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MC Hammer Presents: The Hammer of Transformative Nostalgification - Designing for Engagement at Scale



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Abstract
We argue that the huge success of Augmented Reality game *Pokémon Go* has little to do with clever design. Rather, the success is due to the nostalgic branding, with a franchise for which people already have great affection. As exasperated academics, rather than resist, we have decided to sell out. We suggest that a similar nostalgic branding strategy allows any mildly interesting HCI project to gain similarly huge benefits of public engagement. We provide the HCI community with a crude nostalgification tool – MC Hammer's Hammer of Nostalgification – and present a number of case studies that illustrate its power.

Author Keywords
Stop! Hammer Time!

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

Introduction
Many research disciplines related to HCI, from educational game design, to mHealth, physical therapy and sustainability, have recently become interested in understanding how to design products and services in a





way that encourages users to continue engaging with that product or service. In those fields, the regular engagement of people with that product or service is often a key determinant of whether it can be considered a success.

For example, in the context of technology that aims to deliver physical therapy, [37] the effectiveness of that technology is directly related to how regularly people carry out assigned exercises. Similarly, in dietary interventions, people's success at maintaining or losing weight is directly related to how regularly they log and report dietary behaviour [32]. Thus, in designing these types of systems, we must provide interfaces and interactions that are not only technically accurate, but which people actively want to engage with. Essentially, we need to design our users' motivation for engaging with the product [28].

A diverse set of approaches have been taken to solving this problem, from modifications to usability and user experience design processes, to persuasive design [16], and, more recently, gamification. We argue that the success of *Pokémon Go* illustrates clearly that there is another, cynical, but potentially very effective tool in designing for engagement – a particular type of branding based around nostalgia for the users' childhood. The contribution of this paper is:

1. Identifying and exploring nostalgia as a tool in the 'designing for engagement' toolbox
2. Easy to use 'Hammer of Nostalgification' tool to spruce up your boring HCI project

Designing for Engagement

Across many different types of technologies, the users' motivation for engaging with a product or service is often a specific design goal.

User Experience (UX) Design

UX design is concerned with evaluating and improving the usability, accessibility and pleasure derived from interacting with a product or service. The goal of a UX design process is specifically aimed towards improving user engagement. It is a necessary step in designing an engaging product, rather than a systematic framework for understanding what people will find engaging.

Data-Based Design

Recent improvements in our ability to store and analyse massive data sets has led to a form of design based on a sort of natural experiment. Through measurement of user interactions with a service that is already deployed, we can observe and analyse user data to identify interaction design problems, and opportunities for improvements. [28]. Similarly to UX, this is a responsive rather than directive approach.

Persuasive Design

Persuasive Design is a term popularized by BJ Fogg [16], which describes the use and abuse of findings and methods from behavioural science in the interaction design of products and services. Persuasive Design has been employed primarily to products intended to change the behaviours of users, for example, in energy monitors that encourage you to use less energy. Persuasive Design introduced interaction designers to basic psychological concepts that are very useful in generating and controlling the engagement of users,

such as goal setting, reinforcement, feedback schedules, and habituation.

Gamification
In recent years, people have become fascinated by the potential of using "game design elements" [14] as a means for driving user engagement with non-game systems. For example, systems including elements such as badges, leader boards and "levelling up" [17] have been trialled as a means for performance management and tracking of mandatory professional development in large corporations [3]. Short–term benefits in engagement have been observed in many studies of gamification, although longer-term impacts are less clear [17]. Best practice in gamification is gradually emerging through commercial adoption and academic research.

Design and Motivation
Psychological theories of motivation have been used to understand and design peoples' motivation for engaging in a wide variety of systems. For example, self-determination theory (SDT; [30]) has been cited widely in recent games design literature. SDT identifies three separate psychological needs; autonomy, mastery and relatedness, and these have been used to drive the design of systems that fulfil these needs.

