thus collaboration across discipline boundaries may yield more groundbreaking results than collaboration within a discipline.

III. CREATIVITY IN BUSINESS

Amabile [1] explores a number of concepts of creativity and innovations and their place in the structure of businesses. This work explores the environments created by business managers and how creativity responds, or fails to respond, accordingly.

Amabile states that the majority of managers have a somewhat narrow view of creativity: equating it with the imagination with which they solve problems. This is argued as being only one facet of creative behavior. While it is accepted that imaginative thinking is a part of creative behavior, it is argued that expertise and motivation are just as critical.

Amabile describes how the skills at the disposal of the practitioner are also dependent on personality, stating that the practitioner will be more creative if the practitioner is comfortable disagreeing with others, naturally attempting solutions that go against the status quo. Creativity is also increased if the practitioner combines knowledge and practice from other disciplines to find solutions. Two strategies for creative success are briefly mentioned: perseverance through a difficult problem until a creative output is achieved, and ‘incubation’ in which a problem is set aside temporarily and returned to later with fresh perspective.

Expertise, in Amabile’s view, is described as encompassing the sum knowledge of everything that the practitioner possesses regarding their broad field of study. The skill with which the creative practitioner exercises their ability to solve creative problems is of key importance, but does not lie solely within the specific field in which the problem appears to lie.

The third factor in creative behaviors is motivation: the factor that determines what the practitioner will or will not actually do. Amabile goes further and classifies motivation into two types: intrinsic and extrinsic.

Amabile conducted experiments, interviews and surveys to allow insight into the creative behaviors taking place in businesses. Six categories presented themselves as key to the enhancement or diminution of creativity:

1. Challenge: Creative practitioners need to feel challenged in their work. Their motivation is likely to be high when their abilities and skills are stretched. A delicate balance is required, since both lack of adequate challenge, and overly difficult tasks, result in disengagement. Matching of the right creative person with the task is key to managing engagement with the challenge.

2. Freedom: A creative practitioner engages with creativity more effectively when they are given the autonomy or freedom with which to explore the means or the process, but not necessarily the ends. Better results are obtained when a methodology is discovered rather than imposed. Lack of clearly defined goals and freedom in name only are barriers to the maximum efficacy of freedom.

3. Resources: Organizations may kill creativity through the use of fake or very tight deadlines. Fake deadlines foster a sense of distrust in the organization and tight deadlines cause creative and physical burnout. Either causes people to feel over-controlled and unfulfilled. Under resourcing can result in creative effort being spent addressing the resource gap whilst over resourcing provides no additional creative benefit.

4. Work-Group Features (Team-working): Successful creative teams will exhibit three shared features. They must share enthusiasm for the goal of the team, they must be willing to support each other during setbacks and they must recognize the unique knowledge and perspective that each other member of the team brings to the project.

5. Supervisory Encouragement: Naturally, praise results in increased motivation and satisfaction, whilst criticality typically results in demotivation. It is identified that supervisors and managers may be skeptical or critical of creative solutions until they have been proven. There is also a bias towards criticality in supervisors as they feel this makes them seem more intelligent, or is justifying their position.

6. Organizational Support: Building upon Supervisory Encouragement, creative environments and organizational procedures for emphasizing creative endeavors will enhance creativity. This is not tied directly to monetary gain, which adds little to intrinsic motivation. The values of the organization
must support a community of collaboration and sharing.

These six features will be utilized to reflect upon the authors’ experience of collaborative, creative environments.

IV. CREATIVE AND TECHNOLOGICAL COLLABORATION: ADDRESSING THE CHALLENGES

The previous sections have established core theories and factors that relate to the success and failure of creative teams and businesses, resulting principally in the six key factors identified by Amabile [1].

These factors will now be examined within the context of multi-disciplinary, technology supported, collaborative environments. The assumption is made at this point that each of the individuals within any creative team is already able to exhibit the necessary traits of creativity, expertise and motivation, allowing the discussion to focus upon placing Amabile’s six issues in the scenario of a project or business team:

A. Factor One: Challenge

A multi-disciplinary team will often consist of practitioners that possess a range of complementary skills, which, when working in harmony with one another, allows the breadth and depth of challenge to be significantly increased over that of an individual.

