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THE ROLE OF GAME DESIGN IN ADDRESSING BEHAVIOURAL CHANGE

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ABSTRACT

With the increasing promotion of design for behavioural change as a means of addressing the complex societal and environmental challenges the world currently faces, comes the associated challenge of developing appropriate design techniques to address such change. Whilst many designers have sought inspiration from game design they have often drawn from the techniques associated with 'gamification', which has been heavily criticised as manipulative and only capable of addressing simplistic extrinsic personal motivations. In this paper I discuss an alternative perspective whereby games are considered a rhetorical medium through which players can rehearse plausible alternate presents or speculative futures. The consideration of games in this way is effectively extending the view that 'all design is rhetoric' to include interactive systems and, in this paper, I highlight how by adopting such a perspective designers are enabled to tackle complex issues without resorting to reductionist approaches.

Keywords: game design, behaviour change, gamification, procedural rhetoric.

1 INTRODUCTION

When Richard Buchanan described, 'all design as rhetoric', [Buchanan, 1985] he was acknowledging both design's ability to influence people and that design is not a neutral act. Although the ability of design to influence has been exploited by marketing for many years, it is increasingly being seen as a way of addressing the complex societal and environmental challenges we collectively face by facilitating behaviour change within individuals. Whilst the majority of proponents of design for behaviour change can be considered as trying to influence users in some way there are often considerable differences as to how they think this should be achieved. At present the majority of techniques either:

- seek to directly encourage or discourage a particular behaviour;
- or adopt a more indirect approach that seeks to create an understanding of consequences of engaging in a particular behaviour.

While both these approaches can be implemented in a variety of ways in this research, I am specifically concerned with those that use technology as the primary means of delivery and, in particular, the increasing number that propose adopting techniques associated with game design. The prominence of game design within such systems is undoubtedly in recognition of the number of people now playing games, for example, the Guardian Newspaper reported on 17 September 2014 that 70% of the UK population regularly play games. Further, games have become a major feature of our cultural landscape. This extends beyond the games themselves and we can now see their aesthetic, iconography and even their operation represented in other forms of media such

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as films, books and television – thus, we are arguably becoming a more ‘games literate’ culture [Coulton, 2014].

This concept, of using games to influence behaviour, is not new and one of the most notable examples of this from the past is The Landlord’s Game patented in 1904 by the Quaker, Lizzie J. Magie. The game was conceived by Magie when she was part of a tax movement that promoted the theory that the renting of land produced an increase in land values that profited just a few landlords rather than the majority of the tenants: her game was designed to reveal this theory [Orbanes, 2006]. Unfortunately, The Landlord’s Game failed to achieve this laudable aim, and was no doubt hindered by the fact that a game mechanic, through which the player with the most money won, conflicted with the rhetoric of the underlying economic theory, and likely contributed to its evolution into the capitalistic game we all now know as Monopoly®. Whilst the wide scale adoption of Monopoly might inspire those seeking to use game design for behavioural change, it should also act as a warning that games should not simply be viewed as making things *more fun* - they are powerful interactive systems whose design should be considered very carefully.

2 GAME DESIGN AND BEHAVIOURAL CHANGE

Before considering how game design techniques are used for behaviour change in more detail it is worth considering the main bodies of thought through which this is currently implemented, which are:

- *Serious Games* – These games are predominantly simulations of real world activities or processes and their primary aim is to train or educate the player;
- *Games for Change* – Is a community that aims to facilitate the creation and distribution of social impact games designed to serve as critical tools in humanitarian and educational efforts;
- *Persuasive Games* – This is an approach to game design that argues that games can act as rhetorical tools through which a designer can make arguments or influence players.
- *Gamification* – This is a largely marketing driven approach that argues that elements of game feedback systems (e.g. points, badges, competition with others, etc) can be applied to other areas of activity to encourage engagement with a product or service.

