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Enabling Promethean Leaps: An Examination of Storytelling Techniques in Information Systems Development

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Abstract:

People have used storytelling throughout history to instigate transformative change. Accordingly, one should expect as much of narrative techniques in information systems development (ISD) such as epics, user stories, and personas. However, existing research has focused on these techniques' operational aspects rather than their potential for transformation or the extent to which they currently aid true transformative change in ISD. This study draws on the myth of Prometheus—the Greek god often used as a metaphorical symbol of technology's radically innovative, transformative power. Expert interviews are used to develop Promethean principles that can be used to evaluate the transformative potential of narrative ISD techniques. It also identifies factors that undermine the practicality of such a Promethean lens.

Keywords: Systems Development, Prometheus, Narrative, Expert Interviews, User Stories, Personas, Epics.

1   Introduction

Both as a discipline and as individual researchers and practitioners, we often seem to have grand, Promethean ambitions. We talk about digital "transformation" (Hinings, Gegenhuber, & Greenwood, 2018; Vial, 2019), and many recent papers discuss how analytics, AI, blockchain, the cloud, and many other technologies will transform industry. Rather than anything incremental or even radical, they claim these technologies will result in transcendental innovation. Contemporary technologies provide society the power to "knock at the gates of heaven" (Small & Jollands, 2006) and manipulate the very axes of nature: space, time, energy, matter, and life.

Despite these ambitions, many techniques to analyze and develop systems help produce good software, but the extent to which they inspire leaps and actually deliver on this transcendental innovation often remains unclear. Little research has examined the innovative, transformative potential of narrative techniques such as user stories, epics, and personas in information systems development (ISD). We need to examine such techniques given that they constitute the primary bridge between analysts/developers and users/customers. Their enactment provides the only opportunity to unlock the transformative potential of the overarching systems being developed. To bridge this gap, researchers often use narrative techniques such as epics (Cohn, 2014), user stories (Cohn, 2004), and personas (Haikara, 2007). A recent survey found user stories constituted the most used requirements-documentation method (Wang, Zhao, Wang, & Sun, 2014). Another survey of 182 practitioners (Lucassen, Dalpiaz, van der Werf, & Brinkkemper, 2016) showed stories to be particularly dominant where organizations use agile methods (Scrum (99%), Kanban (79%) and XP (83%)), and, given that 95 percent of organizations practice agile methods in some form (VersionOne, 2017), this finding demonstrates these techniques' wide and global reach and use.

Guidelines for and illustrative examples of what constitutes "good" user stories (e.g., Cohn, 2004; Lucassen, Dalpiaz, van der Werf, & Brinkkemper, 2015), epics (Cohn, 2014), and personas (e.g., Cohn, 2004; LeRouge, Ma, Sneha, & Tolle, 2013; Pruitt & Adlin, 2006) certainly exist. While valid, these guidelines tend to focus on user stories' operational aspects, such as whether they are testable, independent, negotiable, or estimable rather than anything transcendental or Promethean.

This study looks for ways to incorporate larger ambitions into systems analysis and ISD activities. It draws on the myth of Prometheus for several reasons. First, narrative techniques exist to bridge developer teams and users/customers. In this way, they are analogous to Prometheus' intermediary position between fire (the technology) and humans (that technology's consumers) and specifically his aim to enable humankind to use fire for its betterment. Prometheus and Promethean fire also constitute good metaphors to address technologies' competing positive and negative impacts. Fire represents "good" but is also a "historic tool of devastation and destruction" (Dougherty, 2006, p. 18). Second, this study introduces detailed Promethean concepts to the IS discipline for the first time. While the Promethean concept underpins great works of philosophy, fiction, art, and poetry throughout the ages, it is rarely adopted in IS research. Furthermore, research that has used the concept has tended to do so only as an overarching metaphor (e.g., Sawyer & Winter, 2011) or to focus on a single, narrow subtheme of the Promethean story, such as Promethean innovation (Marshall & Ojiako, 2010) or technological recklessness (Small & Jollands, 2006).

This study proposes several Promethean principles that researchers and practitioners can apply to ISD narrative techniques. These principles were presented to 24 experts to:

1) Evaluate the extent to which epics, user stories, and personas currently enable Promethean principles.
2) Examine how practitioners can apply the techniques to more effectively enable these principles.
3) Identify emerging factors that consider how one might apply and/or extend these narrative techniques to incorporate a Promethean level of ambition and foresight in ISD.

This paper proceeds as follows: Section 2 reviews the pertinent literature on narrative techniques in ISD. Section 3 explains the myth of Prometheus and justifies its use as a guiding metaphor in this study. Section 4 presents the research method used for the study. Section 5 presents the results from 24 expert practitioner and researcher interviews and identifies factors that researchers and practitioners should consider to enable effective Promethean narrative. Section 6 presents the study's practical and theoretical implications, and Section 7 presents limitations and directions for future research.

2 Narrative Techniques in ISD Requirements Gathering

2.1 Definition of Narrative

Researchers often use the terms narrative, account, and story interchangeably (Vaara, Sonenshein, & Boje, 2016). Stories refer to existing narratives that one can tell and retell in various forms. Accounts refer to people's own narrative descriptions of organizational processes, events, and phenomena. Storytelling refers to the activity that spreads narrative in and around organizations with intentionality or deliberate action (Boje, 2008, 2014). Narrative refers to the core content conveyed by the story rather than the storytelling activity.

A social constructionist and sensemaking view of narrative influenced the ontological stance adopted in this study (Boje, 2008, 2014; Czarniawska, 2004; Weick, 1995; Weick & Browning, 1986). This study specifically defines narratives in line with Vaara et al. (2016) as:

1) Temporal, discursive constructions that provide a means for sensemaking and sensegiving unlike more static, atemporal artefacts such as a vocabulary.

2) Potentially fragmented; thus, one can study a small yet interesting part of an overall narrative (a user story, epic, or persona).

3) Often "loaded' such that, when studying narratives, one must consider the means by which different actors produce or consume them (e.g., individuals or groups with particular perceptions or personal agendas may create or receive them).

