Enterprise Modelling
COMP 638

Assignment 4: Modern Modelling Techniques & Design Thinking

Research Paper

Naqi U Khan
Mickael Yusufidis

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Preface

This research paper is created to satisfy the group study requirement for assignment 4 in COMP 638 Enterprise Modelling Winter 2019 course. As a part of this assignment, presentation slide will follow with submission.

Abstract

Enterprise modelling as we know it today is becoming a thing of the past. Online virtual communities and societies, digital channels, are growing in number, and audiences that were once human centric are becoming ever more accessible digitally, where business is increasingly being conducted online and digitally. Channels are being created to make these digital audience communities more interoperable and humanly accessible in this new digital reality. This is happening very quickly due to the demand being generated by the rise of start-ups, dominating the technology market today. This research will look into the acceptance and adoption of next gen enterprise modelling capabilities such as Scaled Agile Framework (SAFe) and immersive modelling techniques such as Design Thinking and Storytelling.

Case studies and SAFe assert the term "Enterprise agile" a practice of Agile that is a set of strategies for dealing with reoccurring events and constraints, capable of both large scale and typical agile implementations. The research also draws attention to Design Thinking and Immersive Storytelling modelling techniques which brings an extra level of creativity, artistry and culture, effectively streamlining ideation and innovation practices a disruptive option for enterprises seeking to become more agile.

The paper concludes with the notion that enterprise agile and design thinking are two modern trends that are quickly gaining traction and popularity as an innovation and modelling tools. Their adoption and acceptance enables information scientists to simplify and optimize what was once a complex enterprise modelling system and set of standards into what can arguably be explored next gen (Immersive) Modelling.

Introduction

Enterprise Modelling as we know it today, may be a thing of the past. Why? Online virtual communities and societies, digital channels, are growing in number, and audiences that were once human centric are becoming ever more accessible digitally, where business is increasingly being conducted online and digitally. Wikipedia lists virtual communities with more than 1 million users and 100 million active users [1] [2]. Well known digital communities and channels include [2]:

- Facebook 2,320 million active users
- YouTube 1,900 million active users
- WhatsApp 1,500 million active users
- Instagram 1,000 million active users
- iMessage (Apple) 1,000 million active users
- LinkedIn 590 million active users

Channels are being created to make these digital audience communities more interoperable, i.e. cloud, micro services, etc. This is happening very quickly due to the demand being generated by the rise of start-ups, dominating the technology market today. Clearly, there is a new enterprise technology paradigm on the horizon, and it's called start-ups, a double edge sword for enterprises and enterprise modelling alike. Start-ups are redefining modelling requirements in this insta-age. The age of insta-business, insta-enterprise, insta-model. Insta. As in Instant. Write that down, because slowly but surely, we're getting better at right now.

The rise of the Infopreneur [3] and Technopreneur [4] , "entrepreneur(s) who identifies opportunities for creating enterprising information-based businesses by identifying knowledge deficiency situations and selling target-based information products and services, mainly through the internet" [3] and digital communities noted above denotes that navigating these communities requires agility and an agile mindset, which is a common thread between starts ups and enterprise that makes collaboration and interoperability with other organizations possible. Methods and tools such as Scrum, Kanban and the ever rising star Scale Agile Framework (SAFe), make it possible to "start(s) out with nothing but an 'idea' and defy existing practices and systems to do things different by creating a product or solution that uses the heft and capability of technology to change the way something was traditionally done." [4] This is where we're seeing Scientists (Academia and Research) playing a more prominent role in the development arena, where there is a definite need for information scientists to be more creative in their thinking, innovation and design. The adoption and acceptance of Design Thinking is a leading-edge paradigm that is enabling information scientists to simplify and optimize what was once a complex enterprise modelling system.

This research will look into the acceptance and adoption of next gen enterprise modelling such as Scaled Agile Framework (SAFe) and immersive modelling techniques such as Design Thinking and Storytelling.

Enterprise Agile

Agile practice is the method that allow self-organizing and cross-functional teams to develop requirements and solutions incrementally. Some of the most prevalent framework associated with this practice like Scrum, Kanban, Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), Extreme Programming (XP) etc. provides building blocks for its successful incorporation into any domain.