Although there is often considerable overlap in the motivations of those utilising game based approaches, e.g. schools, Non-governmental Organisations, social enterprises, businesses, etc, the differing political and philosophical standpoints of those involved often results in a great deal of contention over which games, and even game designers, are associated with which of these approaches. One simple way of considering these approaches is whether they are aiming to create complete games or simply using game elements to engage players/users. If we place these four areas along a continuum between being a fully-fledged game and simply having game elements then they would arguably appear as shown in Figure 1. The two areas under consideration within this research, gamification and persuasive games, are represented at the extremes of the continuum and they are not simply differences in implementation they are fundamentally different in design approach as we shall consider in detail within the subsequent section.

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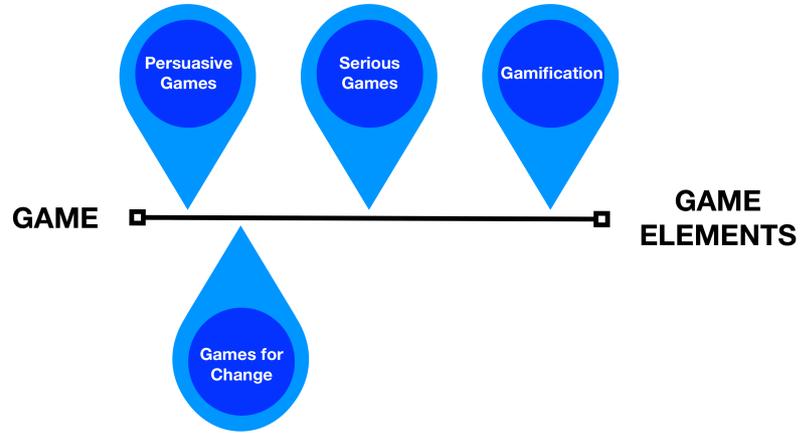


Figure 1 –Use of Game Design for Behaviour Change.

3 GAMIFICATION AND PERSUASIVE GAMES

Since its inception gamification has been highly controversial [Deterding et al, 2011] and while this controversy still remains, it is clear that the majority of gamification systems reported thus far draw their methods from Human Computer Interaction (HCI) and experimental psychology. These methods generally break down problems into simple personal goals often expressed through self interest arguments [Knowles et al, 2014a]. In this respect gamification is very similar to persuasive technology [Fogg, 2002], and both are distinct from persuasive games [Bogost, 2007], in that they seek to directly encourage or discourage a particular behaviour. Such an approach is exemplified by the Fogg model [Fogg, 2009], illustrated in Figure 2, using what Fogg refers to as "captology", which recommends choosing a 'simple behaviour to target' when designing a persuasive technology which is then promoted to the user through arguments of self-interest.

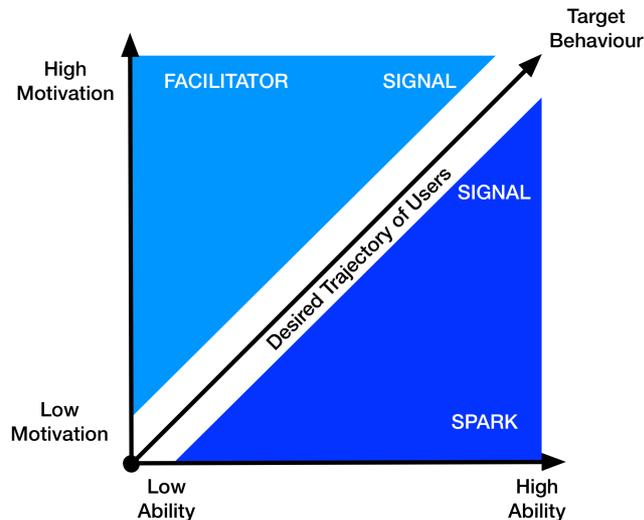


Figure 2 –Fogg Behavioural Model.