4) Possibly more than just text (e.g., visual and audio).

As discussed in Section 1, user stories, epics, and personas represent three main narrative techniques in ISD, and all three meet the four criteria above. In Sections 2.2, user stories, epics, and personas are discussed in turn.

2.2 ISD Narrative Techniques

2.2.1 User Stories

Invented by Connextra and popularized by Cohn (2004), user stories refer to informal, natural language descriptions of system features that a customer writes on an index card. User stories (epics and stories) constitute the production units and driving artefacts in agile ISD. A customer writes each user story to capture a requirement's essential elements: *who* it is for, *what* that individual expects from the system, and, optionally, *why* it is important. The customer also needs to state the user story's priority and provide a corresponding customer acceptance test (CAT) for each story that, when passed, marks the story's completion. Since the initial user story does not contain the details necessary for implementation, an ongoing dialogue ensues between customer and developer to continually clarify and refine the story throughout the ISD process. While the user story bridges communication between customers and developers through this on-going dialogue, the customer should continue to control the story (Cohn, 2004; Layman, Williams, Damian, & Bures, 2006). The most common user story template simply comprises (Lucasson et al., 2016): "As a ⟨role⟩, I want ⟨goal⟩, [so that ⟨benefit⟩]". See examples in Table 1.

Table 1. Example User Stories

As a/an...	I want to...	So that...
Moderator	Create a new discussion group	I can begin inviting members to join
Moderator	Invite members with a link	We can begin a discussion
Member	Join the discussion	I can participate
Member	Create a new discussion topic	I can drive conversation if I do not like the current discussion
Moderator	Approve or block proposals for new discussion topics	The conversation structures are clear and effective
Moderator	Devolve authority to others if I trust them	Control is manageable if the number of discussants becomes too large or if I am not always available to moderate

Lucassen et al. (2016) has provided one of the most comprehensive frameworks for evaluation (see Table 2).

Table 2. Quality User Story Framework (Lucassen et al., 2015)

Criteria	Description
Syntactic	
Atomic	A user story expresses a requirement for exactly one feature.
Minimal	A user story contains nothing more than role, means, and ends.
Well formed	A user story includes at least a role and a means.
Semantic	
Conflict-free	A user story should not be inconsistent with any other user story.
Conceptually sound	The means expresses a feature and the end expresses a rationale, not something else.
Problem oriented	A user story specifies only the problem, not the solution to it.
Unambiguous	A user story avoids terms or abstractions that may lead to multiple interpretations.
Pragmatic	
Complete	Implementing a set of user stories creates a feature-complete application with no missing steps.
Explicit dependencies	Link all unavoidable, non-obvious dependencies on user stories.
Full sentence	A user story is a well-formed full sentence.
Independent	The user story is self-contained and avoids inherent dependencies on other user stories.
Scalable	User stories do not denote too coarse-grained requirements that are difficult to plan and prioritize.
Uniform	All user stories follow roughly the same template.
Unique	Every user story is unique and do not duplicate.

2.2.2 Epics

Agile user stories can be written at varying abstraction levels. These user stories, generally known as "epics", can cover a large number of functionalities (Cohn, 2014). Developers generally cannot complete an epic in one iteration and so typically split them into multiple smaller user stories first. An example epic could include: "As the chief marketing officer, I want to know about potential new sales and markets before the potential customers even know they want our product".

A "theme" lies at an abstract level above an epic (Cohn, 2014) and may refer to an enterprise-wide initiative such as: "We want to transform the way we interact with our customers".

ISD projects usually focus on epics or themes in their early stages where they act as abstract placeholders to define the overall system goals. As the projects progress, developers elaborate and refine epics into more detailed user stories, and they ultimately manifest as concrete development tasks (sprint tasks in Scrum) that produce shippable code. The abstraction level between themes, epics, and user stories varies greatly across contexts (Cohn, 2014).

2.2.3 Personas

A persona refers to a fictional characterization of a user (usually a generalized, super-typical user) that developers create to represent a user group often based on observing or interviewing real users. Developers typically create at least one persona for each significant user group. A persona constitutes a profile that "comes to life" (LeRouge et al., 2013) and typically takes a narrative form, such as:

Sandra is a 77 years old patient who visits the hospital at least five times per year to see different specialists for different ailments. She has a basic level of ICT knowledge and, due to the different systems she interacts with, she struggles with 1) notifying, changing and accepting appointments, and 2) organizing the required documentation for each different appointment.

Personas can be short and succinct narratives or include additional information such as a name, photo, likes and dislikes, habits, background, expectations, and other information needed to provide dimension.

The personas technique has many cited advantages. They are often created to convey users' mental model. Roberts, Berry, Isensee, and Mullaly (1998) indicated that, expressed as a percentage, applications' usability depends primarily on a product meeting or exceeding users' mental model (60%) as opposed to the product's visual (10%) or interactive aspects (30%). The persona conveys this mental model that developers can then address in addition to the "look" and "feel" aspects that they typically prioritize.

Personas are cognitively compelling as they put a personal human face on otherwise abstract data about customers (Pruitt & Adlin, 2006). By identifying with a fictional persona, designers can better infer what a real person might need. Personas also allow developers to prepare for and hone communication with real users and can constantly remind them to integrate user needs into the system (LeRouge et al., 2013; Pruitt & Adlin, 2006).

3   Prometheus

The titan Prometheus has perhaps become best known for his conflict with Zeus in a "gigantic battle of divine wills" over the human race (Morford, Lenardon, & Sham, 2015). Hesiod, an ancient Greek poet, presents Prometheus as a lowly challenger to Zeus's possession of unlimited knowledge and power (Lloyd-Jones, 2003). Hesiod portrays Zeus as a violent tyrant who abused these powers to put and keep distance between the Olympian gods and humans. On the other hand, Prometheus pitied humans, savages ignorant of art and science and "subject to the whims of merciless nature" (Small & Jollands, 2006).