Agile enterprise is an addition of this practice so as the Enterprise agile. They share many similarities yet different in their own way. Enterprise Agile is not nearly a large enterprise with 10 to 100 agile teams but, inspecting and adapting on the higher standpoint by employing Agile in the entire organization. In addition, it is not one-size-fit-all approach rather a set of strategies for dealing with reoccurring event and constraints. Enterprise agility is about integrating finance and human resources so that the entire business is setup to respond to changes in the market to be able to deliver the most value possible within the established time and cost constraints. It is about having the ability to balance the sales and marketing side of the business with the ability to create working products, and then support those products in a sustainable way [5].

Business agility and innovation requires the use of modern techniques and technologies. Perpetual improvements and development of new skills is the only way forward to deliver competitive solutions, make good decisions and avoid missed opportunities. Similarly, agile methodology has progressed into various directions, from software to DevOps and agile UX to so on and now the enterprise. Author suggests probing the following high-level queries for implementation in general:

- How it should be implemented on the enterprise level,
- Potential impact on the business,
- Is there any additional technology or platform associated,
- What are the steps for successful execution,
- Are there any success stories,
- Who should be on the implementation team

As discussed above, there are numerous framework exist in agile practice, in this paper we will look into Scaled Agile Framework (SAFe) which is primarily designed to handle large-scale efforts involving dozens of teams and is the only framework designed for embedded solutions.

Adopting Enterprise Agile

If we take software development as example, most organizations that have implemented agile methodologies have adopted Scrum and/or Kanban, but few have applied the lessons learned in IT to the rest of the organization. Before adopting any enterprise framework, you should first assess your current level of agile fluency to identify gaps in skills and practices that need to be addressed [6].

Agile Manifesto states "the best architectures, requirements and designs emerge from self-organizing teams" [7] which seems to work fine with organizations on smaller scale but more well-organized and architectural feedback is needed for a large establishment that may be running with hundreds of teams working on many systems and projects.

Scaled Agile Framework (SAFe)

A framework of lean-agile practices, SAFe is the only enterprise agile framework aimed to handle truly complex systems consisting of multiple programs in organizations that are composed of more than a few dozen teams developing cyber physical systems (for example, automobiles, airplanes and satellites). The framework provides specific and actionable guidance based on lean-agile development practices to enable organizations to address the inherent challenges of developing large-scale software solutions [6]. It starts with identifying the value stream, which is the most important first step in launching a successful Agile Release Train (ART)

Numerous organisation sustaining a strong foothold in the industry and staying atop of their uncertainties by retrofitting their outmoded approach by implementing agile. Large enterprises like Air France, Phillips, HP, TOMTOM, CISCO are just the few examples of the companies benefitting from increased productivity, better quality, improved employee morale and faster time-to-market right after implementing agile on enterprise level.