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In this model Fogg defines three particular types of trigger that can be used to persuade the user [Fogg 2009]:

- *The Spark* - a trigger that provides the initial inspiration to change behaviour;
- *The Signal* - a trigger that identifies to the user the appropriate time to perform a particular behaviour they are already motivated to perform;
- *The Facilitator* - a trigger that makes the desired behaviour easier to perform.

We can see this approach in action in most supermarkets in relation to their store cards. The spark is through the promotion of potential savings to the customers by using the card, the signal is the assistant at the checkout asking for the customer's card every time they make a purchase, and the facilitator is the electronic card that is simply swiped to register the purchases. Whilst it is easy to see how such techniques can be applied to simple behaviours they become problematic if the behavioural change required is related to highly complex issues such as climate change. In such cases these techniques become reliant on the hope that if enough individuals choose to change their behaviour then the larger problem may ultimately be addressed. This is despite psychology research that demonstrates that even very simple actions take a long time before they actually turn into habits [Lally et al 2010] even when there is a strong intrinsic motivation. The alternative to these direct approaches are the indirect approaches that seek to either create an understanding of consequences of engaging in a particular behaviour or to reveal the operation of the system to which the behaviour contributes and are addressed by persuasive games.

Persuasive Games, as defined by Ian Bogost, promotes the use of rhetoric to reveal to the player the underlying processes or concepts that drive a system or activity through playing the game [Bogost, 2007]. Before discussing this rhetorical approach further, it is worthwhile considering how the term rhetoric is being applied here as in some modern contexts, such as politics, it can be associated with insincerity, whereas here it is used in its historical sense relating to the art of persuasive speaking [Rapp, 2010]. In terms of applying rhetoric within a specific design context, it can be considered in relation to the three modes of persuasion: Logos, Pathos, and Ethos identified by Aristotle [Rapp, 2010] and shown in Figure 3.

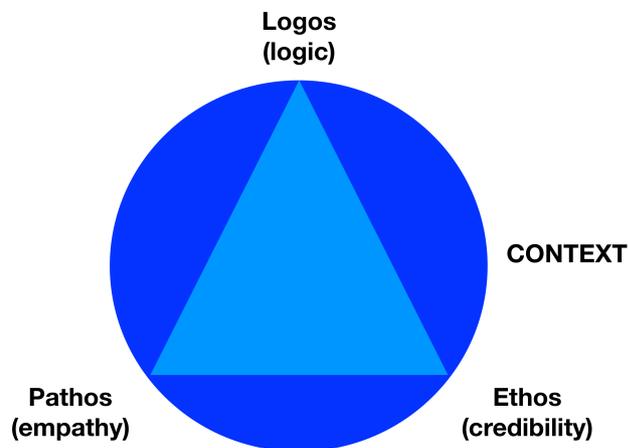


Figure 3 – Modes of Rhetoric.

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Within these three modes various techniques can be used to appeal to the player/user, for example:

- *Logos* - would utilize facts, statistics, analogies, and logical reasoning;
- *Pathos* - would appeal to our emotions and draw upon feelings of fairness, love, pity, or even greed, lust, or revenge;
- *Ethos* - would draw upon credibility, reliability, trustworthiness and fairness.

Further to this, rhetoric has already been considered beyond simply speech; with visual rhetoric associated with image [Kim et al, 2010] through to Richard Buchanan’s argument that all design can be considered “as rhetoric” [Buchanan, 1985] as shown in Figure 4.

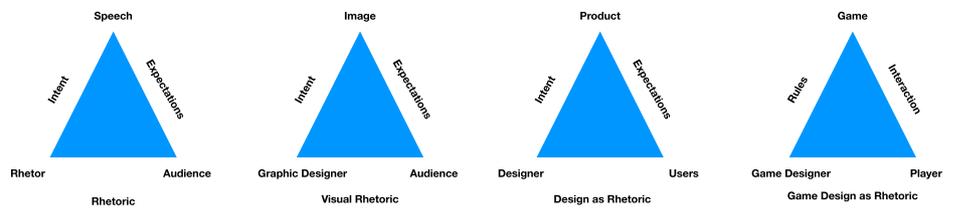


Figure 4 – Rhetorical Mediums.

