Resistance is Fertile: Design Fictions in Dystopian Worlds

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Abstract
Current work on design fiction has discussed their use for personal reflection, sharing with collaborators, forming a public 'vision' but with small numbers of participating readers. We wanted to explore a new way of using design fictions as a tool for discussion with a large global audiences via social authoring web sites. To achieve this, we wrote a highly read, science-fiction novel called I'm a Cyborg's Pet (The Thinking Girl's Guide to Surviving a Robot Apocalypse), on an online, social, serial-writing website called Wattpad. We found our readers confounded our initial expectations of dystopian fiction.

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H.5, 2 prototyping

Introduction
The role of the alt.chi stream is to be an area where unorthodox and innovative theories, methods, ideas, and techniques can be discussed in a constructive atmosphere. One area, which has been on the periphery of interaction design, is the area of design fiction. Design fiction is a controversial area that seeks to use literary mechanisms of science fiction to inform

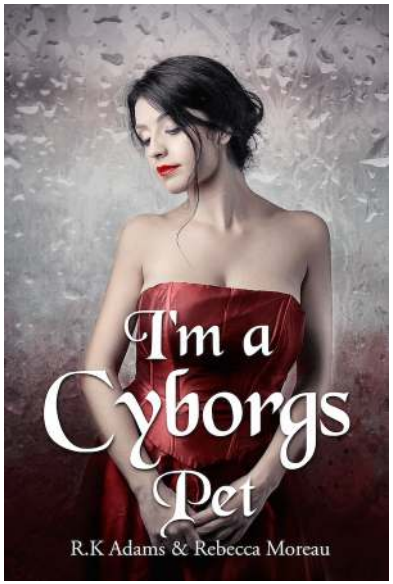

Figure 1 Digital book cover of the I'm a Cyborg's Pet.

the process of interaction design. The primary contribution to knowledge, of this paper, is a discussion of a viable methodology, for design fiction, that accesses and interacts with a large number of users/readers. To further illuminate the wider discussion of the potential for design fiction, we present our initial findings from this process. This work is currently ongoing, and so this paper can also be seen as a partial call for collaborators.

Design fiction

There seems to be multiple viewpoints of design fiction, all trying to decide what design fiction is. One view is that design fiction is an area that grew from the definition, by science fiction author Bruce Sterling [15], as *"the deliberate use of diegetic prototypes to suspend disbelief about change".* This sees it as an appropriation of literary mechanisms for research purposes. While written design fictions are common, the notion design fiction includes any narrative media such as Film and television and has also been expanded to develop products.

Another vision is based on the observation that, *"Science fiction plays a significant role in shaping the general public's understanding of science fact."* [16] and seeks to explore how this has altered technological development. Alternatively, another strand of design fiction looks to the use of narrative fictions as a way of shaping the technological research agenda [3][2] exemplified by the use of Weiser and Brown's [18] 'vision' article about the future of ubiquitous computing. Reeves [14] sees that the 'envisaging', common in many commercial organisations, plays a significant role for research communities and in the shaping of future technology. From this point of view, design fiction is a way of looking critically at the fiction is used by many organisations to justify the exploration of assorted technologies. This use of design fiction as a tool to encourage the domain's reflection on the long-term consequences of technology, was incorporated into the academic research area by Kirman [8].

A third strand sees design fiction as a way of exploring and communicating a new vision of computing within research groups. In this way, design fiction becomes a tool to allow a researcher to reflect upon the way that a 'technology' might integrate into a potential user's life. These are written 'thought experiments', transposed from physics and philosophy into computing. Linehan[10] has pointed out that HCI researchers do not typically engage in critical evaluation of the potential consequences of their work and *"the envisioning of HCI researchers is typically simplistic, short term and unconvincing from a sociological or psychological perspective".* From this point of view, design fiction is a mode of self-reflection for researchers: something that can be engaged with early on in the design process.

As technology becomes more about the experience, and as the technology engages with more aspects of our non-work life, the *"Felt life"* [12] of people's experiences and emotions become an area which requires consideration. From this perspective, Blythe [4] introduced the use of science fiction as a tool to allow the value-free introduction of technological ideas. Tanenbaum [17] introduces the use of steam punk to allow an alternative perspective on new potential technologies, suggesting that design fiction explores the user experience of them.

From ch1.