Transformative Interventions
The word "transformative" crops up frequently in relation to education [27,1] and behaviour change [23]. The term is generally meant to denote a meaningful and sudden change in thoughts and / or behaviour, brought about by self-reflection, and is used to distinguish an intervention approach from a more behavioural approach that involves slow and gradual change.

In summary, these approaches assume that user engagement can and should be elicited through clever and careful interaction design; through designing the features and functions of the systems. Entirely absent from these tools and techniques is recognition of the core feature that we suggest drove the huge engagement with the simple, and fundamentally uninteresting, Augmented Reality game that developers Niantic labelled *Pokémon Go*: nostalgic branding.

Understanding *Pokémon Go*

The immediate and massive success of *Pokémon Go* on its release in the summer of 2016 was a critical moment for designers and researchers working in the mobile HCI and games space [26]. It represents the first breakthrough in mass engagement with locative games moving from marginal curiosities of research into mainstream games culture. The game broke records for popularity, with over 500 million downloads propelling it to the top of the charts in 70 countries [24].

However, Pokémon Go was not in any way novel in design or deployment [21]. In fact, Niantic, the company that developed *Pokémon Go*, previously released a game called *Ingress*, which was similar in design, apart from the lack of *Pokémon* branding. The evolution from the mildly successful *Ingress*, to the unprecedentedly successful *Pokémon Go*, primarily involved slapping a layer of *Pokémon* artwork and narrative over the top of the existing game data [21].



Very quickly after the release of *Pokémon Go*, scholars from a range of backgrounds started publishing articles in online magazines and blogs that explored and critiqued the game in the context of their own expertise, and experience. This included game theorists [33], critics [21], augmented reality researchers [36], and data theorists [2]. These commentators frequently suggested that the game is relatively simple, derivative, and fails to take advantage of and of the 15+ years or research on mixed reality games.

For example, academics were quick to criticise the "crude" way *Pokémon Go* handles location [22, 36]. Since all locations are treated the same way by the game, they argue that the game fails to understand the nuances of real world contexts of play. This is seen as both a missed design opportunity, and a potential cause of distress, as Pokémon appear at graves, memorials and other inappropriate spaces[1]. Others highlight the potential safety issues caused by the crudeness of the game design that makes little effort to keep players from harm [38] both in movement and play posture that encourages 'mixed reality stoop' [13], and there are concerns about the legal issues surrounding gameplay.

The common theme implicit to the complaints from these critics is that these issues are simply not new. The design of *Pokémon Go* is not innovative in any way, and fails to learn from over 15 years of prolific research and development in exactly this area [8]. There is a shared Cassandra complex among researchers, including the current authors, who feel at once frustrated that their work was ignored, but also vindicated that the complaints about the game reflect issues they identified a decade ago [7, 6, 10, 13, 29].

1 See Pokemorbid for lots of examples: http://pokemorbid.tumblr.com/

In summary, *Pokémon Go* is a bang average AR game. The success is derived from something relatively under-explored in the HCI and game design literature: branding.

Branding and Nostalgia

Amongst the hundreds of mixed-reality games we have seen fail to reach success at the scale of *Pokémon Go*, the branding simply cannot be ignored. The lasting popularity of *Pokémon* seems strongly related to players' nostalgia for the games and cartoons of their childhood. Indeed, a survey of *Pokémon Go* players suggests that over 75% are over 18, perhaps eyebrow-raising for a game about what Bogost calls "kiddie cock-fighting" [8].

Other examples of popular nostalgic branding include reboots of film and television franchises from the 80's and 90's. Indeed, in 2017, filming will begin on a movie based on the game Tetris, with an $80m budget (http://www.hollywoodreporter.com/news/tetris-movie-be-80m-us-894779). The weaponization of nostalgia has also escalated in contemporary politics, with two major political upheavals of the past year using rhetoric around "taking back control" or going back to being "great again" that play on nostalgia for a largely fictitious golden past [12].