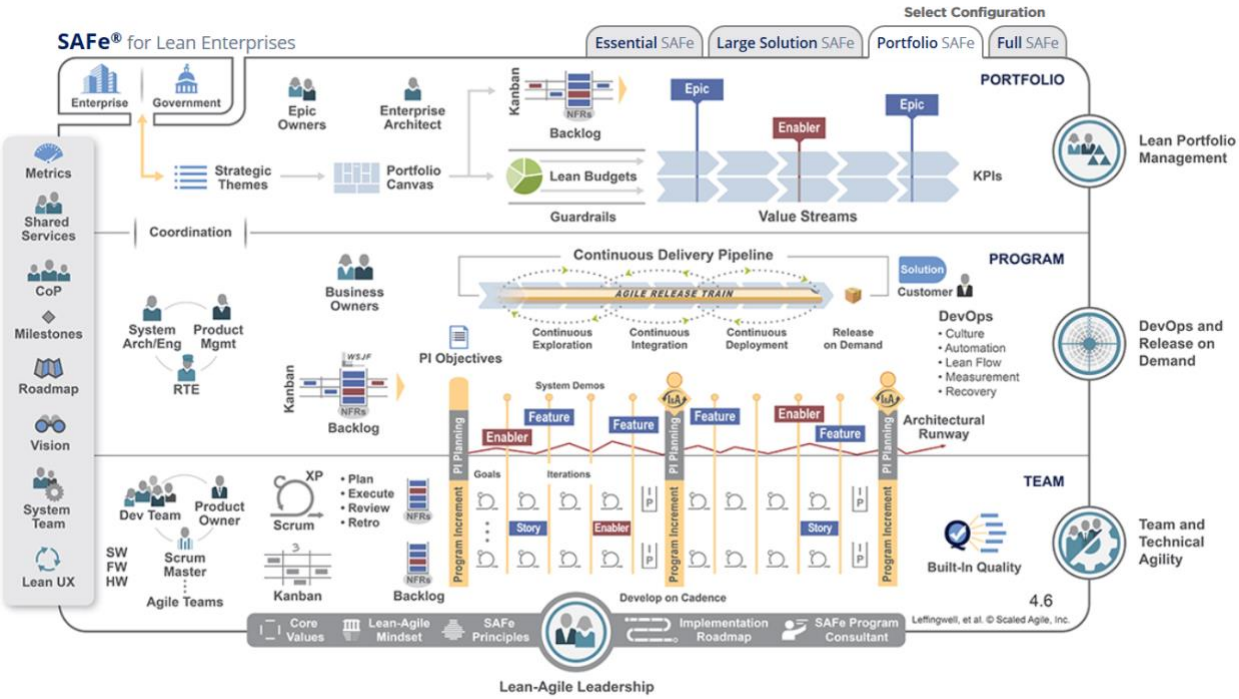


Image of SAFe for Lean Enterprises [8]

Case Study

Out of many examples of implementing enterprise agile, due to their intricate nature of business function following case studies seemed engaging, a brief summary of how these two large organisations in two different domains were not only able to use the methodology to their advantage but went on improvising.

Air France – KLM [9]

In late 2016, Europe's largest passenger airline groups, Air France – KLM chose the Scaled Agile Framework (SAFe) to reduce its time-to-market with business applications. Company decided to improve the business/IT collaboration by breaking down silos and expanding Lean-Agile practices to foster and fast-track the adoption and scaling of Agile practices through the various business areas.

They designed an Agile Release Plane (ARP, modified to fit the industry), inspired by SAFe to create a framework empowering each business domain to define their own way to reach their goals. Each business area (Commercial, Cargo, Flight and Ground Operations, Engineering & Maintenance, Finance, Human Resources) joined the ART (Agile Release Train) with its own change team named Agile Adoption Team and self-organized as a product team. As a mix of IT and business, the Adoption Team defines the specific objectives, approach, and steps to take in its domain: people to train, Agile product teams to form, coaching needed, communication plan, monitoring progress, and more.

Within three months, their efforts began to pay off in business results of 20% more effective delivery. Company released 17 times in the live environment in seven months compared to every six months previously, gained 20% market share and more.

Spotify [10]

Spotify has 140 million subscribers in 61 countries. It has announced an IPO at a $20 billion valuation. They have 150 engineering teams with 700 people with over 2,500 people in its global enterprise.

Implementing a subscription base service with fast customer acquisition, competitors eyeing to close in rapidly to take the share of the pie, you are still trying to figure out what do customers really want. What will they pay for? What is needed to be done convince someone to stop buying CDs or MP3s and instead be willing to pay for a monthly streaming subscription?

With 15 million subscriber, engineering team grew triple in size to 300 (30 teams), which seems very complicated to manage. Scaling is necessary but if you grow further, how do you stay agile? How can you keep the start-up culture that has brought success so far and prevented to turn out to be a lumbering organisation?