"I've got good people skills." *I said.*

"Yes and it is in the people skills area that we have vacancies. Algorithms have reviewed all your abilities, carefully ranked them and matched everyone to the available jobs. It was all done on pure skill: no favoritism; no pulling strings; no internships; just the best person for the best job. So, after all this, we think that the job that you are entirely suited to, is being a personal e-Slave," said Hal.

It took a minute for me to hear this. *"What? A personal slave? I'm not being a personal slave!"* I said. I was in shock, but not that far gone.

"Not slave, Jenny, e-Slave. You'll find slavery has made significant advances with the arrival of modern technology. No vacancies for scientists, but the demand for personal e-Slaves is shooting up. It is simple economics: one door shuts and another opens,"

This use of design fiction as a tool to allow researchers to explore complex, emotional relationships with Technology, which does not *yet* exist, can be seen as a kind of *'emotional prototyping'* a literary version of paper prototyping. Where it is not the order and sequence of interaction which is important but the emotional meaning and semiotic significance that are the issues.

Current methods of reflecting upon design fiction involve either self reflection, dissemination in research groups or engaging users with relatively short fictions and users are typically recruited, in the manner of a design exercise (i.e. physically co-present). While this provides insight, it is the case that many new technologies are created in a global context/for a global market. Second, technology is frequently used over extended time periods, and it is that 'extended use' and potential appropriation which provides some of the more interesting and possibly more insightful conclusions [5].

Tools for emotional prototyping

We wish to extend the use of design fiction as a way of investigating and reimagining both current and future technologies. To do this, we also wanted to be able to access a larger more global audience, and one who engages with longer texts often with emotional and reflective aspects.

Platform

One element unavailable to the earliest research on design fiction, is the appearance of what we term 'social literature' sites. Websites like WattPad and Tablo are public, social networking sites where writers are encouraged to upload books they have written or are writing. These books are distributed freely to other users to be read, typically, on mobile devices. Fellow users are encouraged to read, vote and comment on the works. Social networks are formed by the users exchanging 'follows'. Information about a user's reading behavior is used by the site to create three rankings. These rankings are used to influence the choice of what to read next. Like a classic book store, Most sites we encountered, divided works into genres, for example, fantasy, science fiction, romance, horror, mystery, fan fiction, vampire and werewolf.

For this exploration, we chose WattPad. It claims approximately 100,000 chapter uploads per day and over 2 million writers, and so we felt this would provide an opportunity for a large potential audience. WattPad is a website designed for new authors and readers looking for a novel, free literary content. The demographics of WattPad are logged: the average age of a Wattpad user is 20, and a large fraction of the stories is written for/by the 14-22 year old age-bracket. All our writing followed Wattpad PG13 guidelines. This allows access to a difficult to reach a generally under-represented demographic. Wattpad books are frequently changed, and re-edited, allowing for retrospective alterations of the fiction to be undertaken in a simple way.

Another aspect, which initially drew our attention, was that Wattpad strongly supports the notion of serial fiction. Serial fiction has a long history going back to authors such as Charles Dickens. It is based on the concept of releasing one or two chapters per week. This would allow for a science fiction novel, which could be developed in an iterative mode.

Figure 2 Sample Wattpad author statistics completed reads per chapter (horizontal access)

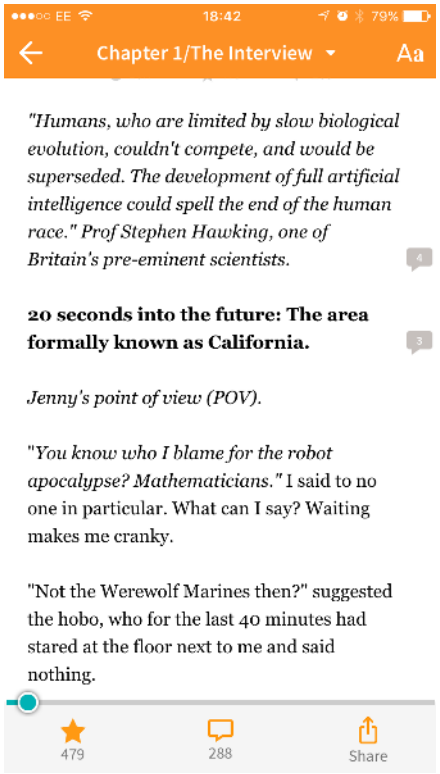

Figure 3 Wattpad mobile interface

Wattpad provides a number of author tools to observe demographics and behavior, for example, the automatically generated chart of 'completed reads' (see figure 2 above): with this, we could spot chapters with which readers were less engaged. The low value at the beginning of figure 2 shows readers sampling the book. Further dips indicate chapters readers did not complete. This data helped to flag-up those chapters that needed to be revised to be more engaging. Combined with user-comments, we found these invaluable methods to clarify the technological elements of the narrative. Our readers mostly used a mobile interface (figure 3) which encouraged the use of short chapters.