Nostalgia is a phenomenon that has not yet attracted in-depth discussion and analysis in the HCI research literature. We suggest that the success of Pokémon Go means that we can't ignore the power of nostalgia as a

tool for the design of user engagement. However, in marketing and media disciplines, the value of nostalgia is closely studied (i.e., [1112]). For example, in one empirical study, Cattaneo et al., 11] found that consumers preferred updated retro brands to pure revivals of the original branding. We encourage HCI researchers and practitioners to join us in blatantly "selling out" in a similar way to Niantic, and in the next section we provide the tools to help you do so.

The Hammer of Transformative Nostalgification

Rather than remain cynical and despondent about the overwhelming effects of branding over careful design, we have taken a constructive approach. In this section, we describe MC Hammer's Hammer of Transformative Nostalgification; a tool provided freely by us to the HCI community capable of driving huge engagement with uninspiring interactive technologies. Along with misappropriating the ideas of whichever dead French philosopher is currently fashionable, we have found that this kind of model is popular among HCI researchers and practitioners, as they appear to make sense and reinforce our own suspicions about design without being specific enough to raise any question as to their true value. In this case we were particularly inspired by the "Wheel of Joy and Triangle of Design" [18], which is put to use by designers apparently dipping a design nacho into a dip tray of ambiguity.

As the HCI community is well aware, the best design thinking about technology is done in the countryside [5, http://www.thedolectures.com/, http://www.bjfogg.com/bootcamp.html] or, even better, on an island [http://tireetechwave.org/; 31]. Since the authors live on two different islands, this model has double the power of an ordinary design model. MC Hammer's Hammer of Transformative Nostalgification is a simple tool that, when applied correctly, allows any designer to use nostalgia to make truly engaging systems that can scale to massive proportions based on the power of users' childhood memories.

Why is it a "Hammer" of Nostalgification?

- In attempting to create a tool that is useful across domains, we were reminded of Maslow's law of the instrument: "it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail" [25]. Thus, a hammer represents a tool that can be conveniently applied to any design domain.
- The Hammer a blunt, rather than a precise tool. Taking our inspiration from Gamification, we believe it is more important to see that something "is hammered" (i.e., nostalgically branded) than to know for sure that hammering was an appropriate thing to do.
- The convenient appropriation of MC Hammer is, in itself, a demonstration of nostalgification.

Building the model

Based on an analysis of recent nostalgified media, we filtered promising design aspects through our own hazy memories of youth, in an iterative process to extract the key features of successful nostalgification, and build them into a model to be shared among practitioners and researchers in an easily digestible, and nostalgic, form.

The first step was in creating a list of appropriate pop culture references. Of course, this can be modified to

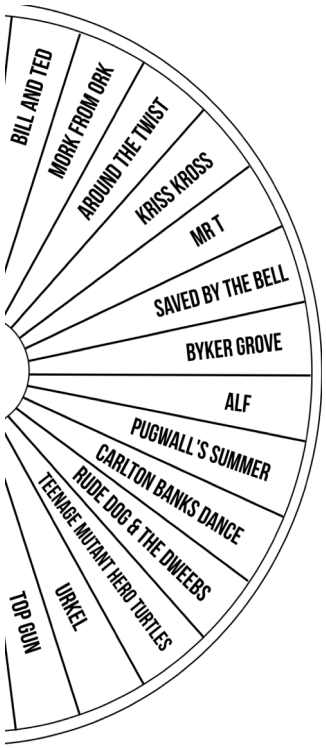


Figure 1 - Sample of the mid-to-late 30's aged Irish/British/American/ Australian Wheel

best suit the target demographic (i.e., You CAN touch this). In the examples below, we have taken the standard HCI approach and designed it to suit our own interests. The list we used in the case studies below is available in supplementary materials.

