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Research story telling: using the research journey map to communicate information, data, systems, and artifacts

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Abstract

The Research Journey Map is introduced to guide researchers on creating engaging, meaningful and impactful presentations and publications. Built on the foundational work of the Hero's Journey by Joseph Campbell, this template helps technical researchers communicate information, data, systems and artifacts that result from research so that audiences grasp and embrace the research findings.

Keywords: communication, storytelling, design informatics

1. Introduction

Many researchers find themselves with a dilemma – on one hand they know that the research they have done is meaningful. They have put countless hours thinking about and exploring the work, and they believe strongly that the work is important and can be impactful. Yet other colleagues do not seem to pay attention, or appreciate the insights from the work. Paper reviews may be supportive, but without enthusiasm. Audiences politely sit through their presentation but quickly focus on their cell phones, or maybe shut their eyes.

The problem for those researchers may not be that their work is unimportant, but rather that their approach to communication is lacking. In the current research environment of massive data and complex algorithms, the conclusions declared are only part of the research puzzle. How to draw insights from those conclusions and communicate them to others in a way that is accessible, engaging and actionable is equally important if the work is to have impact.

This paper presents a method for describing the research journey so that every researcher can deliver an effective message from successful research.

The importance and power of narrative in science has been studied in the literature. Oschatz and Marker (2020) highlight the ability of a narrative to capture audiences mentally and emotionally. Importantly they found that impact is seen immediately after exposure to the narrative but also that its persuasive power is persistent over time. Green and Brock (2000), demonstrate that absorption into a story through imagery, affect, and attentional focus - called transportation - resulted in readers finding fewer false statements in a story than less-transported readers, whereas reduced transportation resulted in reduced story-consistent beliefs and evaluations. Downs (2014) focuses on communicating science to a broad audience but states "use of narrative helps to convey scientific findings in a coherent manner that can help the audience better understand and remember complex processes that are otherwise difficult to explain." Although these works focused on science, their findings motive good story telling in the broader area of design.

The roots of the method I introduce in this paper stems back to Joseph Campbell who published *The Hero with a Thousand Faces* in 1949 (Campbell, 1949). Campbell's own research resulted in a work

of comparative mythology in which he discussed his theory of the mythological structure of the journey of the archetypal hero found in world myths. Through this work he introduced what he called "the Hero's Journey." Campbell's theory, a concept of monomyth, or one myth, considers all mythic storylines as variations of a single meta story. The theory is based on the insight that a common pattern exists within most great myths, regardless of their origin or when they were created.

Campbell's work has heavily influenced film, video games, and the literature. Its roots can be found in great works such as Tolkien's Lord of the Rings, Lucas's Star Wars, Baum's The Wonderful Wizard of Oz, Homer's The Odyssey, most Disney films, and more.

Christopher Vogler, having worked in script writing and production, later provided a template for those fiction writers in theatre and film to apply Campbell's Hero Journey to their work in *The Writers Journey: Mythic Structure for Writers* (Vogler, 2007). Vogler called out 12 steps to the Hero's Journey:

- Ordinary World – the current state
- Call to Adventure – the need for the hero to address a problem through a journey
- Reluctant– the hesitancy to take on the task
- Meet the Mentor – someone who guides and motivates the hero to take on the task
- Cross the Threshold – the start of the journey into the extraordinary world
- Test, Allies, and Enemies – confrontations along the way that teach, mature, provide insights, and test the resilience of the hero
- Approach the In-Most Cave – the transition to meet the challenger
- The Ordeal – the culmination of the journey where the hero conquers the nemesis
- The Reward – the achievement is won
- The Road Back – the path back to the ordinary world
- Resurrection – the satisfaction of the achievement and the change of the inner-self from the journey
- Return with the Elixir – the transition into the transformed ordinary world

Consider Tolkien's *Lord of the Rings*, an epic trilogy written in 1954 (Tolkien, 1954):