To come across this on a global scale, Spotify adopted an agile approach on enterprise level. Teams started to experiment with a scaling model that uses Squads, Chapters, Guilds and Tribes who aim to implement 'minimum viable bureaucracy' and balance high autonomy with high alignment. Through few workshops, agile coaches came up with a set of organizational design principles with the autonomous team as the main concept. They created the following manifesto called "Agile à la Spotify":

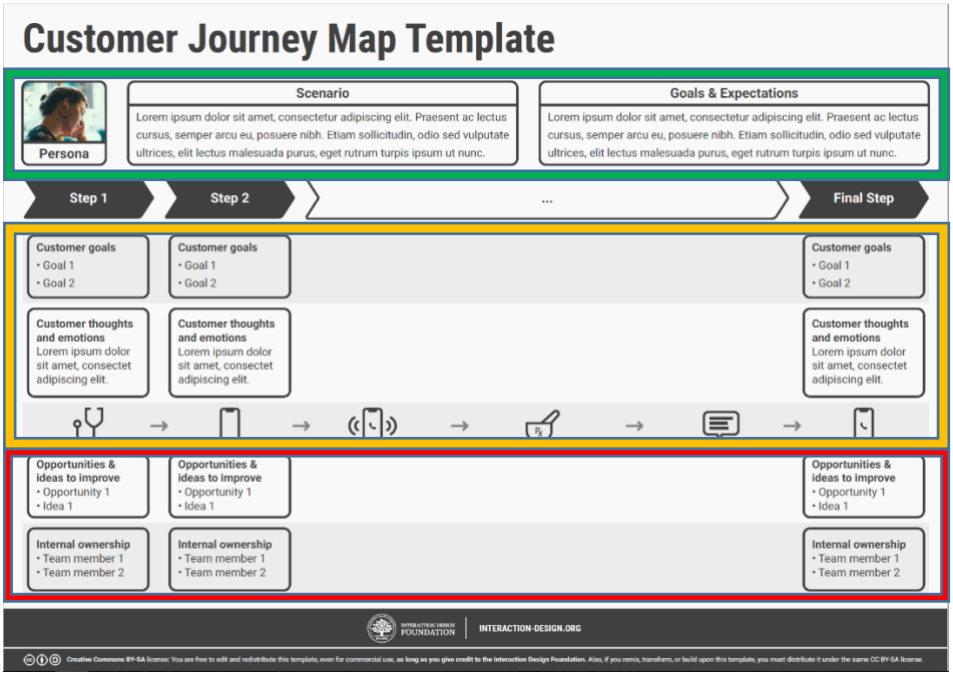
- **Continuous improvement**:
  To look for ways to endlessly progress, both personally, and in the wider organisation.
- **Iterative development**:
  Spotify believes in short learning cycles to validate assumptions as quickly as possible.
- **Simplicity**:
  Scaling is key to Spotify's success and guideline to scaling is simplicity.
- **Trust**:
  Trust our people and teams to make informed decisions about the way they work and what they work on.
- **Servant leadership**:
  Managers are focused on coaching, mentorship, and solving impediments rather than telling people what to do.

Teams are vested to fulfill their undertaking and have the autonomy to act freely.

Design Thinking and Immersive Storytelling for Modelling

Design Thinking & Journey Maps

At the centre of immersion driven design thinking is creating an empathy driven engagement with the consumer or end user. Journey Maps are modelling tools that facilitate extracting powerful insights such as a "day in the life of" that measures the customer's relationship with a business or brand, and how the business or brand is part of the customer's life, over time. Vice versa, with a little tailoring, customer journey maps can be re-engineered to be enterprise journey maps. The outcome of the exercise to develop a journey map illustrates the consumer and enterprise experience across all channels including product, retail, service and online experiences, especially digital experiences. Below is sample template for a (customer) journey map, an outline of its anatomy and an adaptation of recommended steps for developing a generic journey map and its components. [11] It is important to recognize that an enterprise can quickly translate a journey map into agile friendly user story cards.