Design

MC Hammer's Hammer of Nostalgification is a model that contains three components: the vice, the wheel, and the hammer (see figure 2). *The vice* holds a crude representation of the concept that needs nostalgification and figuratively squeezes any distinctiveness out of it. *The wheel* contains illustrations of hundreds of popular culture references from the 1980s and 1990s. *The hammer* is a hammer that is triggered randomly as the wheel spins. A concept is placed in the vice, and the wheel of nostalgia is spun. The Hammer is triggered randomly, at which point it smashes down upon the wheel, mashing the nostalgic content onto the target concept. The hammer also features a claw, which may be used to crudely and cynically remove and destroy any existing nuance in the design that will become superfluous after the application of the hammer. Notably, the designer is free to keep hammering away until they are happy with the result.

Hammer Time

In the following section, we demonstrate the use of the Hammer of Transformative Nostalgification in a handful of contemporary use cases. Together these case studies serve to illustrate how the model is just as powerful and flexible as MC Hammer himself.

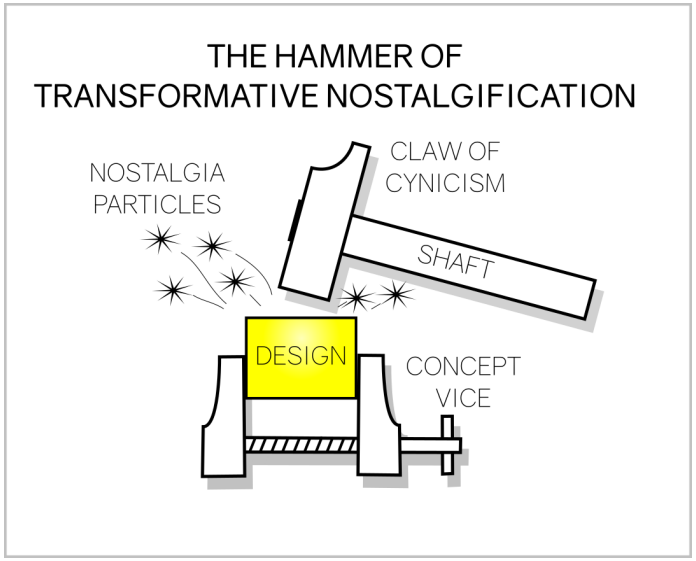


Figure 2 - MCHHOTN Model

Example 1: Nostaligfying Awkward Interactions

Despite our best attempts in user experience and usability design, iterative user centred testing cycles, and large field studies, some interaction paradigms, such as voice input [4], skin-based input, and table tops stubbornly remain awkward for users. Instead of continuing to invest time and energy in improving these interfaces, we can massively improve peoples' willingness to engage with these products through cynical use of the Hammer of Transformative Nostalgification. Specifically, through indiscriminate "spinning" of the "wheel" we may encounter situations where the nostalgic content provides a narrative that justifies the awkwardness of the interaction. For example, instead of attempting to make human-like agents for voice-based interactions in automobiles,



Figure 3. Fitts' Bear

which requires lots of tricky computation, intelligence, insight, and cultural knowledge, a few spins of the wheel revealed that we can simply give the device the voice of KITT from 1980s TV show Knight Rider, use simple pre-recorded messages, but make sure that it addresses you as “Michael” in every sentence. Suddenly the awkwardness is fun! Interestingly, Amazon has taken exactly this approach to the voice interaction design of its Echo device, allowing users to imitate their hero Captain Jean-Luc Picard by addressing the device as “computer” [20]. Or, instead of improving the flexibility of gesture recognition on NUIs like MS Kinect, a few spins of the wheel suggest that branding a device with Madonna’s “Vogue” persona may make people amenable to more closely following gesture instructions and, moreover, being spoken to in a condescending and authoritative manner. Indeed, we suggest that a process like the spinning of the nostalgia wheel is what led Niantic to brand their awkward and pedestrian AR game with the Pokémon franchise.

Example 2: Care Bearables

HCI has long been concerned with how notions of human intimacy and closeness change when mediated by technology, and how this enables new opportunities for empathic and emotional interactions for wearable technologies in particular. Numerous design projects have explored perspectives including love [35], remembrance [39] and sex [15]. Despite the clear potential emotional benefits, these ideas have mostly failed to capture the imagination of the public. We found, through the cynical use of the Hammer of Transformative Nostalgification that this issue can be addressed by reframing this technology as "Care Bearables", taking advantage of nostalgia associated with the "Care Bear" brand.