In relation to games, Ian Bogost argues that the basic representational mode of videogames is “procedurality”, [Bogost, 2007] enacted through rule-based representations and interactions and, when used to reveal processes or concepts of another system, presents the player with a procedural rhetoric. Thus, procedural rhetoric is the practice of using interactive processes persuasively [Bogost, 2007]. Therefore, our previous discussion of The Landlord’s Game highlights what happens if the intended rhetoric of the designers is not embodied in the rule based representations and interactions of the game. It is worth noting Bogost’s definition differs from Buchanan’s argument where all games would be considered as encompassing rhetoric. Although Bogost is essentially only promoting the conscious use of rhetoric, his definition would not necessarily preclude its unconscious use, and therefore, I would argue procedural rhetoric could be applied to the design of all computer mediated interactive systems if we substitute system logic for rules as shown in Figure 5.

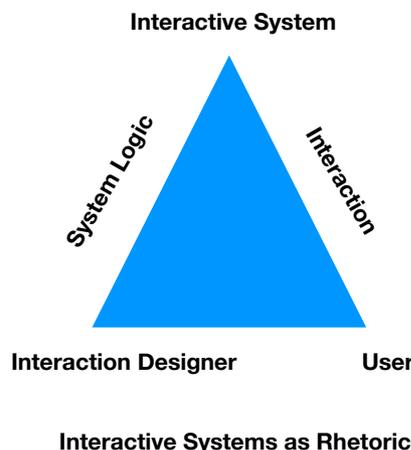


Figure 5 – Rhetoric of Interactive Systems

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Having defined games in terms of rhetoric, we can now return to Figure 3 and consider how Logos, Pathos, and Ethos can be embodied within the procedurality of a game. Video games are arguably unique in their ability to promote feelings of empathy through the control of the avatar directly by the player and, whilst many games merely fulfil power fantasies, there are a growing number that offer more challenging narratives. For example, in Susana Ruiz's game 'Darfur is Dying', the player takes the role of a Darfur child retrieving water from a desert well whilst avoiding the Janjaweed militia [Bogost, 2011]. The only option available to the player is to hide, although lingering too long leads to inevitable capture. Unlike many games it deliberately invokes a feeling of helplessness in the player so that they may better empathise with this terrible real-world situation.

When we consider logic in games we must address the notion of suspension of disbelief [Salen et al, 2004]. Whilst players will accept abilities and situations within a game that are impossible in the real world, they must fit within the overall narrative of the game. When creating games that explore real-world events or situations, the narrative of the game and abilities of the player must be carefully constructed so that its link to the real world is not broken; otherwise, the game world becomes merely another fantastical realm.

Credibility and authenticity is arguably the hardest to achieve within a game setting, although by drawing from verifiable real-world data sources it may be possible, as these provide perceptual anchors to the real world. Additionally, the narrative used to describe the game before the player has even played may be used to emphasise the credibility of the rhetoric contained within. Having discussed the rationale for adopting a rhetorical rather than gamification approach when designing for behaviour change in the following section I will consider a practical example of how this can be applied.

4 DESIGNING PROCEDURAL RHETORIC

In order to practically illustrate designing for procedural rhetoric in this section, I have chosen to use the example of BARTER [Knowles et al 2014b]. This is not a game, but a system to encourage people to spend money in their local economy, which serves to illustrate my assertion that a rhetorical design approach can be applied to other interactive systems and not just games.

4.1 BARTER

Despite the economic problems encountered throughout the world, actual levels of consumer consumption have not dropped significantly; rather, consumers are seeking the bargains and convenience offered by large out of town retail outlets and on-line stores [Knowles et al 2014b]. Whilst this behaviour offers obvious short-term benefit for individual consumers it contributes to the decline of locally owned businesses which has been shown to significantly lower the number of jobs in an area and lower the average retail wage [Hopkins 2013]. Thus, such short-term personal gains are ultimately to the detriment of the larger community. The design challenge is thus to create a system whose rhetoric promotes the benefits for the community over the dominant rhetoric, from large retail outlets and on-line stores, relating to the benefits for the individual.