To control and enslave mankind further, Zeus gave fire to Prometheus. However, rather than turning this weapon on the human race, Prometheus gave it to them instead, which enabled them to attain godlike power over nature. However, fire does not represent the final benefaction that Prometheus provides humans; rather, it is seen as the beginning of technology and mankind's evolution from defenseless savagery to advanced civilization.

Prometheus' thievery enraged Zeus in part due to the act's rebellious and disrespectful nature but primarily due to the increased power that humanity now possessed over nature and the perceived reduction in the gap between gods and mortals. To punish Prometheus, Zeus bound him to Mount Caucasus with indestructible chains for 30,000 years.

Control over fire symbolizes power over nature and the beginning of technology, science, and art (Dougherty, 2006; Small & Jollands, 2006). Promethean fire metaphorically symbolizes technology's power (Dougherty, 2006). Ultimately, the Promethean legend concerns mankind's ability to take "Promethean leaps"—to use technology to do things traditionally restricted to the realm of the gods. The original fire constituted one such leap. Today's technology provides the opportunity to make similar advances.

While the Promethean concept underpins great philosophy, fiction, art, and poetry throughout the ages and despite its metaphorical suitability, IS research has rarely used the Promethean concept. Rare discipline-spanning papers draw on Prometheus to question if we make the world a better place with ICT (e.g., Conboy, 2019; Conboy, Conboy, Gleasure, & Morgan, 2020; Sawyer & Winter, 2011; Small & Jollands, 2006), but the focus on the future rarely trickles down to an applied or specific ICT level that one can analyze and operationalize in a specific instance. This is surprising for several reasons. If we tell the "right" story, advancements in supply-side technological capabilities mean we gain the potential to do what our ancestors would consider Promethean and godlike. In the 21st century, technology gives mankind the power to "knock at the gates of heaven" (Small & Jollands, 2006), manipulate the axes of nature. We have a tech-savvy digital native society with an "insatiable appetite" (Fitzgerald, 2012) to tell stories about how technology can permeate all aspects of their lives (Bennett, Maton, & Kervin, 2008, Smith, Skrbis, & Western, 2012). The myth of Prometheus points to the potential good and bad consequences that can arise when humans manipulate technology. The academic literature, popular press, and anecdotal evidence contain polarized views that point to this duality: some sources emphasize technology's many positive uses and benefits, while others highlight its negative or misanthropic aspects (Small & Jollands, 2006), security and privacy concerns (Dinev, Hart, & Mullen, 2008), unhealthy technology overuse, and addiction (Shapira et al., 2003; Yellowlees & Marks, 2007). Therefore, a Promethean analysis may help one identify and analyze these often polarized and dialectic perspectives.

3.1   Promethean Principles

This study now proposes a set of Promethean principles in a context specific to narrative ISD techniques. These are based on an analysis of the Promethean literature: classic literature, poetry, Greek philosophy, and modern research that underpins the myth of Prometheus. Thematic mapping was used (Webster & Watson, 2002; Salipante et al., 1982) to identify the most important Promethean principles (see Table 3). When developing any definition or concept, one will always find it difficult to decide what level of granularity one should use. Every researcher faces a trade-off between focus and multi-dimensionality and between comprehensiveness and memorability (DiMaggio, Hargittai, Neuman, & Robinson, 2001). This research erred on the side of focus and memorability and adopted what Sutton and Staw (1995) call "strategic reductionism". Promethean concepts were grouped into various high-level "intellectual bins" (Miles & Huberman, 1999). The basic Promethean concepts (see Conboy, 2019; Conboy et al., 2020) were then operationalized in the context of ISD narrative techniques while bearing in mind the metaphors described above: the narrative technique (Prometheus), the potential technology (fire), and the customers/users (humans). Each principle is now discussed in turn and summarized in Table 3.

3.1.1   Principle 1: ISD Narrative Techniques Should Enable and Empower

Prometheus, and specifically Promethean fire, metaphorically symbolizes technology's power (Dougherty, 2006; Small & Jollands, 2006). Prometheus primarily sought to selflessly empower humans with abilities that only the gods could wield (Dougherty, 2006; Raggio, 1958; Morford et al., 2015). One can identify such selflessness in examining the distinction between Prometheus and Athena. While many perceive both Athena and Prometheus as intelligent gods of education, Athena ensured that people continued to depend on her for wisdom, whereas Prometheus emphasized empowerment and self-improvement (Greenberg, Clair, & Maclean, 2007). Therefore, one would expect that stories in ISD must not only have an interesting structure, content, and delivery but also be valuable and empowering such that users can translate them into action.

3.1.2   Principle 2: ISD Narrative Techniques Should be forward-looking and future-oriented

Though the word's etymology remains unclear, "Prometheus" derives from "pro", which means "before", and "metis", which means "clever intelligence" (Dougherty, 2006). Therefore, the word's roots describe describes the word as "the one who thinks in advance" or, as Dougherty (2006) describes, a "forethinker". Promethean fire symbolizes "defiant progress" and foresight (Morford et al., 2015). Translating this Promethean archetype to narrative techniques in ISD, one would expect that such narratives would tell stories about what will be rather than what already is.

3.1.3   Principle 3: ISD Narrative Techniques should Encourage Revolutionary Thinking and Evoke Heretofore Inconceivable "Promethean Leaps"

Prometheus's archetype as a revolutionary character draws a clear distinction between regular foresight and Promethean foresight (Dougherty, 2006). The latter represents something fundamental and game-changing, something incomprehensible—imagine a prehistoric "designer" trying to articulate fire's look, feel, and "user requirements' to individuals trying to envisage or articulate it before its discovery. Therefore, narrative techniques should place the listener in a world outside their usual comforts and daily routines to enable creative thinking and vision analogous to thinking about fire before its invention.