Since the Care Bears are already concerned with love, mental health and wellbeing, their message of love and friendship gel well with many areas of HCI research in this area. For example, rainbow-bellied "Cheer Bear" is a valuable vehicle for crude mental health interventions. "Share Bear" for projects dealing with Uber and the so-called "sharing economy", "Funshine Bear" could be the new face of HCI games research, and "Bedtime Bear" is useful in treating serious insomnia and sleep health issues. Care-Bearables can also help raise the profile of other HCI work suffering from image problems, for example see figure 3 for our proposal of "Fitts’ Bear".



Figure 4. Artist's Impression of Tails Predator Drone

Example 3: Sonic the Wallhog

Although not necessarily positive, in 2016 lots of western political discourse was around immigration and the issues and challenges this creates. In the USA and in the UK, contentious stances on tackling immigration as a “problem” led to major political upheavals. Shortly after winning the US presidential election, Trump reaffirmed his intention to both “build a wall” between the USA and Mexico, and to organise the mass deportation of millions of undocumented immigrants from the USA. The plans have been roundly criticised

for being expensive and horrifying, but also for simply being impractical – it is simply not clear how this would work. Luckily for Trump, shady, unwanted, ill-advised, and poorly-defined plans are perfect for nostalgification, which serves to smooth over such cracks but also add a warm rose-tinted veneer to entice even the staunchest of liberals. In this way, we wish to demonstrate that the Hammer can be useful in service design more generally.

In applying MC Hammer's Hammer of Transformative Nostalgification, we re-theme the deportation and immigration programme as an adventure of "Sonic the Wallhog". The plot of the Sonic the Hedgehog video games fits remarkably well – the story has the heroes trying to rid their homeland of the moustachioed Dr Robotnik and his robot migrants. Not only does Dr Robotnik create mistrust by sounding and looking different to Sonic et al., but the presentation of Robotnik's people as "robots" serves to deprive them of their humanity in ways obviously valuable to any deportation programme. Sonic the Hedgehog has a rich world and many titles across games and television that can be drawn upon. Sonic is also notorious for having a large and active fan base of fan-fiction writers who may be useful as part of the nostalgification programme.

Our proposal is broad, and includes branding most activities accordingly. Citizens can earn virtual "rings" by providing information, through mobile apps, on suspected undocumented immigrants in their neighbourhood, and border control points will be enhanced with loop-the-loop paths used to eject "robot" immigrants. Tools of deportation will also be branded appropriately. For example, Miles "Tails" Prower, Sonic's sidekick, is a fox who can fly for short periods of time using his two tails as helicopter rotors. As a flying predator, Tails is most obviously useful to nostaligify military drones as part of any immigration monitoring programme. Although a brief example, it is hopefully clear how applying MC Hammer's Hammer of Transformative Nostalgification can have great impact, and the actual distasteful mechanics of mass deportation can be concealed through the magic of transformative nostalgification.

Summary

In this section we presented three brief case studies that demonstrate the transformative power of nostalgification in engaging people with otherwise awkward, uninteresting or distasteful interactive tools designed by academics who are too legit to quit. Of course, through use of the Hammer, we have encountered many more that we don't have time to discuss thoroughly. For example, inherently unpopular devices such as typing gloves may benefit from branding with classic Bollywood film scores; the "Poken" devices intended to replace business cards at CHI 2011 would have benefitted massively from branding as "Poken Mon Go" (Gotta catch all the people on your programme committee and buy them a drink); the process of setting up an IoT system to control your home could benefit from branding as needlessly complicated 1980s puzzle games by Infocom.

Conclusion

A huge difference has been observed in user engagement with two very similar games by the same company; *Ingress* and *Pokémon Go*. Since the chief difference between these games was the layer of nostalgic branding applied to *Pokémon Go*, we suggest that an equally cynical and slapdash branding approach

can and should be applied to the design of all interactive technology in order to maximise user engagement. We describe a simple process that researchers and practitioners can use to nostalgify their technology, and provide a series of case studies to demonstrate the utility of this process.

