



## **Car Storytelling and Interaction Design**

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## Abstract

What is it about cars that make people talk so passionately? This paper considers the developments in one mechanical engineering class, Tales to Design Cars By. Storytelling provides a generative focus to explore and discover the methods of inquiry from the class and apply them to how individuals tell stories about cars, and the ways their storytelling informs a new conceptual design. A person's behavior around cars is the framework around which students tell and listen to stories as both individual and group storytellers. A mixed-method theoretical approach draws from social psychology and cognitive psychology, design thinking, and art. Findings indicate that people relate to cars in ways unlike any other object. As a result they tell car stories differently than any other story. Fundamentals of episodic memory, empathy, and collaboration were components of the students' experience and the core part of a final interactive exhibit visited by more than one hundred people. Results demonstrate broad applicability: 1) fostering communication among engineering and design students with their teams and their users, and 2) introducing a generative storytelling approach in an interaction design class.

## Introduction and Background

Today, the need for storytelling<sup>1</sup> is perhaps one of the most vibrant, yet misunderstood and underappreciated qualities of any business. Without coherent, considered storytelling, it is impossible to craft the kind of subtle brand messaging which separates winning organizations from also-rans.

Companies able to leverage the power of many minds working in conjunction to understand their user's story have a vast advantage over those that are unable to do so. Nowhere in the world is this more evident than in the hotbed of ideas that is Silicon Valley<sup>2</sup>.

One group of students at a Silicon Valley university understands particularly well what goes into fostering effective storytelling. Their course, "Tales to Design Cars By" is offered in the College of Engineering's mechanical engineering design program. Students and faculty both are car enthusiasts and non-car enthusiasts. The class features a generative storytelling experience with students defining and examining their personal car experiences, and using their findings to inform new design. These ideas are then further developed by being incorporated into an interactive exhibition that takes place in the last week of the class.

During the class students learn about themselves as the ultimate user and practice by stepping into the shoes of others. They learn to define story and narrative<sup>3</sup> in many different ways: to make sense of their car experiences, to replay memories, to communicate implied messages, to understand user interviews and to inspire insights through another person's point of view. Often this means accepting and acting on the feedback of colleagues. It means each student incorporating the ideas of other students into a coherent overall vision. Team building, product

prototyping - this is storytelling, and it is surprising how uncomfortable the modern business world is with it.

Car tales, from a variety of narrative forms, present strikingly memorable ways to access story and storytelling methods. Car research and academic courses often have a focus on engineering design, quality, and safety. Technical developments include research on test vehicles for road grade impact on GPS; and brake system requirements<sup>4,5</sup>. Many have discussed the car specifically when examining the importance of detecting a driver's emotional state for the importance of safety<sup>6</sup>, and even improving automotive safety by pairing driver emotion and car voice emotion<sup>7</sup>. Whether it is electric vehicles and range anxiety or challenges of incorporating the autonomous car into everyday urban living<sup>8,9</sup>, much of the automotive story has a fundamentally technical foundation. What has not been done, however, is study that uses storytelling methods to better allow designers and engineers to better understand the emotional impetus in transformative design.

Why use story? One of the perennial challenges in the engineering design process is to establish effective communication between and among users, designers, and engineers<sup>10</sup>. Individuals in these groups have differences in orientation<sup>11</sup>, vocabularies, and ways of thinking<sup>12</sup> about themselves and others. Communicative challenges between these groups of people have resulted in well- documented problems with connectedness and during the invention process<sup>10,13</sup>. While many techniques have been employed to facilitate interactions routes between engineers and designers, we have repeatedly seen that one technique—*stories*—have worked consistently.

Our tendency to recall stories allow for memorable communication, which leads to deeper connection<sup>14</sup>. The inability to tell a compelling story before and during the developmental stages of a project, impedes a shared team vision, and turns an ideally interactive process into a monologue. The use of story and storytelling<sup>15</sup>, defined as a real or fictionalized experience, offers a generative opportunity for genuine connection, and facilitates deeper understanding of others, through the car experiences, and within a group - all with the intent to inform new design.