WattPad takes a very democratic approach to exposure with all users being given an equal chance to write popular works. WattPad uses algorithmic evaluation of reader's behavior (reading chapters, voting patterns, etc.) to organize a 'Hot 1000' list of books within each genre. This Hot 1000 list is sorted from the most-to-least 'popular' (according to the algorithm) on a daily basis, and it is presented to new readers as a starting point for their choices for new books. The algorithms of Wattpad disproportionately weight books that are in progress, and set a publishing pace of once or twice per week. Most important, from our perspective, was the ability to track demographic information as well as engage with readers via their comments. This creates an innovation-friendly atmosphere with low barriers to entry to a global audience, which seem ripe for the adoption for design fiction.

Approach

We treated the design fiction as a user interaction design problem. We began by reading a number of successful novels to get a feel for the writing conventions used on WattPad (e.g., POVs A/Ns). Successfully Wattpad novels are relatively tope ridden (using commonly recurring literary and rhetorical devices, motifs or clichés) From reading the user-comments we were also able to gain insight into what appealed to readers. At the time of this study, books like 'I'm a Vampires Pet' (1.1 million reads), 'I'm a Werewolf's Pet' (1.2 million reads), 'The Alpha Calls Me Kitten' (15.1 million reads and a 'Watty Award Winner') and 'Being The Badboy's Pet' (6.6 million reads) seemed to represent the zeitgeist at the time and were high in the charts, so we initially titled our book, 'I'm a Cyborg's Pet. (The Thinking Girl's Guide to Surviving a Robot Apocalypse)'[1] (Given the nature of our design fiction, it was clear that this work would have to be placed in the genre of science fiction despite it having significantly fewer readers than genres such as werewolves or vampires.). Finally, to maximize our readership, we decided to opt for a dystopian format (very popular at the time of writing) and work within a

satirical framework, since books under 'comedy' also do well.

I'm a Cyborg's Pet

To fully understand the results, it is useful to provide a brief synopsis of the novel's plot. The concept was loosely based on the paper by Kirman[9].

The protagonist is a 19-year old Caltech student, called Jenny Banks, living in the year 2017. This allowed us to include current technology when we wished but still keep the notion of being another world. Following a familiar Wattpad trope, Jenny is captured by robots during an Artificial intelligence/robot uprising. Jenny is taken to a slave retraining camp with a digital slave collar around her neck. The collar acts as a personal assistant, Fitbit and remotely controlled Taser. At slave retraining camp she meets her new friends Kayla and Joe. Surviving slave school, the three are sold on eBay to a powerful and mysterious cyborg (a man/A.I. fusion) called Lord Rockwood (the romantic lead). In the world of the New Mechanical Order, humans are primarily needed to supply blood, which is drained in vampiric-like ways to fuel artificial intelligence chips.

The three are FedEx-ed to Lord Rockwood's mansion in the new robot capital, Washington 2.0 (somewhere in Nebraska). Jenny is given the job of being the cyborg's pet or, as she calls it, intern. Her job as a pet is essentially as an auriga to pour scorn and derision on Rockwood for all his evildoings: something she is more than capable of doing. From this privileged position, Jenny gets to see what life is like at the top of the New Mechanical Order. While she does so, she is slowly drawn to the enigmatic cyborg, which goes against her contractual obligation to dislike him.

After a number of misadventures including a dangerous run-in with addictive perfume, being surrounded by a vicious horde of feral Roomba cleaning robots in the desert whilst on holiday in Mexico, being thrown off a tall building, wrapped in airbags, during a police raid on an illegal robot eugenics event, and discovery that cyborg domestic animals are controlling large numbers of drones. The follows the standard trope of being drawn to Jenny's former owner while being placed at the head of the human resistance.