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References

1. Anne Allison. 2006. Millennial Monsters: Japanese Toys and the Global Imagination. Berkeley, CA: University of California Press.
2. Tim Althoff, Ryen W. White, & Eric Horvitz. 2016. Influence of Pok\'emon Go on Physical Activity: Study and Implications. *arXiv preprint arXiv:1610.02085*.
3. Michael B. Armstrong, Richard N. Landers, & Andrew B. Collmus. 2016. Gamifying Recruitment, Selection, Training, and Performance Management. In Emerging research and trends in gamification (140-165). IGI Global.
4. Matthew P. Aylett, Per Ola Kristensson, Steve Whittaker, S., & Yolanda Vazquez-Alvarez. 2014. None of a CHInd: relationship counselling for HCI and speech technology. In *CHI'14 Extended Abstracts* (pp. 749-760). ACM.
5. John Battelle. 2004. When geeks go camping, ideas hatch. CNN Technology. Online: http://edition.cnn.com/2004/TECH/ptech/01/09/bus2.feat.geek.camp/
6. Steve Benford, Andy Crabtree, Stuart Reeves, Jennifer Sheridan, Alan Dix, Martin Flintham, & Adam Drozd. 2006. The Frame of the Game Blurring the Boundary between Fiction and Reality in Mobile Experiences. *Proceedings of CHI 2016*. p. 427-436.
7. Marek Bell, Matthew Chalmers, Louise Barkhuus, et al. 2006. Interweaving mobile games with everyday life. *Proc. CHI '06*, 417-426.
8. Ian Bogost. 2016. The Tragedy of Pokémon Go. The Atlantic. Online: http://www.theatlantic.com/technology/archive/2016/07/the-tragedy-of-pokemon-go/490793/
9. Stephen Brown, Robert V. Kozinets, & John F. Sherry Jr. 2003. Teaching old brands new tricks: Retro branding and the revival of brand meaning. *Journal of Marketing*, *67*(3), 19-33.
10. Sean Casey, Ben Kirman, & Duncan Rowland. 2007. The gopher game: a social, mobile, locative game with user generated content and peer review. In Proceedings of ACM ACE 2007, 9-16.
11. Eleonora Cattaneo, & Carolina Guerini. 2012. Assessing the revival potential of brands from the past: How relevant is nostalgia in retro branding strategies?. *Journal of brand management*, *19*(8), 680-687.
12. Stephanie Coontz. 1993. *The Way We Never Were: American Families and the Nostalgia Trap.* Basic Books.
13. Paul Coulton, Omer Rashid, & Will Bamford. 2006. Experiencing 'touch'in mobile mixed reality games. In *International Conference in Computer Game Design and Technology*.
14. Sebastian Deterding, S., Dan Dixon, Rilla Khaled, & Lennart Nacke. 2011. From game design elements to gamefulness: defining gamification. In *Proceedings of MindTrek 2011*, 9-15.