One matter that must be considered by the task supervisor or manager, however, is the overlap of roles and responsibilities in the team. A good, interlocking, multi-disciplinary team will often exhibit skills ‘bleed’, where an individual’s expertise integrates with another. Typically, this will come from previous experience of working with others in a team, as well as having to take on adjacent roles when working in smaller teams and on less well-resourced projects. For example, a photographer will often have digital image editing skills, in addition to camera skills, which may bleed into the skillset of a digital artist or image retoucher. Key to dealing with this issue is the distribution of clear delineations and responsibilities within the team. This does not need to stifle creative debate and peer discussion, but ultimately the final result should be within the control of the designated person. This strategy manages the challenge of matching the person to the task, as well as ensuring that the challenge is within the range of each team member.

B. Factor Two: Freedom

The main risk in providing creative freedom to multi-disciplinary teams is that the team may become fractured or, worse, that a team breaks apart to the extent of failing to meet the project aims. Such fracturing may be attributable to poorly defined aims, as recognized by Amabile [1] or through misinterpretation by individuals or sub-groups within the team. As such, effective communication mechanisms and ensuring shared understanding are crucial in managing this risk. Similarly, the methodology or creative approach that the team adopts must be one that is understood and involves all disciplines. For example, uncertainty within a team is likely to cause individuals or discipline groups to regress back into their own discipline because of the uncertainty about how to interact with others.

Intuitively, this risk seems likely to be exacerbated when dealing with teams working remotely from one another. However, in recognizing that participants are to be remote, a good manager will engineer sufficient milestones and virtual or real meetings to track progress. Furthermore, the use of technology such as email, electronic conferencing, and so on, ensures that there is a clear audit trail. To this extent, there is no reason to believe that remote participants in a project are more likely to suffer fracturing, provided that adequate project management tools are put in place.

C. Factor Three: Resources

In considering the management of resources, a supervisor or manager must be aware of the broad range of resources and expectations that will feature within each of the disciplines that constitute the group. This is especially true when dealing with a range of practitioners across the spectrum of the creative industries. Those from more technically inclined disciplines will typically have a minimum level of expectations that they will be uncomfortable to deviate from, whilst those from artistic or media communication disciplines are typically prepared to improvise or scale their performance relative to available resources. Effective communication is necessary again to ensure that all understand the distribution of resources within the team, so that favoritism and demotivation risks are minimized.

D. Factor Four: Work-Group Features

Intra-team support can be difficult in multi-disciplinary teams, especially where there are different backgrounds of reporting, methodology, and culture. Lack of support can often occur due to instincts of self-preservation or lack of understanding about the other disciplines involved. This needs to be managed effectively; allowing for honesty, constructive commentary, and critique, whilst avoiding demotivation of individuals of teams. As such, this requires an honest and trusting environment and culture.

While acknowledging the need for honesty in discussion of creative projects between creative individuals, Catmull [3] proposes a linguistic shift in terminology from honesty to candour. Honesty is a concept that is bound to a sense of morality that supersedes the truth. Candour as a concept is similar enough to the concept of honesty that honest and candid feedback are essentially the same, however candour allows for a lack of reserve and a departure from the morality of right and wrong. A strategy for countering the fear of the critique is establishing that the feedback is based upon empathy for the process and the creator. By making clear that the intention of the feedback is to construct possibility, rather than destroy potential.
Ensuring sufficient motivation of everyone concerned in a team is necessary to manage this situation. Similarly, an established team dynamic and mutual confidence amongst team members is essential. Multi-disciplinary team dynamics can be likened to the established models of cultural integration, such as a melting pot or a salad bowl [10]. Given this current collaborative issue, and those previously discussed, we advocate that an effective team integration model for multi-disciplinarians is more akin to that of a soup, specifically a broth, which allows the constituent disciplines to retain their form and specificity, but whereby they are bound together in a common situation and purpose, greater than the sum of its parts.

E. Factor Five: Supervisory Encouragement
The range of disciplines and technologies present may be inhibitive and even found to be obstacles by team supervisors and managers. For example, a project manager whose background is in the film industry, and having crossed the Kipling threshold, may struggle to deal with the technologies and approach of computer programmers and animators when working on a computer game. This is likely to impact upon their capacity both to praise and criticize, although the latter is more likely for fear of otherwise not being seen to be in control of the team or lacking the necessary knowledge. Equally, over-praise for work that is not understood is misplaced.

The use of technology, and potential contribution of technologists, in creative teams presents an interesting opportunity for creative solutions to be tested, piloted, and ideally proven, before their actual implementation. This can be achieved through the use of mock-up, rapid prototyping, simulation, and so on. In this regard, a multi-disciplinary team may be able to offer supervisors and managers greater levels of reassurance, likely resulting in more praise and reward, throughout the project, rather than when the solution is deployed in the wild. This unique opportunity provides supervisors with mechanisms by which they can be informed by the progress of all disciplines within a team.