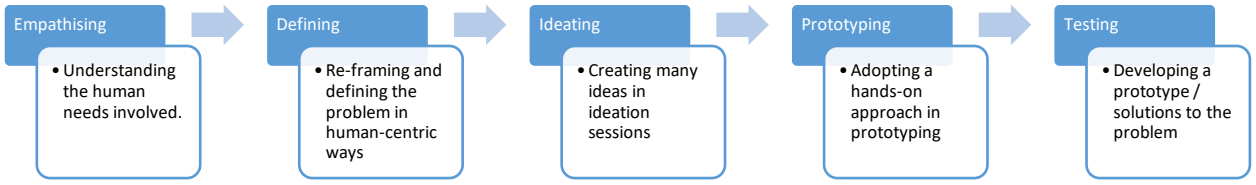


Anatomy of a journey map – Adapted from [11]	
Zone	**Components**
Top	#Scenario #Goals #Expectations
Middle	#Research #Narrative #Goals
Bottom	#Insights #Barriers #Forks #Controls

8 steps to develop journey maps - Adapted from [11]		
	Steps	**Components**
1	*Review objectives*	#Goals #Needs #Intent
2	*Perform and review user research*	#Research #Narrative #Goals
3	*Review Touchpoints and Channels*	#Map #Touchpoints (steps where interactions occur) #Channels (means of interaction)
4	*Create Empathy Map(s)*	#Interactions #Feelings #Senses #Behaviours #Outputs {Arguably: Belief, Intent. Desire => BDI Logic}
5	*Build affinity diagram*	#Brainstorm #Diagram #Relations #Together #Concepts #EmpathyMap #Group #Ideas #Label #Impact #Outputs
6	*Sketch customer journey*	#Timeline #Roadmap #Journey #Motion #Touchpoints #Channels #Timeline #Storyboard #Expectations
7	*Iterate and produce*	#Meaningful #Useful #Visuals #Graphics #Design #Awesome
8	*Distribute and utilize*	#Awareness #Communication #Measures #KPIs #Improvements #SuccessCriteria

The above introduces a simple design thinking modelling technique and is demonstrative of the power of abstraction and adaptation, which are key [tools] accelerators in design thinking, suggesting that the higher the level of detail, especially high-level design (vs. low level design), the better. Most, if not all of Design Thinking, is represented and modelled for visual communications; that's why Storyboards work, they can be quickly adapted into useful story objects (user stories, journey maps, etc.). Design Thinking at its core, is a business and technology friendly "innovation process, focused on cognitive strategic design of multidisciplinary systems, and is a relevant modelling tool for both research and development. Design thinking normally aligns and integrates best with DevOps delivery paradigms, solution-focused modelling provides a great continuous improvement mechanism that fits seamlessly well with inception and elaboration activities, effectively enhancing those processes as well. [12]

A key goal is implementation and prototyping as soon as possible to prove the architecture (and design); getting there quickly can be succinctly described – **(A)** identify the need, **(B)** stand the resources up to address the opportunity, and then **(3)** iterate. [12] While prototyping and testing are the key expected outcomes of Design Thinking, again, empathising with needs is a key differentiating feature that design thinking brings to the table. The design thinking and modelling journey is outlined in the below two figures. [13]



5 Step Design Thinking Process {Adapted from => [13]}		
	DT Steps	**Key Notes**
1	**Empathize**	• Most important and key design thinking differentiator • Role focus: User / stakeholder drive • Empathize with the problem and user needs. • Consult, observe, engage, experience, motivate, be immersed in the physical environment (deep personal engagement), human-centered design

2	**Define**	• Role focus: Designer driven
		• Establish features and functions
		• Analyze and synthesize information, problem and opportunity statements, i.e.
		  ○ "We need to increase our food-product market share among young teenage girls by 5%,"
		  ▪ A much better way to define the problem would be,
		  ○ "Teenage girls need to eat nutritious food in order to thrive, be healthy and grow." [3]
		• Resolve issues and obstacles

3	**Ideate**	• Role focus: Designer driven • Outside of the box (thinking) • Brainstorm • Gather ideas and solutions early • Use tools and techniques
4	**Prototype**	• Role focus: Developer Driven (Folding in the development team early) • Inexpensive, scaled down, feature focused • Investigative & Experimental • Success criteria driven (Benefits / Measures) • Focus Groups (External) • Iterate, improve and user driven acceptance/rejection • Identify and overcome constraints • Behaviours and interactions
5	**Test (and pilot)**	• Test prototypes • Pilot system integration and end user usage, interactions and behaviours • Alter, modify, refine problems and solutions