Certainly, techniques in conceptual design have traditionally included the act of sketching, and outlining key characteristics of a product, service or experience early on in the design process with the goal of initiating creative reflection and planning subsequent phases<sup>16</sup>. Storytelling is a natural extension. It facilitates every aspect of the design process. The history of entrepreneurial opportunity and research show formal applications amongst other design activities in the evolution of engineering design from Boston to Silicon Valley ---- due to the way companies perceive innovation phases<sup>17</sup>.

The power of first moments in entrepreneurial storytelling<sup>18</sup> show how a degree of ambiguity in the study and teaching approach adds anticipation and preserves creation for engineering and design students. The stories students tell themselves have a powerful predictive effect independent from the reality.

The use of storytelling in the Tales to Design Cars by class makes students' latent needs and design wishes explicit through the exercises. One student engaged the group with a prototype he

built that mirrored an autonomous car driving experience. He genuinely believed that vision impedes research on the impact of the autonomous car, and tested out his theory. He constructed a design interaction with the intent to find the unspoken story of driving without vision (see Figure 7), releasing control and being steered by some other, perhaps non-human means. Methods and more detailed examples of exercises and responses will be provided in the next sections.

## **Method**

Overall, we follow a “modified research through design” approach where teaching, case studies, and preliminary narrative experiments are used to provide insights that are subsequently incorporated into a conceptual design of something new. A mixed method approach uses communication cues, and socio-cognitive psychology- specifically social proof<sup>19</sup> and art<sup>20</sup> along with reflective participant<sup>21</sup> responses to students in the class, during story interactions. In this paper, we feature the car storytelling focus of the class, provide examples of how tangible pieces of a story are featured and assessed through specific proven tools, and thereafter the impetus for the concluding interaction design showcase.

The mixed methods of psychology, art, and design thinking used in this work fulfill a dual purpose. The process of finding and telling car stories is introduced with the intent to use active storytelling by highlighting different themes as a new design is developed.

Graduate students and undergraduate students and faculty collaborate in a class group that includes both car enthusiasts and non-car enthusiasts. The common bond is their interest in story and storytelling. During class, students work closely with a mechanical engineering design instructor and a resident Automotive Historian.

While the goals and curriculum featured in this work apply to one class, methods demonstrate broad applicability: 1) story tools and car storytelling practice fostering communication among engineering students and facilitating team work for a shared vision; 2) developing a deep understanding of others, specifically their user; 3) strengthening meaning and potential for subsequent activities in the design process; and 4) designing engineering design prototypes that test and validate a story model.

## **Car Storytelling Design Process**

Drawing upon previous work, the Tell/Make/Engage (TME)<sup>22</sup> set of active storytelling reflective observation tools and validated methods are applied to the class. The course used ethnographic research, interviews, and a variety of narrative methods including verbal, non-verbal, cinema, and sound, and short collaborative projects to inform the creation of a physical prototype for a new car experience and the story around it.

Photographs, paintings, documentary and feature films used extensively, demonstrating how these different mediums convey meaning and tell stories. Students were also introduced to the

university's special archived car library collection, and encouraged to use the new resource. The moving image is particularly relevant for the study of "automobility," since each come of age during the 20<sup>th</sup> century, are about movement and social transformation. Films as "pre-work," homework, or short clips are discussed in class<sup>23,24</sup>.

The methods were specifically designed to facilitate finding and then telling car stories in three ways: the participants told individual stories, interviewed and found the stories of others, inspired to personally pursue themes inspired by media and film, and then worked collaboratively through short experiments. First, prompts were designed to result in individual narrative. This offered the students an opportunity to create a snapshot in time, and go on a kind of mental time travel – also referred to as episodic memory. Stories detailed by specific memorized facts, like time and place – is referred to as semantic memory. Methods also included ethnographic interviewing. Conducting user interviews on family, friends, and strangers about car experiences, organized around similar prompts, provided yet another opportunity to step back. This offered each participant an objective opportunity to learn from another person's car experience point of view. Finally, the active storytelling and the findings as 'stories' helped the group get to know each other as a person and inspired collaborative work.