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As inspiration BARTER utilised the New Economic Foundation metaphor of a 'bucket' when describing local economies [Ward et al 2002]. Using this metaphor, the reason certain communities struggle is because they have too many holes in their bucket, allowing the local wealth to leak out faster than it can enter. The two solutions to this are either: to try and plug the leaks; or increase the wealth within the bucket [Knowles et al 2014b]. The first option implies substituting non-local transactions (money sent outside of the bucket) with local ones when there is no obvious incentive (e.g. convenience, price) for the individual - in effect its aim is to decrease the rate at which the community's wealth is decreasing. Whereas the second option is based on the premise that when money is passed around in a closed system the overall wealth increases, as a profit is made on each transaction - thus, it attempts to increase the rate at which the communities wealth increases. Whilst both may provide initial objectives for designers, the latter is interesting as it affords the provision of a providing different economic rhetoric based on the flow of money rather than its value.

Money can be considered as an information system that has an abstracted value but contains no information about where it has been [Knowles et al 2014b]. This means people cannot recognize if money they have spent locally continues to be spent locally without effectively adding more information to the money. Therefore, the BARTER system was designed not simply to record 'who', is spending with a specific business, as with most store cards, but how the money 'flows' within the local economy, and in particular, when money spent by a customer can 'return' to them through the local economic activity. The easiest way to understand this is to imagine writing your name on a 10 Euro note that you then spend with a particular business. At some time in the future you receive that money back when someone purchases something from you, along with your signature the note also indicates all the people who have also used the money before it came back to you. In the BARTER system these return paths are described as loops. To be able to illustrate these loops and the economic flow, businesses are required to also reveal whom they spend with, and therefore, in this system, the 'BARTER' is not an exchange of goods but an exchange of information that, unlike many existing store cards or local currencies, promotes a reciprocal information exchange between customer and businesses.

The BARTER system comprises: Near Field Communication (NFC) cards for both customers and businesses; a mobile terminal (phone or tablet) on which customer to business (C2B) transactions are recorded (note the use of phones allows any size of business and even ones without premises to be included in the system); and a web portal to allow businesses to record business to business (B2B) transactions. Capturing the information in this way allows us to link the personnel spend of businesses and their staff within the system to produce a more complete picture of the local economy. Thus the system needs to:

- keep track of each individual purchase in real time as the card is scanned at the time of purchase;
- for each purchase the system searches the database to find if a loop is made;
- if a loop is made the event is indicated to the community and that loop is then removed from the system so it cannot be counted twice.

Whilst this is rather complex to understand in terms of the system implementation, the rhetoric for the users is the promotion of an understanding

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of the benefits of making loops. Whilst the system provides feedback when loops are made it is probably worth starting with the demonstrator animation that shows how the loops operate, as shown for the BARTER mobile community app in Figure 6. This demonstration allows users to 'play' with the economy so that they more fully understand what the feedback they receive relates to.