3.1.4   Principle 4: ISD Narrative Techniques should Limit Reckless Ambition

While revolutionary thinking constitutes a core concept of the Promethean myth, Goethe drew on the Promethean myth to warn against reckless ambition (Dougherty, 2006) in that Promethus gifted it to humans without any guidance or thought regarding its future use or implications. Such extreme innovation, even if well intended, can create unforeseen disaster (Dougherty, 2006; Raggio, 1958; Morford et al., 2015). Prometheus further heightened this archetype by intentionally and proudly "stopping mortals from seeing their fate" and, thus, "plant[ing] in them blind hopes" without concern for the potential downfall to come (Morford et al., 2015). Therefore, in an IS context, narratives should not only convey the Promethean leap but also consider its implications.

3.1.5   Principle 5: ISD Narrative Techniques need to Limit Misanthropy

While many authors have portrayed Prometheus as giving humanity fire to help humanity better itself and that he definitely symbolizes the suffering creator (Grene, 1940), many others have portrayed him as a cunning trickster who, like other tricksters in folklore traditions throughout the world, is "anomalous", "deceiving" and a "shape-shifter" (Dougherty, 2006; Witzel, 2012; Raggio, 1958) and a thief (Witzel, 2012, pp. 357, 366). Fire represents not just good but also a "historic tool of devastation and destruction" (Dougherty, 2006, p. 18). They have referred to him as "the initiator of technological evil" (Ziolkowski, 2000) who unleashed humankind's powerful, all-consuming, and sometimes unethical desire for knowledge and technology (Ziolkowski, 2000). In fact, De Ropp (1972) referred to scientists as "the new Prometheans" and discussed how every creative technological development creates a matching destructive force that threatens to erase its benefits and often creates a net negative effect. Technological developments' creators sometimes seek to intentionally cause such destruction, and that intentionality differentiates this principle from the simple recklessness that embodies the fourth principle (see Section 3.1.4). Common discourse regarding technology focuses on technology's increasing capability and probability to return humanity to pre-civilization through varied routes such as resource exhaustion, climate change, or devastating weaponry. While few ISD scenarios involve a destruction scale such as these examples, damage is relative and so the principle can still apply wherever one uses narrative techniques.

Table 3. Development of ISD Principles Based on Promethean Concepts

Principle	Dougherty (2006)	Grene (1940)	Morford et al. (2015)	Raggio (1958)	Witzel (2012)	Ziolkowski (2000)
1: ISD narrative techniques should enable and empower	x		x	x		
2: ISD narrative techniques should be forward-looking.	x		x			
3: ISD narrative techniques should encourage revolutionary thinking and evoke heretofore inconceivable "Promethean leaps".	x					
4: ISD narrative techniques should limit reckless ambition	x		x	x		
5: ISD narrative techniques need to limit misanthropy	x	x			x	x

4   Research Method

This study's empirical component involved expert interviews. One can more easily understand phenomena via obtaining the views of actors with significant and extensive involvement and experience in the area. Interviews represent a particularly appropriate choice for this study given user stories' subtle, multi-dimensional, context-laden nature (Beck, 2000; Schwaber & Beedle, 2002; Koch, 2005) and the Promethean concept's complex, polymorphous nature (Dougherty, 2006). Furthermore, pooled intelligence can often help one resolve complex and ill-defined problems (Dalkey & Helmer, 1963).

The literature on group size theory varies in its suggestions regarding the ideal number of expert participants. Specifically, suggestions range from five experts for a homogenous population to more than 15 experts for a heterogeneous population with people from different social and professional stratifications (Delbecq & van der Ven, 1975; Uhl, 1983). Given the stratification across practitioners and academics, As described below, 24 interviews were conducted (i.e., more than the recommended minimum limit).

One cannot easily verify expertise. For instance, one can judge it based on status, experience, or "a myriad of other things" (Brown 1968). Researchers consider allowing every willing person to take part highly unscientific (Sackman, 1975; Clayton, 1997), and so participants were systematically selected (see Table 4).

The choice of selection criteria was based on recommendations for expert studies (e.g., Brown, 1968; Meyer & Booker, 2001) and on reasonable expectations about ISD experts' typical characteristics. Both practitioners and academics were chosen to provide a rich mix of participants.

Participants volunteered after a seminar on the topic at one academic and two practitioner conferences where there was an explicit call for participation. In all, 29 participants volunteered, though only 24 (16 practitioners and 8 academics) met the criteria. Practitioners came from every continent and had worked in both consulting and traditional roles, in both customer-facing and internal-facing roles, as subject matter experts (SMEs), and in multinationals. The academics included researchers from four continents and a balance between business, IS, and computer science.

Many of the practitioners (particularly the ones who worked in consulting organizations) had worked on many projects or had many roles. Since projects constituted the unit of analysis in this study, all practitioners were required to have "substantially" participated in two or more projects. To verify such involvement, qualifying questions were asked to ensure their projects lasted for a sufficient duration (over three months), that the interviewees participated in the projects to a significant degree (over 60% of their time), and that they had a role in the projects that provided them with an informed opinion on implementing user stories in these projects (either creating, using, or evaluating the impact of user stories or narratives).

Table 4. Classifying and Selecting Participants

Desired background or skillset	Method to identify experts	Minimum selection criteria
Practitioners who have extensively used user stories/epics/personas (either creating or directly using or evaluating)	Members in relevant agile method groups (e.g., Agile Alliance) Personal contacts	> Five years' general ISD experience > Two years' user story/epic/persona experience > Experience with two projects
Researchers who have studied user stories/narratives in ISD	Literature review (e.g., relevant academic and practitioner journals/conferences)	≥ Three relevant publications in refereed journals (*MIS Quarterly, Information Systems Research, Journal of the AIS, Journal of MIS, Information Systems Journal, European Journal of Information Systems, Journal of IT, Journal of Strategic Information Systems, Transactions in Software Engineering, Transactions on Software Engineering Methodology, Journal of Systems & Software, Information Software & Technology*)

4.1 Data Collection

Data was collected through personal face-to-face interviews. As all participants had volunteered following a seminar on Promethean thinking, all generally knew about the Promethean principles and how they were to be used to evaluate narrative techniques in this study. Questions were open ended to allow interviewees to convey their experiences and views on the socially complex contexts that underpin ISD and narrative use (Oppenheim, 1992; Yin, 2003). Interviews began by eliciting the narrative techniques that the practitioners used and the researchers studied before examining the extent to which these techniques addressed or constrained the Promethean principles in each case.