The motoring adventures of others often help us evoke our own, and in the class we used some great reference material: the 1936 Chevrolet sedan featured in the Mason Williams' "Auto-Biography," the race cars in the opening sequence of the 1971 film *Le Mans*, or the eerie anonymity of the Chevy Impala in the film *Drive*, "the most popular car in California." In the process, we were touched by how car stories teach us about relationships -- our own and between others.

Student work indicated that people relate to cars in ways unlike any other object. As a result they tell car stories differently than any other story. Multiple elements contribute to this. Chief among them: a car provides a confined space that encourages but never forces interaction. Because the vehicle takes its occupant on a journey, it becomes a natural mechanism for storytelling. Inspired by cinema, video, road trips, interview and observations, the students learned about the art of finding and telling car stories. Episodic memory, empathy, and collaboration become key components of the students' storytelling experience. Those fundamentals combined with the classroom sessions and individual assignments became the core part of a final interactive showcase which took more than one hundred visitors through five different stations each examining cars, driving and the mobility experience from a different perspective.

## **Findings as Stories**

We found that when you ask a diverse group, in this case, students from - China, Korea, India, Mexico, Saudi Arabia, Pakistan, and the United States – to design a car experience, you hear the most amazing stories. Sharing unfamiliar yet similar experiences of the car in class discussion resulted in a warm, welcoming space for imagining, making, and building the final exhibit. Often the most compelling stories<sup>15</sup> are those told by self-identified "non-carguys" - people who see cars as appliances/tools rather than having a strong emotional connection with them.

One assignment required that students use ethnographic interview techniques. They interviewed each other, friends, and family using one question, “tell me a story of a car adventure.” Story results varied: dad applied discipline and reward to teach his daughter and son to drive; painstakingly learning how to accelerate from on an off-ramp onto the highway; high school friends during an after school activity drove in different cars resulting in persistent taunting, trying to resist racing up a windy mountain; sand surfing with exotic and luxurious cars in Saudi Arabia; family road trip from Rhode Island to Arizona; and romantic, first-love memories sitting in a bench seat in a grandparent’s old pick-up truck. Extensive discussion and reflection of story results by the students indicated images and themes in the following categories: Road Trip, Racing, Romance, Family, Danger, Accomplishment and Teamwork. These divergent themes were part of a focus for the interaction design showcase, features in the last section of the paper.

### **Students learn lessons in empathy**

In empathy we are capable of relating with another person and experiencing what they feel. During classes, we set up an environment to allow students to learn about empathy through a variety of experiences, provoking some wild insights, all driving toward learning about storytelling at the heart of the automobile experience.

In one memorable case, empathy took on some very interesting physical forms. In one of our user interviews, something surprising shined through that really made everyone think. It was an interview with a young woman engineer and graduate student who talked about how complicated driving was for her if she ‘wasn’t’ wearing high-heeled shoes. The males in our class were visibly dumbfounded. In her words, no car was made with her in mind. As it turns out, driving without heels presented a problem for her. In wearing low-heeled shoes, or flats, or going barefoot, her foot didn’t actually rest on the floor of the car. Rather, it floated above the pedal. A heel was the only way to get that ‘bridge’ to make contact with the pedal and for her foot to rest firmly on the floor of the vehicle.

As shocking as it sounds, wearing high-heels was actually the most comfortable driving setup for her. The male students, in a state of disbelief, volunteered to step into her shoes, quite literally -- and the shoes of high heel wearing women everywhere -- by squeezing into high-heeled pumps. To further simulate the experience, the male students gallantly promised to walk the distance to the van, over in a distant part of campus.

This presented us with a profound learning opportunity. We brought in a variety of (very large sized) women’s pumps and had our male students experience the wonders of driving a car with a heel (see Figure 1) that doesn’t make contact with the floor (or, rather, does so via a 5-inch heel).