In addition to empathy, another key features that makes the design thinking process a robust and dynamic immersive modelling tool is how it addresses the very typical constraint of time and linear execution. These stages are not always sequential and can follow any (vs. specific) order; they can occur in parallel and should occur iteratively as required. [13]

Progressive Immersion Techniques

LEGO Serious Play - The Method (LSP)

As discussed earlier, Enterprise Agile is evolving quickly with the likes of methods and tools such as SAFe gaining popularity. Agile methodologies are maturing into scalable portfolio management, delivery and modeling capabilities. LEGO Serious Play – The Method (LSP) [14] is a next gen solution that the industry is looking to as a turnkey solution to facilitate the problem solving and solutioning by introducing the all too familiar 3D blocks that we all have touched and played with at least once in a lifetime. Coupled with Enterprise Agile techniques, innovation, modelling and design capabilities are augmented and optimized significantly. Why and when to use LSP is described well by the official site [14]:

- **"{WHY}** At its core, it is about solving complex issues by building models using LEGO bricks. The metaphors in the models serve as the basis for group discussion, knowledge sharing and problem solving and help foster creative thinking and finding unique solutions" [14]
- **"{WHEN}** Effective when there is more than one possible right answer, and when the organization wants to harness all available knowledge in the team in order not only to find the best possible solution but also to get the strongest possible commitment" [14]

What's key is that LEGO Serious Play is both a modelling tool as well as a facilitation and communication mechanism. By leveraging a model (LEGO) that we're all too familiar with as a catalyst for solutioning, all of sudden, team members can be confronted with problems or opportunities as questions by the facilitator, who then positions teams to communicate and share ideas using LEGO bricks representing ideas and solutions as physical three dimensional models, engineered to represent and generate thoughts and real time collaboration when (design) thinking. [14]

Arguably, at the heart of LSP is immersive storytelling. Given participants are all gathered together, what in essence happens as a result of this technique, visual, auditory and kinesthetic skills, the human senses are engaged, augmenting the experience, value and quality of a participant's voice in front of their peers as an audience, in effect creating (dramatic) actors. What participants probably don't realize is that LSP creates a simulated theatrical environment, complete with sets (the brick made models), actors and an audience (team members). This form of immersive modelling augments improvisational and spontaneous innovation with the added twist that LSP generates instant empathy among participants, the differentiating and first step to effective design thinking capabilities. The phases and learning process for participants is described well in LSPs official open source documentation [15]; the figures below outline the details; also LSP is aligned with the design thinking process outlined above.

3 Phases of LEGO Serious Play (LSP) {Adapted from => [15] }		
1 - Challenge	**2 - Building**	**3 - Sharing**
The facilitator poses the building challenge to the participants.	The participants build a LEGO model representing their reflections on the building challenge.	The participants share the meaning and the story that they have assigned to their own models.
• State the building challenge, purpose & set expectations • Open up reflection/dialogue • Communicate guidelines	• Build a response to the stated challenge • Assign meaning and narrative to the model • Reflect and think with senses	• Share stories and meaning • Extend reflections • Shape points of view and voice • Identify/pursue shared desires and understanding

4 Learning Process Steps: LEGO Serious Play (LSP) {Adapted from => [15] }			
LSP Steps		**Key Notes**	**Design Thinking**
1	**Explore**	People connect to what they are going to explore and begin to understand the context and meaning of what they are about to learn more about.	**Empathize**
2	**Model**	Create the product (brick model) connected to the targets of exploration, including knowledge and reflections; be creative and immerse in the use of human senses, especially via physical building with one's own hands.	**Define / Prototype**
3	**Reflect**	Reflect on what has been created, look deep into the reflections about one's own product and become self-aware of the insights that the exploration and modelling has resulted in.	**Ideate**
4	**Connect**	Connect newly gained knowledge to new explorations to pursue, effectively, continuous improvement.	**Test (and pilot)**

An Interesting observation is to note how design thinking suggests asynchronous or non-sequential execution of steps. In the case of the LSP learning process, prototyping levels up from the 4th step in design thinking to the second step in LSP.