Interviews lasted from 45 to 85 minutes (average = 72 minutes), and were conducted the interviews in a reflexive manner (Trauth & O'Connor, 1991). To aid subsequent data analysis, all were recorded with consent and subsequently transcribed and annotated. In cases where ambiguity arose, clarification from was sought from the appropriate interviewee.

4.2 Data Analysis

To aid analysis, coding procedures were chosen to systematically label concepts, themes, and artefacts (Miles & Huberman, 1999). The coding structure comprised three distinct parts.

First, an identification code was attached to each piece of text extracted from a transcript (A1 to A8 for the researchers, and P1 to P16 for the practitioners) to ensure participant anonymity. In addition, all text was coded to align with the narrative technique it referred to (namely, user story, epic, persona, or other).

Second each quote was assigned to the Promethean principle that gave rise to it. These principles (see Section 3) acted as "intellectual bins" (Miles & Huberman, 1999) used to segment and filter the interview data. Given that Promethean principles were used to structure the interviews, all quotes logically aligned to at least one principle. In some instances, a quote aligned with two or more principles.

Third, axial coding was used to "identify emergent themes, configurations or explanations" (Miles & Huberman, 1999, p. 88). See examples of this coding in Appendix A.

In examining how narrative was used, it was tempting to say that "the use of technique X caused the actors to do Y". However, in doing so, one would revert to positivist thinking in a search for cause and effect. It was more appropriate to say that the research data was analyzed to investigate how the participants used metaphors as a shared cognitive-structuring device to structure and articulate how they interpreted a situation and, based on that interpretation, made assertions about their organization and/or decisions to take particular actions.

5   Findings

In this section, the findings about the five Promethean principles are described and, specifically, the degree to which the epics, user stories, and personas contribute to them. The factors that affect these Promethean principles that emerged from the axial coding phase are then described, along with supporting evidence from the interviews.

5.1   Principle 1

Some interviewees lauded epics', user stories', and personas'; potential to "clearly bridge the gap" (P6) between customers and developers and to enable developers to map out the system and produce a product that clearly mapped to the "complexities and idiosyncrasies of the customers and the world they live in" (A5). Quite a few referred to these techniques as the "most powerful" and the "only true" method for effective communication in ISD. Others however, referred to stories as "nice to look at but not much else" (P5), "superficial" (P11), and only there "to show the customer we are thinking of them" (P15).

5.2   Principle 2

The interviewees provided mixed responses to this principle. While many felt stories are "extremely effective for imagining the future" (A7), "creating a vision" (P6), and conveying something "that isn't there at present" (P12), many also referred to the fact that these techniques often portray the present. One interviewee said: "Personas always describe current *as-is* customers and their current mannerisms - I rarely see persona mapping of future *to-be* customers" (P6).

5.3   Principle 3

The interviewees generally agreed that, despite stories' and personas' potential to convey extremely, emotive, powerful revolutionary stories, they rarely did so in practice. They found stories "often mundane" (P4), "uninspiring", and "generally boring" (P1), while they found personas rarely "larger than life characters but are just average Joe Bloggs customers" (P6). Furthermore, they rarely found epics the big picture vision because "when you try to push the boundaries on what is possible, people think about the practicalities of the user stories that will come from the epic and block anything that isn't very simple and do-able" (P8).

5.4   Principles 4 and 5

The interviewees did not consider epics, user stories, or personas as very effective in limiting reckless ambition or misanthropy. According so some interviewees, customers and management teams solved these issues before developers created stories afterwards (P2, P5, P7, P9, P10, P11). For instance, two interviewees said: "Usually money and time pressure constrain recklessness" (P1) and "management will stop nasty activities rather than any story card" (P14).

5.5   Emergent factors Affecting Promethean Capability of Narrative Techniques

From the first phase of data analysis phase, it was shown that epics, user stories, and personas did not significantly enable the various Promethean principles. As a result of the subsequent axial coding process, several core factors emerged that contribute to these mixed results and to differentiate "good" from "bad"

experiences. Table 5 shows which seed categories (the five Promethean principles on the horizontal axis) informed each emergent category (vertical axis). An "x" denotes these linkages (i.e., where an emergent factor affected a Promethean principle). Supporting expert interview evidence is provided in Section 5.6 to further illustrate each factor.

Table 5. Emergent Factors that Affect the Promethean Principles of Narrative Techniques in ISD

	Promethean principles				
	1: Enabling and empowering	2: Forward looking and future oriented	3: Encouraging revolutionary, Promethean "leaps"	4: Limiting reckless ambition	5: Limiting misanthropy
Narrative technique factors					
Specificity	x	x	x		
Contextual depth	x		x		x
Authorship	x	x	x	x	x
Peer review	x	x	x	x	x
Development context factors					
Tailoring narrative to process	x				
Integrating narrative in the process	x	x	x	x	x
Narrative resourcing	x	x	x		
Limiting Temporal degradation	x				

5.6 Narrative Technique Factors

5.6.1 Specificity

Developers stated that clients and users will often refuse to approve a stated epic and accept it as valid unless it encompasses all characteristics (P2, P7, P11, P13), while others require the narrative to reflect their exact specific unique traits and needs (P1, P6, P9, P11, P15). Some suggested that overly vague and non-specific narratives can really hinder the second principle and, certainly, the ability to envisage revolutionary Promethean change as one interviewee said: "I always see a persona start out really interesting with real creative potential but by the end becomes so broad, encompassing the views and needs of every last [user] that it is effectively useless" (P12).

These "last" users—the ones that often adopt technology or change after all others—are typically "low performing" (P7), "not innovative" (P12), and "as far from Prometheus as you can get" (A7), and so all the richness of the leading people that we want to use as "shining light" (A7), "exemplar personas" (P7) becomes lost or "diluted" (A6). Overly narrow stories may also affect Promethean potential in that developers can often become "so extremely preoccupied with one narrow user" (P6) that they do not consider the larger Promethean potential that the wider user cohort could gain (P2, P6, P11, P13).