*Figure 1. No faces allowed – only a leg shot to show his driving experience; squeezed into ‘her’ 5-inch high-heeled pumps.*

One student’s comment exceeded our expectations for learning about empathy, “It’s easier to drive in these things that it is to walk in them.” “It made me feel silly that I didn’t know that a female’s driving experience was so different from a male’s. I can’t believe I hadn’t thought about that before, nor had I really given much thought to a woman’s experience in general.”

### **Car stories are about relationships**

When ‘first experiences’ was a focal point for students to tap into episodic and semantic memory; the car becomes the reliable vehicle for time travel. Emotional development, nostalgia, and family ties are themes that paint vivid, active pictures. While these are all unique stories, it’s revealing to find and blend common themes among them. Below are two examples of stories that tumbled forth in working sessions:

#### *A ride on grandmother’s lap in Nanjing:*

“Bouncing up and down on my Grandma’s lap, I thought I was going to fall out into the night markets. Pretty lanterns and pungent smells blurred past me as our moto-rickshaw took us through the Nanjing streets.”

#### *Driving a sibling rivalry:*

"I will always recall the thrill of racing against my brother in my favorite electric blue race car. The most intense moments would occur as we zoomed towards that all-important last corner, jockeying for pole position as we neared the finish. With the wind rushing through my hair, I would floor the pedal.... making the most of the preceding slope, gathering speed..."

The stories are real, but sometimes the perception of this memory is stronger than reality. Take, for instance, the awe-struck five year old, pushing the magic buttons in a James Bond show car, only to grow up and learn those features were fiction and therefore absent from other cars. Or, consider a little boy laughing as he connects with his Dad bumping magically down the road in the big red truck. Sometimes the car in a story personifies a personal relationship.

It is noted that out of the many stories that were told as part of this specific exercise in the class, there are some emerging themes. It was determined that those associated with a family member

or of a close personal relationship were told more often than others. The observation that family is a commonly occurring theme indicates that these stories are worth telling due to the family component, rather than the car itself. The car is a medium through which the story is experienced, but fundamentally the story is about family.

*Beautiful and utterly boring* -Danger, aesthetics and price collide:

“I don’t think I like nice cars the same way other people do. Brand new, perfectly clean cars look nice, but what adventures could they possibly have endured without a single dent to show for it? These cars are the trophy wives of the automotive world. Beautiful and utterly boring. And while I admire nothing more than good engineering, I feel like expensive are too often used to say something, and I don’t like what they’re saying. My favorite cars have always been a little beat-up. Rustic. *Smelly*.”

Car stories are some of the fastest mechanisms we have to get people to talk about themselves and their relationships. Because cars are about travel, often with someone else, car stories reveal something about the dynamic relationship of the storyteller and their relationship with others. These stories are rich because the car offers us an opportunity to go back to another time, reflect on memorized aspects of a significant relationship, and then take us to a new point of view.

### **Car Conversations**

In one class experiment, our focus on car conversations began with the prompt, “Imagine that you are taking a road trip.” And so, the entire class (of eight) piled into the shiny red, exquisite, vintage Chevrolet, 1954 truck (see Figure 2) and recreated the nostalgia of driving in cars with others with projective cue prompts such as “You are driving your university team to a meet that’s six hours away.”

We added a sensory cue in the form of everyday road sounds, unknown to the students, with the aid of a computer planted in the front passenger seat. During planned moments into the ‘road trip experience’ two different sounds emanated: beeping horns during sounds of bumper-to-bumper traffic; and a police car’s unmistakable siren- with a booming police officer’s voice demand, “Pull over!”

Additional experiments were performed where the projective cue and sensory cues were varied. These experiments showed that regardless of the cue, similar responses were evoked among the group, regardless of the context. It also reiterates that car conversations are influenced greatly by the topics of conversation and the external circumstances the group is placed in. Cars are unique in delivering this experience.