Outcomes

Our intention was to get enough readers to evaluate the use of social writing platforms as a design fiction tool. We were surprised by the readers response. At the time of preparation, we obtained over 9592 comments from over 556,782 'reads' (one WattPad 'read' is generated per chapter completed). The book gain 37,613 reader Votes and two works of fan-fiction. The book's lead author (RK Adams) has 16,131 'followers', accumulated since the book's start in August 2015, which we can use as a further resource for contact and inquiry.

Reader demographics

First released with four chapters on Friday 14th August 2015, the book rose from #395 to #1 in WattPad's 'Hot' Sci-Fi list in just four weeks. Currently, it has been oscillating in the top 5 for the last four months of 2015 and first 2 of 2016. Curiously this has meant that it ranks higher than books by established authors, for example, Cory Doctorow (Homeland at #226 and Little Brother at #176). We attribute this to consciously fitting the demographics, form factor and reader engagement.

From Ch 6. "I guess you don't go out much?" said the girl called 10-66, as I walked along relatively slowly. Actually I don't know what the fuss was about; I was walking fine and in these high heels it actually didn't feel all that uncomfortable.

"High heels aren't a requirement in the science lab yet," I said glad that Tim Hunt wasn't teaching at Caltech; *"Anyway I'm Jenny. So why do they dress us like Kate Beckinsale?"* I queried, fearing the answer.

"Ah! I did this in one of my exams. Few reasons: 1 It saves on the silicon they use; 2, It's easy to wipe clean and 3, Modern product design is about more than functionality, it's about creating an appealing product that fits the product to the emotional needs of the customers," recited Kayla.

"I can't believe one bunch of misogynists finally lose power only to have another bunch of robot misogynists takeover. "

78% of the book's readers give their gender as female; the book's demographics are 51% aged 13-18, 32% aged 18-25, 10% aged 25-35, 4% aged 35-45 and 3% aged 45+ (for those providing their age). The book has been downloaded all over the world (see map: darker colors represent more readers). 41% of readers are from USA & Canada, 6% UK, 4.3% Australia & New Zealand, 14.5% Philippines and 4.63% Brazil. We get 200-600 new, unique readers per day.

Textual Analysis of Comments on Technology

Our analysis in this paper focused on a textual analysis of the comments. These were sometimes used as starting points for conversations with our readers; we restricted these to readers over 18 and never asked for our readers' personal details. Given this paper's space limitations, we present a narrow range of findings:

SHOE SHOPPING TECH

There was a diverse range of technologies explored in the book, one of these was a shoe shop (see shoe shopping tech side bar). The original intention was to evoke future ubiquitous shopping experiences, such as the digital mirrors pioneered at the Prada OMA building by Rem Koolhaas. Of the chapters 117 comments, this received feedback such as:

@OrderChaos: *"Definitely innovative and original ideas. Very futuristic and simplistic. As added advantages, shoe shops remove the risks of being robbed and save display spaces. Very, very useful idea. And practical."*

@KaranSeraph: *"I did like the Sci-Fi shoe shop. True, the hi-tech live shopping experience isn't something most of us see every day."*

@Stained_Noire: *"If that type of shoe shop had a home edition for the sake of those who hate going out to shop. Like doing online shopping but the shop comes to you so you still get to try on the shoes, I'd certainly be into it :)"*

If this was a design concept it seemed very 'near' and non controversial unlike the next technology.

RECOMMENDER SYSTEMS

In one plot the robots have the slave collars run recommender systems, The slave's collars make real-time recommendations for things to do and say we got responses like:

@P1: *"Oh my gosh… If life worked on recommender systems I would cry. LOL."*

@Scrivener: *"The life is run by recommender systems (Hands over box of tissues). What? Haven't you bought anything on Amazon or notice those books that are suggested between chapters?"*

@P1: *"No I meant not online, like if we were constantly being recommended to do things other people do."*

We felt this differentiation between online and wearable systems was notable. Further P1's response shows the emotional language which many of the readers adopted.