- Ordinary World – the Shire where hobbits, including Frodo, are happy and without worry
- Call to Adventure – The wizard Gandalf warns Frodo to leave the Shire and return the Ring to its source, else face continued pursuit of the Dark Lord Sauron
- Reluctant – Frodo resists wanting to leave his home in the Shire (for hobbits do not like adventure), but agrees to do so with several hobbit friends
- Meet the Mentor – Although Gandalf guides Frodo and his friends, Frodo meets a Ranger named Strider, who turns out to be Aragorn, the rightful King of Gondor.
- Cross the Threshold – Frodo and friends meet Aragon at the Inn of The Prancing Pony, the transition point from the ordinary world into the start of the journey into the extraordinary world. Frodo and friends join up with elves and dwarfs and together journey to Mordor.
- Test, Allies, and Enemies – There are many confrontations along the way that test Frodo, as he pursues the journey, under pursuit of Sauron, and under the spell of the Ring. There are more mentors that Frodo meets including Elf-queen Galadriel who guides Frodo to eventually go alone to the final quest at Mordor (although Frodo is joined, guided and saved by his friend Samwise).
- Approach the In-Most Cave – Frodo and Sam reach the cave entrance to the fires of Mordor.
- The Ordeal – In the furnace of Mordor, Frodo confronts the force of Sauron, the power of the Ring, and the physical and mental exhaustion of the journey.
- The Reward – Frodo throws the Ring into the furnace where it melts. All is now aligned and great in the world again.
- The Road Back – After celebration the hobbits return to the Shire, which was unaware of the possible end of all that is good.
- Resurrection – Each of the hobbits has gown, matured, and feel personally rewarded for having saved the world.

- Return with the Elixir – After they return to the Shire, their ordinary world, Sam finally asks his crush out and they marry. For Frodo though, the ordinary world is no longer a place that he can enjoy, so he joins Gandalf and travels to Valinor, the Undying Lands.

Clearly a lot more happens in the brilliant trilogy, but the basic story line is provided and maps directly onto Campbell and Vogler's "Hero Journey". But, the question is how does all this inform the researcher on how to impart the wisdom of their research through their communications? For research is not fiction, and good research is not a fantasy. For that I introduce the Research Journey Map.

2. The research journey map

In Figure 1 I present the Research Journey Map - a template for research story telling. My hypothesis is that a thoughtful application of this journey can turn an ordinary research presentation (paper or talk) into an extraordinary one. The ability to tell a story is the difference between a mundane presentation of facts and a communication that engages the audience. It is important to note that the facts still need to exist. The goal is not to hide a mediocre or wrong piece of research behind a cloak, but rather to present science or engineering in a clear, informative and convincing way.

Know your audience

In the Research Journey the first task is to know your audience: Who is the audience? What is their interest in this work? These questions are important to ask before embarking on the journey. The task of the presenter is then to understand the needs and interests of this audience, and to answer the questions along the journey through that perspective.

Ordinary World, the Call, Mentors

The journey starts in the ordinary world – the current state of the system or environment before the research takes place – and to motivate the journey: What is the Problem? Why is it important? Who cares about it? This is the time that the researcher must help the audience decide if the problem is worth addressing, and it may refer to experts or even the news to mentor or inform the researcher.

Reluctance and the Threshold

The next step is to define the problem by clearly articulating what is missing today in solving the problem. I call this this a Research Gap Opportunity (RGO), a gap between what exists today and what the state could be if the research were successful. This concept leverages the idea of the Product Opportunity Gap (POG) from Cagan and Vogel (2002) when defining the opportunity to fill a gap in the marketplace between products that exist and the needs, wants and desires of the customer. Here the researcher communicates: How does prior work (e.g., the literature) not address the desired results for a system or environment? Why do current solutions not work? The point is to motivate research that is worth pursuing and make the decision to move forward on the journey from the current (ordinary) world, into the extraordinary world of research activities. The clear objectives or goals of the work must now be articulated. What does your work set out to do to address the RGO? What are your conjectures, hypotheses, and/or goals?

Tests, Allies, Enemies; Approach to innermost Cave; Ordeal; Reward

Next is when the presenter describes the science or creation of an engineered system or artifact that took place, the research process. Research is a journey that describes a method that leads to data from which insights are gained. This part of the presentation focuses on the means to move from Goals to Results. It is important to stick to the main final path, rather than give a history of how the final outcome was achieved. The path should go from step A to step N, highlighting only the important steps and findings along the way. Avoid offshoots unless, and only unless, those offshoots are important to final results.

Here is where researchers often lose their audience. In a spoken presentation avoid text and primarily use sketches and diagrams to describe the journey. Speak to the visuals rather than read text; this means the presenter (you) needs to know what you are going to say and how to do so efficiently, with confidence and energy. However, even in a paper, stay with the journey, and use figures to illustrate the important points. As a side note, many reviewers and readers will "read" the figures before reading any text. And if you have text or figures that are different than your narrative, you will lose the audience. So use them wisely and with attention.

This part of the journey does not have to include every detail, but it does need to demonstrate the core methods and provide evidence of research validity. Here is where the work will undergo the biggest

scrutiny. The work is tested, critics (enemies) emerge, allies (positive reviewers and readers) support the work. This is the "innermost cave" meaning the essence of your work. The researcher has gone through the ordeal through mental and physical effort to achieve results. The reward is the insights that will be gained and contributions made to the literature or to the audience.