F. Factor Six: Organizational Support
As with all effective organizations and cultures, leading by example and embedding core values is essential. The major risk in adopting a multi-disciplinary strategy at an organizational level is that the organization may appear, to external parties, to be fragmented. However, there are many large and successful organizations in the creative industries that incorporate this model and so it may be argued that the issue is one of scale and therefore resources.

It is worth noting that Amabile’s six factors portray themselves as being embedded across and throughout the organization. In forming a working model of these factors for example, it is difficult to separate out the organizational and managerial aspects from those of the team. Whilst it seems that Amabile recognizes these as separate actors within the organization, there is no hard barrier between them. For example, embedding Freedom and Resources into creative practice requires management endorsement, but not necessarily on an active level but one that is more passive. Supervisory Encouragement and Organizational Support, on the other hand, are more active in nature. However, it is hard to detach any of the six features completely from some kind of management structure. This leads us to attempt to present a functional model of Amabile’s size factors and this is illustrated in Fig.2.

1 The Kipling threshold can be likened to the Peter Principle [5, 9], but where the individual concerned no longer has the opportunity to demonstrate their core expertise, although they may still be promoted.
V. AN EXAMPLE OF CREATIVE MULTI-DISCIPLINARITY: CROWD-ACCELERATED DEVELOPMENT

The traditional method of distribution within the creative industries means that many of the works that may be classed as innovative are only heard about long after the point of conception, upon release. If an innovation sits outside of the viewer's personal preferences when it comes to surface facets of the construction such as the aesthetic style, these innovations can be largely overlooked and therefore unheed. Anderson [2] proposed the idea of crowd-accelerated innovation after observing the upward trend in innovative approaches to the lectures given at the TED conference that he curates. Anderson proposes that crowd accelerated innovation requires an existing community, that this community is visible to one another and that this community have a shared desire. This desire can be personal; the desire for recognition, wealth, or social status; to benefit the medium of the creative discipline the practitioner is working within. This is described as ‘The Crowd, The Light and The Desire’.

Giving these communities access to the innovative thinking of the individual (not necessarily the deployment or application of the concept or the final product) allows the community to access the innovation and expand upon it prior to the point of release or consumption, the publishing date. This access to innovation or innovative behaviors, prior to the point at which the project goes to press, refers directly to the acceleration. If the community only has access to the consumption point of the artwork, it may be inferred that this is ‘regular’ rather than accelerated innovation.

A key aspect of crowd-accelerated innovation is the ability through technology to intensify its effects. Anderson states that by increasing the size of the crowd through online social media with the ability to share creative work digitally, the fidelity with which the community may communicate and access to extended modalities for the sharing of media, crowd-accelerated innovation affords enhanced opportunities for innovative behaviors to take place and at an increased pace. An example that Anderson gives of the increased fidelity with which information can be accessed and shared is through online streaming video sites such as YouTube.com, where a creative practitioner can demonstrate a skill rather than simply describing it. An important technical aspect of sites such as YouTube is the ability to post comments, link and embed specific videos, at specific time codes on an extended range of social media.

So, by increasing the size of the crowd and giving this inflated group of linked practitioners access to the insights and innovations of others, Anderson argues that the desire to continue engaging emerges naturally as part of intrinsic human behavior.

The central thesis of Anderson’s article argues that through the ability to share with an enhanced level of fidelity the insight and innovation of a group of creative practitioners, the rate at which the overall group innovates is increased. Anderson relies heavily on the idea of streaming video being the key component in this process, and while this is pertinent for the examples he gives of innovation in dance and street performance. The process he describes relies more heavily on the building of networks of connected professionals, the ability for others to engage with the network and the technical fidelity with which this network can transmit and receive data in a format relevant to their practice rather than a single mode of sharing information. Streaming video demonstrates very effectively the way in which dancers have been able to innovate but may not be as pertinent for example to a designer sharing insight into the creative process. What is required over the ability to share video specifically is the ability to share a variety of forms of media and enable the community to engage in discussion.