*Figure 2. Class participants engaged in a role-play scenario within the 1954 Chevy. During the road-trip, the team captain drove his ultimate Frisbee team to a meet. Every student reported later that they could feel the captain's frustration in the recreation of the effort to get everyone ready on time, lead them into a seat in the truck, and remain calm during the sounds of congested traffic. His conversation sounded stressed and his voice strained, "We all want to do well today when we compete, don't we?" Even after hearing, "Oh no, we are being pulled over by a cop," They agreed, "It's worth the six hour road trip to win as a team."*

### **Discussion of Interactions at Showcase**

Fundamentals of the classroom sessions and individual homework led to an interactive showcase for more than one hundred visitors. The opening moments began with an activity inspired by the themes and images that emerges during the aforementioned class ethnographic interview assignment.

Imagine being invited to pair up with a stranger, sit in the car seat, and respond to prompts, the first of which is to "Draw a picture of a car adventure." Visitors of all ages enjoyed making and interpreting stick figure drawings on large, bright, red and blue paper post-its. They took turns as driver and passenger and talked to each other about what it was like to sit in the other person's seat – to visit another person's adventure story. Then, they attached the post-its onto a large moveable white board wall (not visible to the participants while they were sketching) in the appropriate category based on class ethnographic results: Road Trip, Racing, Romance, Family, Danger, Accomplishment and Teamwork. The distribution of these among the respondents is shown in Figure 3. Most respondent images depicted the relationship themes of Road Trip and Family.

Visitor response showed that the large majority of women participants drew pictures depicting Danger and Romance. While the category of Danger included depictions by both males and females, all Romance pictures were drawn by female participants. Not surprisingly, men told Racing and Teamwork adventure stories. Yet, there appeared to be a balance between the genders telling Road Trip, Accomplishment and Family stories. The distribution of these themes (see Figure 4) is illustrated by the type of picture drawn by women.

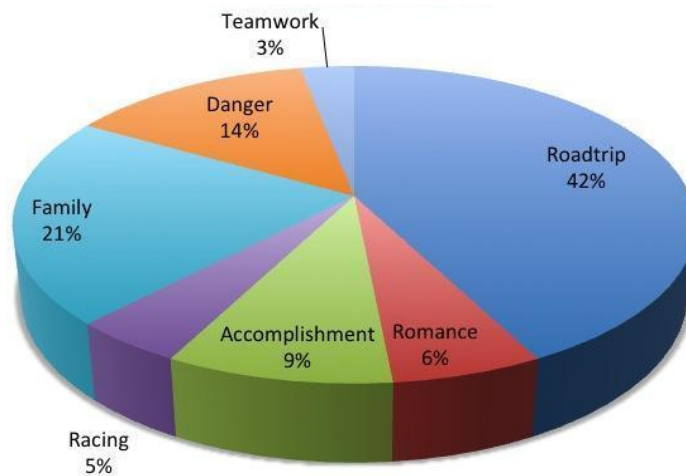


Figure 3: Percentage of car adventure themes chosen by the participants at the showcase



Figure 4: The figure shows distribution of response between male and female based on their choice of car adventure themes. For ease of interpretation, the results are shown as percentages of female respondents. The vertical axis corresponds to car adventure themes.

Sample drawing image results from the draw-a-picture test included in categories:

- Road Trip - happy daughter driving with mom and dad
- Racing - rear view of two drivers intently peering at the pedometer
- Romance - abstraction of cars driving down different roads arriving at same destination
- Family – happy family in a convertible driving off in the sunset
- Danger - boat view in rough water rapids with a car waiting on the lands end
- Accomplishment - female changing a tire after a blow-out
- Teamwork - van of a team, singing, on a winding road up to a swim and/or track meet



*Figure 5. The vacuum-formed cars, integral to the car building experience as shown in Figure 3, after being freshly painted racing yellow.*

The draw-a-picture exercise was just the beginning of a paired car storytelling opportunity. There were multiple other audience touch points: Build a Car (See Figure 5); commemorating the “garagiste” era of Formula 1, when small, independent teams were able to win against Ferrari and Maserati using “off the shelf” components allied with their design ingenuity, tenacity and will to win.