5.6.2 Contextual Depth

The user stories can portray a richness of context that may not exist. For example, one participant said:

We spend so much time writing stories and requirements where everyone knows that the real story is something deeper and darker. We embrace the dark side and get the dislikes, insecurities and fears of people down in those personas and that allows us to create something that addresses and embraces those things and so is truly different and potentially powerful. (P16)

Many interviewees noted that developers often build personas on the "idealistic" (P4, P9, A6) and "formal" (P4, P11, P13) but fail to acknowledge the "informal, messy realities" (P4) that users operate in (P4, P9, P11, P13, A3, A4, A6, A7). In particular, some referred to narrative techniques' failure to recognize, capture, and convey the "patterns of power and domination" (A8) and general culture (P4, P11, P13, A4, A7). This absence impacted ISD teams' enablement and empowerment: the teams would build "empty shells that in theory were fantastic" (A6) but that inevitably remained underused due to various

"powerplays" (P11) and "in-fighting" (P2, A6). The absence also affected narratives' potential to enable revolutionary "leaps". In the small minority of cases where narratives did capture the political and cultural issues, the interviewees sensed that "true revolution" (P16) was possible.

The presence of stories' and personas' also allowed teams to limit misanthropy. While the "darker" side remains undocumented and unquestioned, authors can create stories that may be "loaded with evil and selfishness" (A4), whereas, when everything is out in the open, "it becomes OK to question the true agenda, emotions, or selfishness at play" (P16).

5.6.3   Authorship

In some cases, one person authored all stories. In other cases, individuals who worked in the story's niche area authored them. In others still, local or niche experts were forbidden from authoring those stories that they may be considered too close to, to write in an unbiased narrative (P2, P3). According to the interviewees, the author and authorship strategy affected all five Promethean principles. The more the author is familiar with the technical specification and skills required, the more they know about how one can radically enact it (P1, P4, P5, P6, P9, P11, P13, P14, P15, P16, A1, A3). Stories embody (A3) and physically represent (A6) an author and, thus, possess their inherent strengths and weaknesses. As for Principle 2 (forward-looking narrative techniques), interviewees referred to some user story and persona creators as "thinking about tomorrow" (P11), "being one step ahead" (P7, P14) and to others as "living in the past" (P7) and loving "the status quo" (P2, P9, P16). As for Principle 3 (Promethean leaps), interviewees referred to some user story and persona creators as "highly creative" (P12), "visionary" (P2, P7, P9, P12), and "outside the box" thinkers (A2) but to others as "very limited creatively" and (P12) "[people who] would find it hard to envision a world different to the one they have worked in for 30 years" (P14). I found a similar dichotomy for Principle 4 (limiting reckless ambition). On the one hand, interviewees portrayed some authors as writing stories by "careful consider[ing] implications" (P11, P15, A2) and "always thinking things through" (P16, A2) and others (and, in particular, customers or those detached from the subsequent systems development) as writing stories that do "all kinds of things" (P15) without thinking about the implications (P2, P4, P5, P6, P9, P10, P15, P16, A2, A3, A5). Finally, as for Principle 5 (limiting misanthropy), the interviewees noted that some authors would write stories in a "selfless" manner for "the greater good" (P6) with all customers, staff, and the ISD team in mind (P4, P5, P6, P9, P15, P16, A2, A3, A5) while others would view story writing "as their chance to make sure the new system fulfills their selfish needs to the detriment of everyone" (P7).

5.6.4   Peer Review

The extent to which others reviewed stories and authorship transparency (who knew who had written which story) affected all five Promethean principles. Interviewees mentioned that narratives could not sufficiently enable and empower (Principle 1) as authors "created a scenario they could understand but others struggled with". Peer review strengthened the "relevance and applicability" of stories (P8) to the broader team (P1, P2, P7, P8, P9, P11, P16). As for Principles 2 (forward-looking narratives) and 3 (Promethean leaps), reviewers were more likely to challenge single authors' "often conservative" (P7) and "tentative" (P10) thinking. However, to counteract such challenges, authors act even more conservatively and tentatively when faced with a peer-review process (P7, P10). As for Principle 4 (limiting reckless ambition), review groups with diverse group members will more likely fully consider implications that authors may not think or be aware of (P3, P4, P7, P8, P10).

5.7   Development Context Factors

5.7.1   Tailoring Narrative to Fit the Development Process

While most participants commented that developers always tailor methods to suit the context, epics, user stories and personas often represent an exception, and developers use them in their original format. For example, for 13 of the 16 practitioners, the original Connextra template "As a ⟨role⟩, I want ⟨goal⟩, [so that ⟨benefit⟩]" constituted the most common format in their organization despite the fact that "every other part of the process is often tweaked or tailored" (P4). In one case, developers effectively tailored user stories to fit automated usability evaluations (P9), virtual boards or repositories (P11, P13, P16), Kanban boards (P7), and distributed teams (P2, P4, P6, P9, P10, P11). While interviewees often found tailoring the narrative technique to the context effective, they found failing to do so to affect how well they integrated

narrative techniques into the development process. Failure to tailor the narrative technique often made the distinction between whether the narrative techniques had enabling value or not.

5.7.2 Integrating Narrative Techniques into the Process

Many interviewees noted that the extent to which they integrated narrative techniques (even when tailored) into the development process as a further key factor in enabling Promethean leaps. Many cited the fact that they often perceived stories or personas that could enable all five Promethean principles proposed in this study but that developers often underused them or did not use them at all. For example, approximately half the experts referred to the fact that their organizations used user stories only "to show the customer we are thinking of them" (P15). Many noted that stories played a key role in customer review, but not in regular development activities such as actual requirements specification, prioritization, testing, or retrospectives. Even when they did, the true use of them was unclear. As one interviewee noted: "Stories are something that are so exciting, rich, loaded with potential and incredibly powerful communication tools, but people either just like them or they don't. So many people ignore them or at least don't really engage" (P10).