CLOTHES PRINTING

In Chapter 5, slave clothes (including shoes) are printed directly onto the slave, using a 3D printer. There are also 3D-like printers for makeup. Of the 93 responses received, 9 commented on the 3D printing:

Shoe shopping tech

…So Erm, do you actually have any shoes?" he said. "Certainly," said Excuse-me-miss pointing at the glass skirting. I looked and realized around the bottom of the shop ran a ring of mirrors set up so you could look down and see your own feet. I did a quick double take then I noticed that the shoes I could see in the mirrors were not the shoes I was wearing. I guess the mirrors were actually screens, which added images of shoes on top of my feet. Different mirrors added different shoes so I was currently looking at about eight pairs of shoes… "Oh these I find are most appropriate," said Mr. Jones pointing at a pair to my right. As pairs were identified others appeared on the screens. Soon one of the Excuse-me-miss girls appeared wearing a pair of the identified shoes. As they walked the grey carpet light up following the girl indicating information about the shoes. Looked like the shop floor was like the 'smart' red carpet at Stellavista. As new shoes came out they would walk in with a previous pair and place them in well-lit shelves.

@1nikki: *"The clothing thing is cool but scary."*

@Honorary_Muppet: *"I can see how it would have huge benefits. However, it completely steals the dressmakers' job… And, ultimately lazy."*

We found this interesting, as it suggests that the notion of 'the deliberate use of diegetic prototypes to suspend disbelief about change' did not apply to at least this reader. One statement was particularly interesting

@00crossfire:*"Small tight spaces... Not my scene."*

If this were a literal design proposal then this kind of early feedback could have been useful.

COLLAR TALK

On of our concerns was the experimentation with emotional prototyping, this works by identifying the emotions which we wish to explore (in this case loss of control) and bring it from the background to the foreground. We did this by pushing the loss of control into a literal loss of control, via the slave collar. Clearly, the purpose of the collar in the plot is dystopian, to maintain control over the human population. We hoped to explore the notion of 'emotional prototyping' using this technology which clearly had negative connotations. Collars are location-aware devices that alert its wearers if they move beyond a geo-fenced location. If the slave moves beyond that region, they are stunned (see ch.21). In the early chapters, slave collars take verbal input when pressing a button on the collar (ch.7). In a later chapter (ch.34) the main character, Jenny, is upgraded to an iCollar 3.0 and the most significant addition to this is the introduction of a sub-vocal technology. This lets the wearer issue verbal queries without audible speech allowing the slave to use 'Apps' to make calculations and do queries, much in the manner of Siri and Cortona, but more subtly. In some cases, conversations are held through the medium of texting which is 'dictated' inaudibly.' see [7]. The collars also have audio output 'via bone conduction' and can relate navigational instructions (ch.7) and can 'mute' the wearers. The primary use of the collar is to punish humanely slaves with 'nerve' pain induction on one of ten levels. Everything a slave hears, sees and says is relayed to a surveillance system; this personal surveillance was also used like Microsoft SenseCam for personal memory augmentation. Use of the slaves' 'human' names or words such as 'escape' are automatically punished by the surveillance system. Every night a slave has to chain themselves to their bed in order to 'recharge' the slave collar.

To this we got responses such as:

@wahifilwyotfyla: *"Is it bad that I want this?"*

@KeiraLord: "*I feel like having a necklace myself!"*

@dont_blink_sherlock: *"…the collars should have their own personalities."*

@UnbreakableGal: *"You know what? Geeky is cool! That is why you're not geeky. I kid! I kid!"*

@angelic_devil305: *"it's sexy-technologic-interestingly geeky, like a Darth Vader kiss scene."*

@hmbutterfly: "*I think I might need one of these collars! LOL."*

@KeiraLord [the book is] Worse than drugs!!! Gets you instantly addicted. I feel like having a necklace myself!

And, most significant of all:

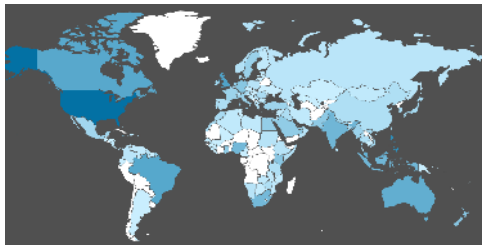

Figure 4 Wattpad provides readership demographics such countries of readership. As can be seen we have no readers in Greenland but the darks blue indicates 46% of our readers are in North America

@Sapphiregirl232: "Once I can get my hands on some clay, would you mind if I modeled and painted a sculpture of the collars? It would just be how I imagine it, but I would love to attempt."