15. Anna Eaglin and Shaowen Bardzell. 2011. Sex toys and designing for sexual wellness. In *CHI '11 Extended Abstracts* (CHI EA '11).
16. B.J. Fogg. 2002. Persuasive technology: using computers to change what we think and do. *Ubiquity*, *2002,* 5.
17. Juho Hamari, Jonna Koivisto, J., & Harri Sarsa. 2014. Does gamification work?--a literature review of empirical studies on gamification. In *2014 47th Hawaii International Conference on System Sciences* (pp. 3025-3034). IEEE.
18. Karen Holtzblatt. 2011. What makes things cool?: intentional design for innovation. interactions, 18(6), 40-47.
19. Koichi Iwabuchi. 2002. Recentering globalization: Popular culture and Japanese transnationalism. Duke University Press.
20. Anthony Karcz. (2017). Live Out Your 'Star Trek: The Next Generation' Dreams With Amazon Echo Update. Forbes. Retrieved 13.2.2017 from http://www.forbes.com/sites/anthonykarcz/2017/01/24/amazon-echo-star-trek-update/#2b31caf34419
21. Brendan Keogh. 2016. Pokémon Go, the novelty of nostalgia, and the ubiquity of the smartphone. *Mobile Media & Communication*, November 24 2016.
22. Ben Kirman. 2016. Pokémon Go Exposes the "Oddish" Friction Between Virtual Worlds and Reality. Medium [Online: https://medium.com/@benki/pok%C3%A9mon-go-exposes-the-oddish-friction-between-virtual-worlds-and-reality-4f90a2687b65#.sq03jf10e]
23. Anja Kollmuss, & Julian Agyeman. 2002. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental education research*, *8*(3), 239-260.
24. Matthew Lynley. 2016. With 500M downloads, Pokémon Go is coming to the Apple Watch. Techcrunch [Online: https://techcrunch.com/2016/09/07/pokemon-go-the-hottest-game-on-the-planet-is-coming-to-the-apple-watch/]
25. Albert Maslow. *The Psychology of Science: A Reconnaissance*, New York: Harper & Row, 1966.
26. Frans Mäyrä. 2016. Pokémon GO: Entering the Ludic Society. *Mobile Media & Communication*, 2050157916678270.
27. Jack Mezirow. 1991. *Transformative dimensions of adult learning*. Jossey-Bass, 350 Sansome Street, San Francisco, CA 94104-1310.
28. Cecily Morrison, & Gavin Doherty. 2014. Analyzing engagement in a web-based intervention platform through visualizing log-data. *Journal of medical Internet research*, *16*(11), e252.
29. Nicolas Nova, Fabien Girardin, & Pierre Dillenbourg. 2005. 'Location is not enough!': an empirical study of location-awareness in mobile collaboration. In IEEE WMTE'05, 21-28.
30. Richard M. Ryan, C. Scott Rigby, & Andrew Przybylski. 2006. The motivational pull of video games: A self-determination theory approach. *Motivation and emotion*, *30*(4), 344-360.
31. Phoebe Sengers. 2011. What I learned on Change Islands: reflections on IT and pace of life. *interactions*, *18*(2), 40-48.
32. Laura E. Shay, Diane Seibert, Dorraine Watts, et al. 2009. Adherence and weight loss outcomes associated with food-exercise diary preference in a military weight management program. *Eating behaviors*, *10*(4), 220-227.
33. Miguel Sicart. 2016. Reality has always been augmented: Play and the promises of Pokémon GO. *Mobile Media & Communication* (2016): 2050157916677863.

34. Edward W. Taylor. 2008. Transformative learning theory. *New directions for adult and continuing education*, *2008*(119), 5-15.

35. Anja Thieme, Jayne Wallace, James Thomas, Ko Le Chen, Nicole Krämer, & Patrick Olivier. 2011. Lovers' box: Designing for reflection within romantic relationships. *International Journal of Human-Computer Studies*, 69(5), 283-297.

36. Eduardo Velloso, & Marcus Carter. 2016. The Pokémon GO craze sees gamers hit the streets but it comes with a warning. *The Conversation*. [Online: https://theconversation.com/the-pokemon-go-craze-sees-gamers-hit-the-streets-but-it-comes-with-a-warning-62278]

37. Jonathan Waddington, Conor Linehan, Kathrin Gerling, Kieran Hicks, & Timothy L. Hodgson. 2015, April. Participatory design of therapeutic video games for young people with neurological vision impairment. In *Proceedings of CHI 2015,* 3533-3542.

38. Annika Waern, A (2016) You Don't Have to Catch them All [Online: https://annikawaern.wordpress.com/2016/07/12/you-dont-have-to-catch-them-all/]

39. Jayne Wallace. 2007. Emotionally charged: A practice-centred enquiry of digital jewellery and personal emotional significance (Doctoral dissertation, Sheffield Hallam University).