VI. DISCUSSION

A. The Internet and Online Collaboration

The Internet is now ubiquitous and increasingly integrated into everyday activities such as work and leisure. Clark [4] argued that one Internet year was equivalent to seven calendar years, and therefore the more significant the Internet became, the faster the processes and developments would take place. This point has already been noted in the earlier section on crowd-accelerated development, particularly when this increase in the number of collaborators is not just physical but also becomes virtual through the Internet and online social media. This can also have an unexpected and serendipitous effect when new collaborators join in from different cultures and with different backgrounds. They bring their own unique and diverse contributions that can be transformative in their effect on the status quo. Thus the Internet and online collaborations not only bring accelerated developments, they also bring new kinds of environments and interactions, which can have creative outcomes that were not initially planned or expected. A significant quantum effect in creativity and collaboration can take place, simply because of the large volume of potential collaborators. The Web Science Research Initiative is an example of such an augmented collaboration via the Internet. Established in 2006, it has currently 16 world-class international research groups and a series of international teaching and research events including an ACM Web Science conference now in its 5th year.

This raises the interesting question of what further developments may take place in online collaboration via the Internet that may have even greater effects than those already observed.

B. Sharing and Collaboration

The raison d’etre of Facebook and most of the other social media sites is to increase networking capability and
information sharing without requiring physical co-location. In many cases the size of the group via the network far exceeds any local physical group. Thus the effect of the virtual group can far outweigh any group established solely on a physical basis. This indicates that a transformation from the local to the universal in the potential to share and collaborate is taking place. Even local physical communities in towns and cities are being augmented by downloadable apps in order to provide added value in services and facilities to the local area. Examples of this are projects run by the Knowledge Transfer Network in the UK for Creative, Digital and Design under the aegis of Innovate UK (formerly the UK Technology Strategy Board) such as those to enable local communities to gain greater access to information and services via digital means. In addition, the Creative Industries Strategy for 2013-16 has a focus on knowledge sharing and delivering through partnership, and therefore providing the infrastructure and digital communication services to facilitate this.

Educational organizations are increasingly offering courses enabling content from leading institutions worldwide to be accessed by anyone online. All is required is the time and motivation. The borderless campus is becoming an increasing reality. Opportunities for learning and knowledge acquisition are therefore increasing at a significant rate. When this is combined with access to digital libraries of the kind facilitated by the Oxford/Google Digitization Project, there is significant potential for an open access world of information and learning.

C. Broadcasting Media and Internet as Second Screen

Broadcasting media have well-established methodologies for generating content and distributing to viewers either via traditional broadcasting or via the Internet. The content can also be stored by users on servers and used to determine their own schedule for viewing the content, rather than having to comply with those of the broadcasters. In addition, viewers now have their own capability for generating content, including commenting on the content they have already received via traditional means. Thus we are moving from a world of one to many broadcasting, to one of many to many. Viewers are also being given increasing interactive control of content in broadcast transmissions so that, for example, they can set up their own viewpoint for a sports event. The viewer is therefore moving from passive recipient to interactive user. Thus media is being increasingly customised and the consumer is invited to tailor it to their particular interests and requirements. The decreasing costs of technology enable users to transmit their content to the same fidelity standards as that of broadcasters. It is only a matter of time before they also have the required creative and production skills to generate the content to the same standards as well. Thus traditional broadcasters are looking to form partnerships with new media organizations and innovative content creators in order to preserve market share in an increasingly collaborative media environment in the future.

D. Virtual Environments and Creative Collaborations

Virtual environments have been used to facilitate theatre rehearsal, orchestra rehearsal, dance rehearsal, and art installations. In these performances, exhibitions and experiments, local and remote participants have been brought together into one virtual space by means of broadband technology and appropriate sensors and cameras. To date, it has been most successful for theatre rehearsal, where all movement planning for the actors in the production can be done in advance on the virtual set, before the cast come together for a final rehearsal period on the physical set. It has not been as successful for virtual orchestra rehearsal simply because the rapid interactions between conductor and players currently exceed the latency effects introduced by the virtual environment. Friston and Steed [6] have investigated methods for measuring latency in virtual environments. The next steps are to determine how far creative processes and cognitive awareness are influenced by latency in online environments.

E. Metadata and Collaboration

In the creative industries sector, metadata is information about digital content and services, and the ways they are being consumed, used and distributed. This includes information about the content and who was involved in its design, production, and distribution, and also information about who is accessing it, how it is rated, and with whom it is being shared.

Three areas of interest are the interoperability of different sets of metadata, improving the search and discovery of metadata to help generate revenue, and improving the linkage between metadata and the original content. Interoperability implies that there is benefit to collaboration whether in research and development or across businesses. Increasing connectivity brings increasing amounts of available data and therefore more opportunities to extract value from it. Metadata enables content to be discovered, licensed, and distributed. It can also be embedded in strategic processes and decision-making enabling these to take place in real-time, or near real-time. Data is therefore having a transformative effect on the creative industries and the processes within them. It can help to understand audiences, pilot products, and increase the efficiency of production processes. A question of current interest is to develop business models that will make best use of metadata to generate long-term sustainable content businesses.