The Road Back; Resurrection, Return with the Elixir

Finally, the results are assessed and their meaning communicated. What are your findings? How do they meet the goals? How do they address the Research Gap Opportunity? And what is particularly important to your audience about them? This last question is the most critical. What will people fundamentally learn and use from your work? At most the audience or reader should have three main take-aways. What are they, based on your results?
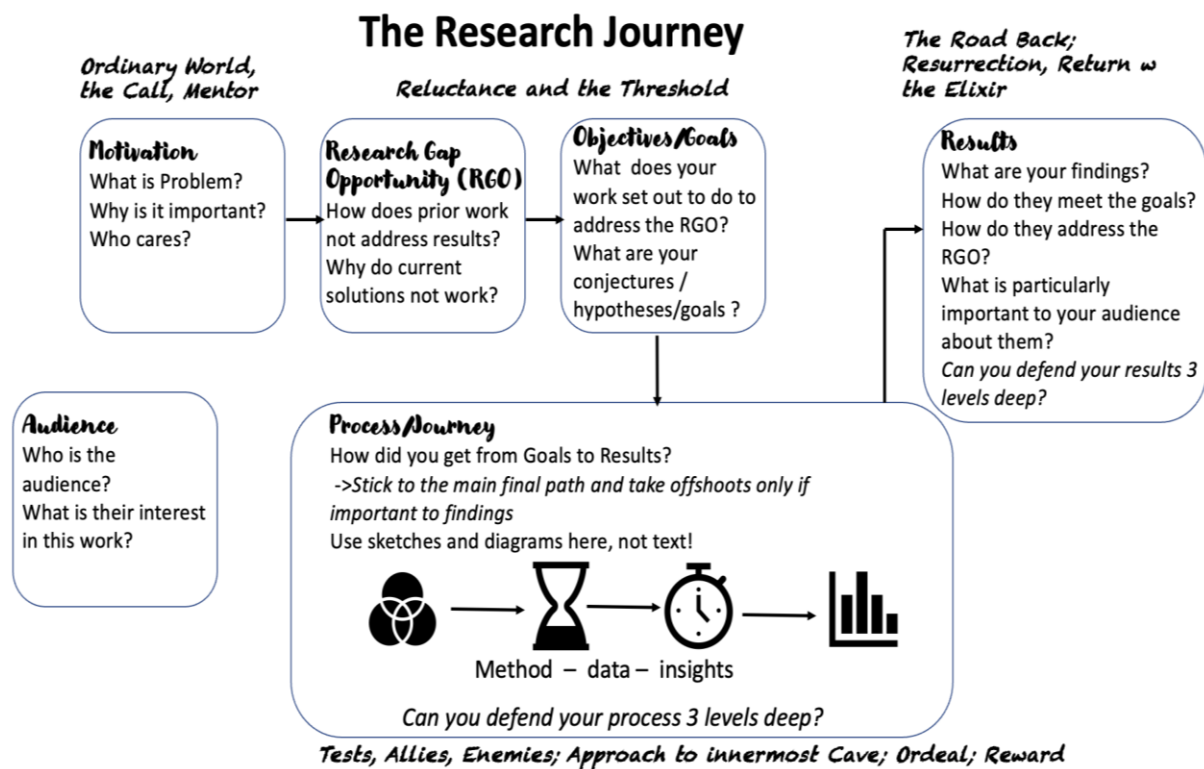

Figure 1. The research journey map

3. Example research journey

An application of the Research Journey Map is seen in Figure 2. Here Kabuye, et al., 2023, identified that surgical procedures were a cause of significant medical errors and even deaths. Medical students relied on cadavers and then moved into surgical rotations and fellowships. The cadavers were limited in dynamic response, and at times of limited availability. An alternative emerging technology was using virtual reality, but there the haptics were missing so the surgeon was essentially cutting into air. Kabuye, et al., took on the challenge of envisioning a new type of environment where the user was in a surgical environment, looked at realistic models of surgical sites using Augmented Reality (AR), performed a procedure that they saw through the AR goggles, and felt the haptic response of cutting into tissue.