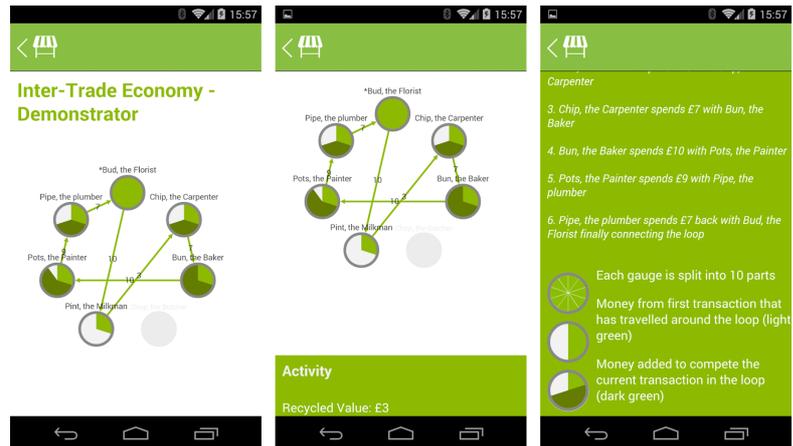


Figure 6 – BARTER Inter-Trade Demonstration Tool

The demonstrator shows a simplified fictional local economy of eight businesses that inter-trade with each other. It shows how loops can be formed and how much of the original money spent with a business has effectively been returned to them through other members of the local economy. Unlike the physical example not all the money has to return at one time and any residual money effectively remains in the economy to enable future loops to be created.

The demonstrator provides users a way of exploring the operation of the economy. For example, when a loop is made in real-time this is represented as a flower that is added to a garden. This presents a rhetoric where the loops are helping grow the local economy as shown in Figure 7.

Each flower is unique and generated from the number of businesses (traders) in the loop, the amount of each individual transaction, and the amount effectively returned (recycled) from the original transaction that started the loop. Rather than presenting users with a personal display of their BARTER activity, the system deliberately presents a community view to emphasise a user's role as a citizen within the local economy. From this community view, they can drill down to get their personal information and how the loop has been formed. It is important to note that BARTER is an 'in the wild' research project and the visualisations have been developed in conjunction with a number of local businesses and their customers who have been testing the service and recorded transactions of over 30,000 Euros. Whilst the research has been successful in the short term, to such an extent that the businesses have set up a community enterprise to take over the system when the software goes open source, I recognise that as with much of design for behavioural change the real impact will only be known in the long term, which is often outside their timescales of academic research projects.

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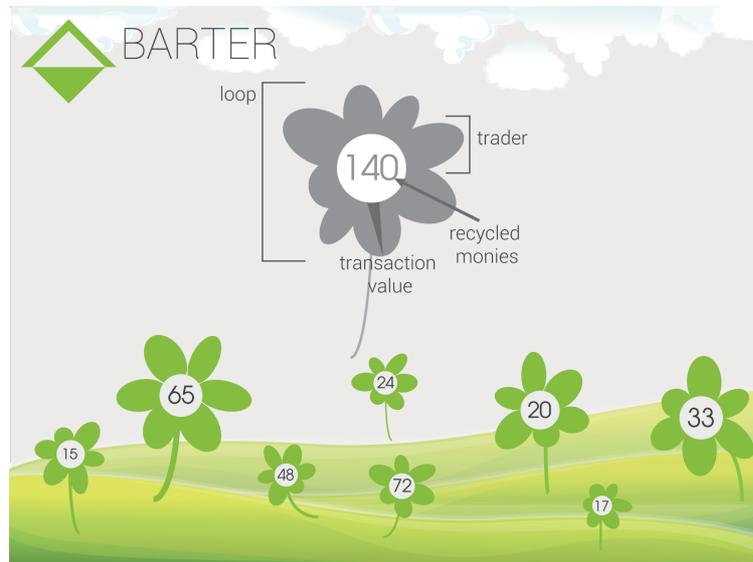


Figure 7–Community garden representing the inter-trading of the local BARTER economy.

5 CONCLUSIONS

As discussed, one of the reasons for proposing a rhetorical approach to behavioural change design is that many of the complex problems society faces, both now and in the future, cannot simply be reduced so that they can be addressed through direct techniques that promote minor behavioural change with easily understood and uncontroversial goals. To address such cases, a more indirect approach is required that seeks to create an understanding of systems to which a particular behaviour contributes and the concept of procedural rhetoric derived from game design has much to offer for the design of interactive systems with this aim.