VII. Conclusions

The impact of creative collaboration presents an opportunity for significant rewards and impact on short and long-term scales. Technology has worked not only as an enabler for the creative sector but also as an opportunity for new kinds of collaborations and interactions. Crowd-accelerated innovation is facilitated by advancing technologies. In addition, the socio-cultural changes that mass media, always on/always connected communication, high speed Internet, and technologically driven consumer markets have produced
increased public interest and expectation. The result is that many crowd-funded or crowd-sourced innovations are often technologically inclined themselves. Similarly, the computer and video games and Hollywood film industries have been transformed by the way creativity is executed.

Whilst there is much opportunity for further technology-driven innovation and success, the next steps in fully utilizing the creative potential lies in the understanding, integration, and enhancement of creative teams working together over large distances, often bringing together different cultures and social contexts. Harnessing these global creative assets for the benefit of future environments, products and services in the artistic domain in more effective and efficient ways is a major challenge for the future.

REFERENCES


Author Biographies

Dr Stuart Cunningham

Stuart Cunningham is a Senior Lecturer at Glyndwr University. He was awarded the BSc degree in Computer Networks in 2001, and in 2003 was awarded the MSc Multimedia Communications degree with Distinction, both from the University of Paisley. In 2009 he was awarded the degree of PhD in Data Reduced Audio Coding by the University of Wales. His research interests cover a broad range of computing and creative hybrids and include: audio compression techniques; human-computer interaction and audio for health and wellbeing; sound design; wireless network security; and the socio-economic impact of leading-edge technologies. Stuart is a Fellow of the British Computer Society (BCS) and Chartered IT Professional (CTIP), Member of the Institution of Engineering & Technology (IET) and Member of the Institute of Electrical and Electronics Engineers (IEEE). He currently serves on the BCS Computer Arts Society committee. Stuart was also a member of the MPEG Music Notation Standards (MPEG-MSM) working group.

http://www.glyndwr.ac.uk/cunninghams/

Dan Berry

Dan Berry is an MPhil student in Creative Industries at Glyndwr University, UK

Prof Rae Earnshaw

Rae Earnshaw is Professor of Creative Industries at Glyndwr University. He gained his PhD at the University of Leeds. He was Dean of the School of Informatics at the University of Bradford (1999-2007) and Pro Vice-Chancellor (Strategic Systems Development) (2004-09). He has been a Visiting Professor at Illinois Institute of Technology, George Washington University, USA, and Northwestern Polytechnical University, China. He is a member of ACM, IEEE, CGS, and a Fellow of the British Computer Society and the Institute of Physics, and a recipient of the Silver Core Award from the International Federation for Information Processing, Austria. He has authored and edited 36 books on computer graphics, visualization, multimedia, art, design, and digital media, and published over 200 papers in these areas.

http://sites.google.com/site/raearnshaw/

Prof Peter Excell

Peter Excell is Deputy Vice-Chancellor and Professor of Communications at Glyndwr University. His interests cover computing, electronics, and creative industries, with a strong spirit of interdisciplinarity that is needed for the digital knowledge economy. He gained his BSc in Engineering Science at the University of Reading and PhD in Electronic Engineering at the University of Bradford. His work on future mobile communications devices is being carried out in conjunction with colleagues from wider discipline areas, analysing human communications in a holistic way and developing new ways of using mobile multimedia devices. He has published over 400 papers. He is a Fellow of the British Computer Society, the Institution of Engineering & Technology and of the Higher Education Academy, a Chartered IT Professional and Chartered Engineer. He is a member of the UK and Ireland committee of the IEEE Society on Social Implications of Technology.

http://www.glyndwr.ac.uk/en/StaffProfiles/PeterExcell/

Prof Estelle Thompson

Estelle Thompson is Professor of Fine Art and Head of the Business Division of Media, Arts and Design at Glyndwr University. She has a Post Graduate Degree (MA RCA) in Painting from the Royal College of Art, London (1986). She is a practising artist who has exhibited nationally and internationally including solo exhibitions at Oriel Sycharth Gallery, Wrexham (2014) Purdy Hicks, London, (1989 - 2009), Wetterling Gallery, Stockholm, (2004), The New

As a painter her research concerns include visual perception, colour, chromatic and monochromatic theories, Sacred Geometry and two-dimensional geometry including the golden ratio, divine ratio and golden rectangle, compositional formats and spacial possibilities.

http://www.estellethompson.com/