Stories' and personas' "subtle", "soft", "qualitative", and "emotive" nature exacerbated the challenge in achieving Promethean leaps (P1, P2, P4, P6, P7, P8, P10, P11, P13, P14, P15, A1, A3, A4, A5, A6). Unlike the "harder", "tacit", and often "binary" nature of other activities such as coding and testing, one cannot easily examine the true extent to which a customer or developer engages with and understands narrative's depth and, therefore, the extent to which the narrative technique has really integrated into the process (P2, P4, P6, P7, P8, P13, P14, P15, A3, A4, A5, A6).

5.7.3 Narrative Resourcing

Many interviewees conveyed resourcing the narrative function (recruiting people with the appropriate narrative writing or telling skills or the time allocated specifically to user story or persona development, refinement, and evaluation) as critically important (P3, P6, P11, A3, A4, A6) to evoke Promethean "leaps". For example, one interviewee said: "It is not the user story or persona technique that's useful at all but the person writing and telling the story" (P6). Many interviewees noted that, when recruiting staff, their organizations emphasized technical skills and perhaps teamwork and communication but "rarely on user story techniques or skills a requirement" (P11). They unanimously agreed that their organizations allotted no time to developing, refining, or evaluating stories and that they had to fit such tasks into time allocated for other tasks. As one interviewee said:

> What we do is rare. We spend two hours per story—we really push the boundaries on the story, and what can be achieved if we challenge ourselves and our thinking. The story at the end of the two hours usually looks much different to what we start out with and is the main reason our projects are usually so visionary. (P3)

5.7.4 Limiting Temporal Degradation

Five practitioners referred to the fact that stories or persona often degrade over time, which diminishes their Promethean potential. They degrade for many reasons. First, the narrative often has a "glory period" (P6) in which actors richly describe, discuss, and debate it when first created. However, "the level of debate and discussion takes a dramatic drop soon after that creation" (P1). If the narrative does not spark ideas at the time or soon after creation, it will not likely do so later on in development. Second, staff "come and go" (P8)—that is, they leave to work on other teams, projects, roles, or organizations. Thus, narrative's richness and value paper, can be lost on staff that were not there when it was relayed. Finally, the narrative describes a context, a persona, or a need that themselves changes over time. Therefore, any narrative will suffer from natural degradation as it captures less and less of the evolving context, persona or need (P6, P7, P8, P10).

6 Discussion

There are three contributions in this research study. Each is now discussed in turn with a reflection on the extant literature that pertains to each one and the resulting implications of each one to research and practice.

6.1   Promethean Principles

This study is based on the Promethean myth and associated poetry and mythological literature and, as a result, provides several principles for evaluating ISD narrative techniques' innovative and transformative potential. While the Promethean concept underpins great works of philosophy, fiction, art, and poetry throughout the ages, IS research has rarely used it. While a small number of discipline-spanning papers refer to Prometheus to question if we make a better world with ICT (e.g., Sawyer & Winter, 2011; Small & Jollands, 2006), they have focused on the Promethean concept at an abstract, thematic level and not developed analyzable principles or components. Further, the focus on the future rarely trickles down to an applied or specific ICT level that one can analyze and operationalize in a specific instance such as the application of Promethean principles to specific ISD techniques in this study.

Further research could develop, refine, and apply the Promethean principles to IS research more generally in order to apply to ISD methods and techniques beyond narrative and, indeed, beyond ISD. For example, one could evaluate the Promethean capabilities of an IS itself.

6.2   Evaluation of ISD Narrative Techniques

The Promethean principles are then used to evaluate the current state of epic, user story, and persona narrative techniques. Stories and narrative constitute a powerful means to examine and explain concepts. Narrative techniques such as user stories, epics, and personas can help bridge the communicative barrier between customers and developers (Cohn, 2004; LeRouge et al., 2013; Pruitt & Adlin, 2006). They constitute a fundamental component of most contemporary ISD methods such as agile and flow. Despite their prevalence, little rigorous research has evaluated their quality or impact.

The interviews show that developers sometimes tailor these techniques from their original textbook format (e.g., Cohn, 2004, 2014; Pruitt & Adlin, 2006). Further case research could examine the nature of such tailoring and identify better, more effective versions of their original format.

6.3   Emergent Factors that Affect Narrative Techniques' Promethean Capability

Practically, this research extends the current measures for assessing user stories by providing measures that test user stories' transformative potential. These measures include several narrative technique characteristics: 1) specificity, 2) contextual depth, 3) authorship, 4) the nature of its peer review, and 5) the extent to which it exhibits temporal degradation. These measures also include several development context characteristics: 1) narrative resourcing, 2) tailoring the narrative to the process, and (3) integration of the narrative into the process. Researchers have provided guidelines for and illustrative examples of what constitutes "good" user stories (e.g., Cohn, 2004; Lucassen, 2015), epics (Cohn, 2014), and personas (e.g., Cohn, 2004; LeRouge et al., 2013; Pruitt & Adlin, 2006). Lucassen et al. (2016) provides one of the most comprehensive frameworks for evaluation. However, extant work tends to focus on operational aspects such as these techniques' testability, clarity, and independence (e.g., Lucassen et al., 2016) and does not address in any way their innovative, transformational, Promethean potential. Also, research to date has examined only story factors and not development context factors, which clearly play a significant role according to the findings in this paper.

Researchers and practitioners can use these factors to evaluate narrative techniques' innovative potential. Following this exploratory research, other researchers could conduct explanatory research via developing and testing hypotheses that to relate to each factor identified. Researchers could also conduct quantitative research to determine the extent to which practitioners use narrative techniques in ISD practice, the degree to which they tailor the techniques, their effectiveness, and the impact (either positive or negative) that these factors have on that effectiveness.

Furthermore, contradictions and tensions between the factors could potentially arise. For example, the degree of revolutionary thinking that one invests in a narrative may require significant additional resources such as expertise or research time. One may need to balance these (sometimes conflicting) components, and so researchers need to further examine such balancing.