However, as with many design strategies, the use of a rhetoric inspired approach can lead to a wide variety of possible games or interactive systems. Thus the modes of rhetoric highlighted are not intended to be used to rank systems in relation to some perceived quality about what may or may not make a 'good' behavioural change design, but are to help designers reflect on the appropriate uses of rhetoric and their responsibilities when designing such systems.

In terms of evaluating these systems, traditional usability measures are also inappropriate as they are designed to reveal their rhetoric to the user as they interact, and, in some cases, as with *Darfur is Dying*, limiting the playability of the game might be part of the rhetoric. These systems must, therefore, be evaluated phenomenologically so that players'/users' interpretations can be understood and considered in relation to rhetoric embedded by the designers. This means that in a similar vein to research through design, appropriate methods of evaluation will emerge through a process of creating these interactive systems.

Overall, while I acknowledge the power of game design might appear an attractive option for those seeking to design for behavioural change, I would

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advise consideration of this quote by the renowned game designer Will Wright, who created The Sims®, "Game elements aren't the monosodium glutamate of fun that you can simply add to an activity to make motivating and engaging" as games are only fun when they are well designed.

6 REFERENCES

- Bogost, I. 2007. *Persuasive games: The expressive power of videogames*. MIT Press.
- Bogost, I. 2011. *How to do things for videogames*. University of Minnesota Press.
- Buchanan, R. 1985, *Declaration by design: Rhetoric, argument, and demonstration in design practice*. *Design Issues*, pp 4-22.
- Coulton, P. 2014, 'Designing mobile and ubiquitous games and playful interactions'. in A Nijholt (ed.), *Playful user interfaces: interfaces that invite social and physical interaction*. vol. 1, *Gaming Media and Social Effects*, Springer, Singapore, pp. 71-95.
- Deterding, S., Sicart, M., Nacke, L., O'Hara, K., and Dixon, D. 2011. Gamification. using game-design elements in non-gaming contexts. In *CHI '11 Extended Abstracts on Human Factors in Computing Systems (CHI EA '11)*. ACM, New York, NY, USA, 2425-2428.
- Fogg, B. J. 2002. *Persuasive technology: using computers to change what we think and do*. Morgan Kaufmann Publishers Inc.
- Fogg, B. J. 2009. A behavior model for persuasive design. In *Proceedings of the 4th International Conference on Persuasive Technology (Persuasive '09)*. ACM, New York, NY, USA, , Article 40 , 7 pages.
- Hopkins, R. 2013. *The power of just doing stuff*. Totnes: Green Books.
- Kim, T. and DiSalvo, C. 2010. Speculative Visualization: A New Rhetoric for Communicating Public Concerns, *Proceedings of Design Research Society*, pages 11.
- Knowles, B., Coulton, P., Lochrie, M. and Whittle, J. 2014a. Wicked persuasion: a designerly approach. In *Proceedings PERSUASIVE 2014, Lecture Notes in Computer Science*, vol. 8462, Springer, Berlin, 137-142.
- Knowles, B., Lochrie, M., Coulton, P., & Whittle, J. 2014b. BARTER: a technological strategy for local wealth generation. *IEEE IT Professional*, 16(3), 28-34.
- Lally, P., van Jaarsveld, C. H. M., Potts, H. W. W. and Wardle, J. (2010), "How are habits formed: Modelling habit formation in the real world". *Eur. J. Soc. Psychol.*, 40: 998-1009.
- Orbanes, P. 2006, *Monopoly: The World's Most Famous Game--and How It Got that Way*. Da Capo Press.
- Rapp, C. 2010. Aristotle's Rhetoric, *The Stanford Encyclopedia of Philosophy*, Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/spr2010/entries/aristotle-rhetoric/>.
- Salen, K., & Zimmerman, E. 2004. *Rules of play: Game Design Fundamentals*, MIT Press.
- Ward, B., Lewis, J., Britain, G., Unit, N.R. 2002. *Plugging the Leaks: Making the most of every pound that enters your local economy*. New Economics Foundation, London.