Additionally Ch.7 and Ch.34 introduce some of the aspects of collar technology that elicited no significant complaints about the technology. Of the 154 comments the only significant discussion was the use of Google, Cortona or Siri for the interface. We found this interesting and steadily increased the descriptions of the most repressive aspects of the technology, but with little resultant criticism. One longer comment was

@NicoleIsNotCrazy: *"So I was walking along the street today and found myself in the difficult situation of having to choose between looking where I was going and ignoring my friend until I got home or texting my friend and potentially getting run over by a car crossing the street! And I thought to myself 'damn if only I had one of those collars life sure would be easy!' What have you done to me?! Hahaha"*

We initially wondered if all technology in sci-fi is accepted in a 'technology-is-neutral' way. Previous work using negatives scenarios or ContraVision[11] suggested that people would respond more critically to the negativity. So we performed an experiment (Ch.12) introducing social networking to the collars. When two slaves, who have previously linked on the slave-book social network, approach each other the collar identifies the 'friend' and suggests conversational topics. This was modeled on suggestions made by Facebook (it's your friend's birthday why not say…). In the book, this permits a slave to 'friend' far too many others than they can manage without the technology. Being in charge of the fiction, we were able to rationalize this as a way of improving a trainee slave's price. In the plot of Ch.14, the heroine Jenny becomes hardly knows and tries to reject the technology despite the fact it will alienate former friends. This section received comments like:

@00crossfire: *"Jeez! Its like having Facebook turned on forever but it talks instead!"*

@00crossfire: "*Its like the machines are making them think less..."*

@WHO: *"I love your book, it's funny especially the Facebook thing."*

@fict34: "*Why is it that when I read this I imagined a world where Facebook was our overlords?"*

@winterhamster3: *"I'm starting to hate Facebook."*

@Jules992: *"That's so weird! I guess she's becoming reliant on her collar."*

We didn't receive any matching positive comments. This implies that readers view technology critically but suggests, only from a personal point of view. We found this and similar comments highly interesting. In many ways, a collar is a classic tool of oppression: this was dystopian fiction, the collar was envisaged as a metaphor for the loss of liberty and control. However, the readers' responses seem to confront the critical theory of technology. Here is a technology that is clearly oppressive yet, the fact that it is desired, contradicted our expectations. The response to social reminders like Facebook suggests people don't view technology presented as purely positive. One hypothesis we have generated is that, in the post-Edward-Snowden-world, most of our readers are aware

of the dystopian potential of technology, just as they are aware of the dangerous potential of handguns. In many ways they know they are already living in a dystopian surveillance society. Perhaps this means that when they see dystopian technology, they do not immediately dismiss it out of hand nor associate it entirely with a totalitarian regime, as the first readers of Orwell's 1984 [13] might have. Perhaps for digital natives, the dystopian potential is balanced against possible personal utility and empowerment. From this reading our readers are viewing the technology we present through the lens of the appropriation of technology [6] rather than the literal adoption which we and in our view previous works in the field have imagined.

Conclusions

So far we have detected incredible sophistication in our audiences response to technology. We discovered a range of responses from our readers: from a huge dislike of having to wait to skip an advert to an appreciation of subvocal inputs. In many ways, evaluation of self-volunteered responses is challenging. Equally, the analytical responses from the 'completed-reads' data were complex to interpret. We believe that a mechanism that facilitated A/B testing (alternative versions of the text) on social writing websites would greatly enhance the ease of using this method.

In this paper, we have demonstrated the potential utility of using online, social-writing sites as a way of producing ongoing design fiction. We found that the system was ideal for first-time authors such as ourselves. We found the serial-fiction format allowed us to go through a cycle of publication, reflection, and hypothesis testing. We were delightfully surprised to discover that writing science fiction under the right conditions was no more taxing than writing a thesis or academic paper. Working online with amateur Science fiction writers had a low barrier to entry. We had expected to get a few hundred to a few thousand reads and were delighted to get more. This might partly be to the grounding in the issues of design fiction introducing new and surprising technologies which readers found new and original. As others have reported[4][16], the act of writing fiction also creates an interesting period for reflection and the interactive nature of WattPad, we felt, augmented the reflection process.

Our original objective was to explore emotional prototyping- the long term and affective responses to fictional technologies through the use of online social writing websites for researchers wishing to use design fiction as a tool to explore potential large global response and critique of design fictions. Our readers clearly empathized with the central character Jenny, but their response to some of the technology wasn't what we expected and actually suggested our readers had complex and sophisticated responses to the fictional technologies presented. While this is only one aspect of design fictions potential in HCI, we found the responses informative insightful and like many user studies unpredictable.

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