Kabuye, et al., took on a research journey of leveraging 3D bioprinted models using collagen, created from cadaver CAD models. Those same models could be projected into the AR environment. A flexible IMU sensor would be embedded into a scalpel so the cutting procedure can be precisely tracked. The surgeon would see the surgical site, cut into the bioprint, feel the accurate and realistic haptic response, and the see the CAD model respond accordingly. This technology could change how surgeons are trained and even provide the opportunity to help surgeons plan surgical paths in new cases with scans of the body.
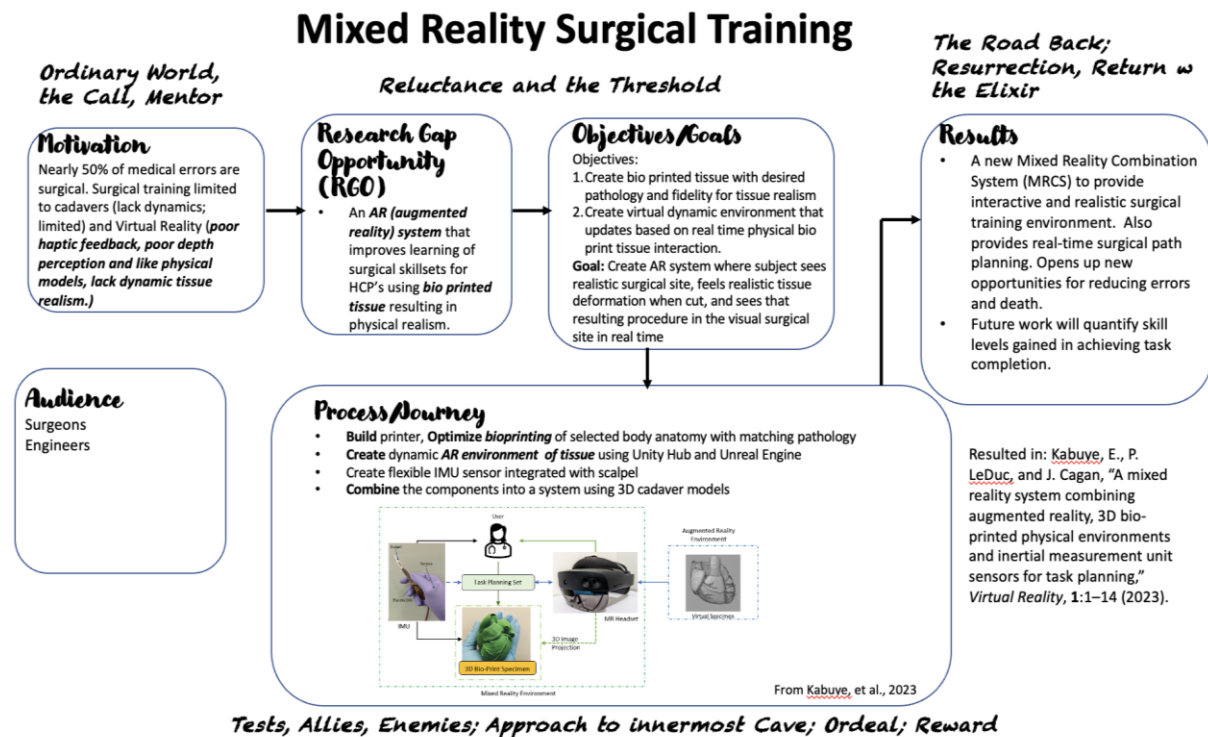
Figure 2. Example research journey for a mixed reality surgical training project (Kabuye, et al., 2023)

4. Discussion

A template to think about a meaningful way to create a research presentation or write a research publication is presented in this paper. The Research Journey Map builds on the basis for some of the most well-known fantasy epics, projecting in this use a message that is accurate, supported, and engaging. Any researcher can use this process as they set out to develop their research communications. I have a few final comments:

One heuristic I use in assessing my claims is whether I can defend my results 3 levels deep. In other words, if I make a claim (level 1), what might a critic challenge me with and what response would I make (level 2), and then what might that critic challenge me with based on my response and again what response would I make to that (level 3)? If I can legitimately respond at that third level, then my presentation is solid, and my work is as well.

Another heuristic I like to use it is to offer a surprise in my presentation, an unexpected finding or insight that is not obvious, or is particularly applicable. Audiences tend to remember research and even sum it up from such surprising findings. If delivered at key points in the talk or paper, it will help keep the reader or listener engaged and eager to see what is next in the journey.

I stated that every presentation should have no more than three take-aways. Here are mine:

1. Motivate and assess your work with Research Gap Opportunities.
2. Use the Research Journey Map to design your communication.
3. Know your audience and create communications that will be meaningful and engaging to them.

The one other heuristic I like to use is to enjoy not only the research journey but the presentation journey as well.

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