Immersive Storytelling Use Case: Interactive Deep Dive

Interactive Deep Dive (IDD) is a think tank out of Austin Texas that is taking agility, creativity and immersion to the next level with interactive story experiences that are experienced in the physical environment, complete with role playing and chalk full of improvisation driven by a director and professional live actors. For anyone who has seen David Fincher's movie 'The Game', the creative lab experience works exactly like that, a simulation of real life, or "SimuLife" [16]:

> *"SimuLife" — an experience that uses live actors and real locations to blur the lines between fantasy and reality, mapping a fictional narrative onto the real world."* [16]

Backgrounds in a variety of disciplines and tools are involved in simulating dynamic storylines, choose your own adventure style but where the story response, including VR, education simulation, dance, traditional theater, and improv occurs both in the real world and or a staged environment as required called StoryBox, in effect used to manage the audience. Note how drama and improv is key. The StoryBox is a "14-foot square with fabric walls, outfitted with lights, cameras, and microphones that separates the audience from the narrative." [16] The Key is that StoryBox removes the audience and transforms that energy into integrating trained interactive actors as spectators into the storyline acting as participants in real time performances, used in the moment to author a story experience, recorded and monitored live.

An important differentiation is distinguishing between immersive vs. interactive. In SimuLife, the subject is actively participating as a dramatic actor, so it's not a passive interaction. Feeling, responses, decision making, and struggles occur in real time. Again, this is not to be confused with interactive

alternate reality games; there's no quest structure or critical path; the experience is about people, emotions, behaviours and relationship management of the demographic and environment that makes up the storyline's socio-economic network responding to the protagonist (or end user) motion and emotion, [16] occurring outside of a theater (real locations) or a controlled StoryBox that separates the subject from the audience.

What's happening here is the encapsulation of the problem or challenge into a story like narrative that is acted out in the real world, in essence extremely advanced and organized role playing.
Bryan Bishop, a contributor to The Verge online was invited to actually experience SimuLife over four days at the South by South West (SXSW) festival (in Austin). The narrative was called OpenMind and "told the story of a protagonist leaping between two parallel dimensions, tasked with stopping a nefarious tech genius from overtaking both worlds with an insidious thought-reading technology. The experience avoids websites and screens. Instead, the participants interact with the story and characters as part of their daily life." [17]

What's really amazing about the IDD and SimuLife experience described above is that the experience also provides for multi-dimensional modelling, reasoning, decision making and problem solving as a core component of the narrative. By being cast as a "trans-dimensional doppelganger" the subject can switch between multiple use cases or scenarios, represented as dimensions of perspective. The subject is charged with dynamically advocating for the dimension (of thought) or ideas that make most sense while being afforded with the opportunity to explore and model based on options and alternatives, again, represented as and physically acted out as actual parallel dimensions. Subjects immerse themselves into dimensional experiences A through Z instantly and on-demand. Subjects learn abstract and adapt while in different situations in real time with the added value of experiencing multiple design and modelling perspectives, by switching from dimension to dimension.

Conclusion

Adoption of enterprise agile is a huge undertaking; it affects every part of the organization. The change to an agile culture requires the learning of many new processes and practices. It is best for organizations with limited agile experience to invest in building up the agile capabilities of the development teams while simultaneously addressing the organization and cultural changes necessary to support such a change. Build proficiency in the core principles behind the framework before trying to tailor it to your situation. When considered acutely, tailoring and tools to augment agile processes are becoming more relevant today, given technology and processes are being optimized, fostering creativity, culture and art into the modelling process is becoming much easier.

Design Thinking and Immersive Storytelling are capabilities that are quickly gaining traction and popularity as next gen innovation and modelling tools. What we're seeing is that empathizing with problems, needs and opportunities as part of the modelling process creates a deeper and personal understanding of the model being proposed and designed. Immersion techniques such as LEGO Serious Play and immersive storytelling accelerate and humanize the modelling process, with empathy being the forefront goal while modelling and solutioning. More importantly, what is being realized is the role of storytelling combined with design thinking brings an extra level of creativity, artistry and culture to helping streamline ideation and innovation practices, certainly a disruptive option for enterprises seeking to become more agile, innovative and creative in modelling technology frameworks; something that can be arguably described as a form of, in future tense ➔ Immersive Modelling.

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