7   Conclusions and Limitations

Stories and narrative constitute a powerful means to examine and explain concepts. In ISD, narrative techniques represent powerful tools that can assure that developers coherently describe usage behavior and underpin most contemporary software methods such as agile and flow. However, little research has

evaluated these narrative approaches' quality or impact and has ignored their potential to enable radical, Promethean innovation.

The research in this study makes three significant contributions to the literature on narrative techniques in ISD: 1) it develops several Promethean principles that others can use to evaluate narrative techniques' true innovation potential; 2) drawing on these principles and interviews with 24 expert practitioners and researchers, it examines the current state of three of the most commonly used narrative techniques in ISD (i.e., user stories, epics and personas); and 3) drawing on the same interviews, this research identifies story and ISD context characteristics that affect the Promethean potential of these techniques.

As with any study, this one has several limitations. First, the narratives techniques studied have purpose other than simply to be "Promethean". Readers should consider their purpose and not state the main principles proposed without considering such context. When one uses an artefact such as user stories to represent requirements, one cannot only focus only on, for example, the extent to which they look forward. The artefact must also serve more pragmatic roles such as representing boring, present-looking requirements that developers still have to implement. Developers also need to consider other pragmatic ISD aspects (e.g., time constraints). For example, time or resource constraints may limit the amount of effort than developers can spend on thinking forward regardless of the potential that a narrative technique may exhibit.

Second, in applying the principles and factors identified in this study, one must recognize the fact that actions to achieve one principle or factor may inhibit or limit the achievement of another. As one very obvious example, one may tweak a narrative technique to encourage revolutionary thinking (Principle 3) but, in doing so, may lead to reckless ambition (Principle 4). Future research could examine ways to optimally balance principles or finding techniques that achieve positive effects without damaging other principles.

Third, this study builds on interviews with 24 experts intentionally drawn from various backgrounds and perspectives to provide a thorough and holistic overview. However, we also clearly need to analyze user stories from the perspective of those stories' different creators and consumers. What constitutes the "right" narrative depends on the particular interviewee, and a narrative characteristic that developers insert or amplify for one consumer may reduce its value or usefulness for another. One must also consider ontology. For example, a social constructionist ontology will draw on sensemaking and power ("Who says this is the right narrative?"), whereas an ontology based on discourse will measure the "right" narrative in terms of effectiveness or usefulness in a specific discourse.

Fourth, this research only focuses on user stories, epics, and personas. These were selected based on their dominance in contemporary ISD methods and ISD generally. However, one could certainly apply the Promethean principles developed in this research to other narrative techniques in ISD or, indeed, narrative in other aspects of the IS discipline beyond development. Future researchers could replicate this study and apply the newly derived principles to assess if the narrative or development context characteristics identified in this study also arise when one adopts other narrative techniques or uses them in other development contexts.

While the interviewees gave useful examples and evidence, researchers should conduct further exploratory research through detailed case studies in the future. In particular, they should conduct such studies on narrative techniques given stories' subtlety, inherent complexity, undertones, and impact as a communication mechanism may be such that interviewees may not be aware of some factors that researchers question them about. Researchers need to conduct more in-depth cases to truly validate these factors, to more richly describe how one can operationally enact them in practice, and to provide additional evidence about their efficacy. Given the dynamic and emergent nature of some factors identified and that temporality itself constituted a distinctive factor, longitudinal cases would be particularly welcome.

While this research is based on the premise that stories should enable Promethean leaps in innovation, one should not assume that such radical innovation always represents a good thing or that a narrative technique should always strive for such leaps; the most effective use of a narrative may be to communicate a simple, incremental change if a situation even requires change at all. Therefore, before measuring narrative techniques' Promethean potential, assessing the factors affecting that potential, or taking any corrective action, one needs to determine whether such a leap is necessary and ideal in that instance.
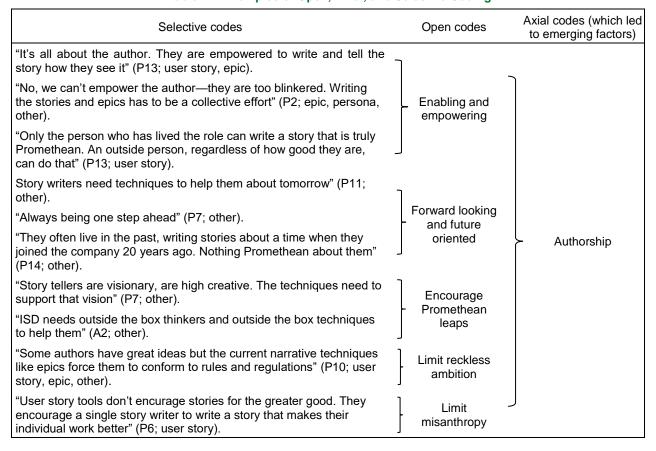
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Appendix

Table A1. Examples of Open, Axial, and Selective Coding

Selective codes	Open codes	Axial codes (which led to emerging factors)
"It's all about the author. They are empowered to write and tell the story how they see it" (P13; user story, epic).		
"No, we can't empower the author—they are too blinkered. Writing the stories and epics has to be a collective effort" (P2; epic, persona, other).	Enabling and empowering	
"Only the person who has lived the role can write a story that is truly Promethean. An outside person, regardless of how good they are, can do that" (P13; user story).		
Story writers need techniques to help them about tomorrow" (P11; other).		
"Always being one step ahead" (P7; other).	Forward looking and future oriented	Authorship
"They often live in the past, writing stories about a time when they joined the company 20 years ago. Nothing Promethean about them" (P14; other).		
"Story tellers are visionary, are high creative. The techniques need to support that vision" (P7; other).	Encourage Promethean leaps	
"ISD needs outside the box thinkers and outside the box techniques to help them" (A2; other).		
"Some authors have great ideas but the current narrative techniques like epics force them to conform to rules and regulations" (P10; user story, epic, other).	Limit reckless ambition	
"User story tools don't encourage stories for the greater good. They encourage a single story writer to write a story that makes their individual work better" (P6; user story).	Limit misanthropy	

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