Co-Maneuver the Autonomous car (See Figure 6, 7); and finally, sit in the mechanically altered moving seats in a room designed to feel like a race-track as you ‘race’ the car you built on the road of your dreams. Each duo lived the racing adventure together while hearing the unmistakable sounds of a race track roaring in the background: screeching tires and the whistle of a turbo-charged engine, all the while they bounced up and down as they sat, poised to race, in the mechanically adjusted bucket seats. Men and women of all ages focused intently on a raceway of their choice: a windy and scenic mountainous road or a famous track, depicted on the large screen, and talked back-and-forth to each other while accelerating hard on the pedal. But speed wasn’t their only answer. One male driver was overheard kindly saying to his female passenger, “I need to drive and race slower so that I can hear what you are saying.”



*Figure 6. Two participants test the “autonomous car” phase of the interactive exhibition. During this portion of the immersive and comprehensive car experience, one of the participants is given limited field of vision and gets the experience of being driven in an autonomous car.*

## Summary and Implications

The art of car storytelling helps us get to a core value that is once surprising and inspiring for our future work. Participants realize that they are amazing storytellers. Their capacity for finding and telling great car stories translates to personal and professional goals. Implications for life during and after the academy include multiple parallels: 1) we know that car stories are about relationships and remember how the people we share car experiences with make us feel; 2) stories help us understand someone on an individual level because we have been invited to step into their shoes. This helps us map themes from the developmental stages of relationships to the developmental stages of a project; 3) finding your personal car story boosts confidence and enhances a capacity to find and tell another person's story, with applications in research and product development. 4) Compelling stories teach us about some of the most potent yet hard to define intangibles of engagement. Finally, 5) story is the great equalizer in a group. Car storytelling sets us up natural ways for hearing and thus embracing other people's ideas. Surprise. Some of the most unexpected things happen, which leads to new design.

Further work and compilation is necessary to understand the full impact of the car storytelling curriculum and results. Why *do* people tell car stories differently than any other story? Storytelling provides a generative focus to explore and discover the methods of inquiry from the class and begin to apply them to how individuals tell stories about cars, and the ways their storytelling informs design. Findings here have only scratched the surface. While the final showcase featured in this work, received more than 100 participating visitors, and included new design moments – specifically with the creative autonomous car experiment (in Fig. 7) and the expedition opportunity to see and feel as if driving an autonomous car (see Fig. 6), the overall impact lacked the connectivity and flow of exhibition and interaction design potential. Perhaps, the class needed to spend less time diverging on the details of making the garagiste design, building and painting the specific cars, and more time converging in on planning the themes behind the design interventions, featured during the showcase.

Questions persist. Specifically, since the introductory “draw-a-picture” of a car adventure exercise set an outstanding stage for the student leaders of the garagiste events, why were some participants unclear about the next-step instructions? Clarity of planning for the interaction design initiative and in the moment, student leadership, while strong, needed improvement. Both the interaction design work and meaning of making the cars, featuring the theme of racing, to the later connection to the autonomous driving experience, with the finale of the duo living the car racing experience together, though compelling, was, at times, lost on the participants.



*Figure 7. Designers perform a test run of the autonomous car experiment to work out the parameters and identify potential issues with the experiment, while individuals look over the preparation session.*

Finally, applications from teaching this one particular class, offers suggestions for learning outcomes in other engineering and engineering design classes. Future work might develop and detail specific course goals and further consider an added focus on gender and technology and emotions. For example, learning outcomes might include specific statements.

After taking the course students should: Have experienced interaction design; Be able to develop, identify, and inspire effective personal and team storytelling; Design models that preserve real and fictionalized past and future car stories; Qualitatively and quantifiably define a car story by designing an exhibition experience; Represent opposing design goals such as change through beauty and sustainability; and Use media in multiple forms to inform a new design experience.

In the end, a great story yields extraordinary results. How evident in the case of the car storytelling class, because it offers the students' an opportunity to experience interaction design, and learn the principles of making and doing design work. This work shows that incremental new work – or innovation – is created by cross-functional collaboration. The students, through the power of car storytelling in the interaction design showcase, created insightful and lasting stories that provide a preliminary direction necessary to guide an expansive and meaningful design effort –those that gets at the heart of a mesmerizing story.

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