The Future of Disease Detection: CRISPR's Breakthrough

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Abstract

In this Essay, I find a research essay about CRISPR and translate it into a non-academic writing genre. The genre chosen is TED talk speech. I write a reflective essay about the process of translating a peer-reviewed academic paper into a TED Talk script, focusing on the choices made during this genre shift. The essay reflects on the challenges of simplifying technical terms while maintaining accuracy, the importance of storytelling in the TED Talk format, and the adjustments made to cater to the audience's expectations. This essay also discussed the difference between academic writing and non-academic writing from many different aspects, including audience and purpose of each type of genre. Also, the challenge I faced and the skill I used are also discussed in this essay.

TRANSLATION: The TED Talk Speech Script

Hello, how is everyone going? Fine? OK. Now I'm going to start by talking about the covid-19 crisis that impacted the entire world. I can still remember how each of us had to go to the testing spot, line up and wait for COVID-19 nucleic acid testing. That was not an exciting experience, right? The traditional to test COVID-19 is called qPCR, a complicated, expensive, lab-based method. However, what if I tell you that one day in the future, you won't have to go to a hospital or testing site? Only with a small device at home, you could find out if you are infected by a virus. That sounds like a sci-fic movie, doesn't it? To make this a reality, many scientists tried applying a new technology to this field. It has an interesting name – CRISPR. Some of you may hear about this name – it's widely known as a part of gene-editing engineering, which seems very distant from us -, but what you may not know is that it is also rapidly advancing medical diagnostics. Especially during the COVID-19 pandemic, CRISPR technology was quickly used to develop cost-effective, fast, and accurate testing tools.

Then, here comes the most important question: how does this work? To answer it, we need to first get to know about CRISPR and viruses. CRISPR can be defined as genome editing tool which can allows researchers to modify DNA sequence or induce a mutation for lots of organisms, including animals and plants. A virus is a simple creature containing DNA or RNA encased in a protein shell. During the research, scientists found that a type of CRISPR, named as Cas12, can be used to detect RNA or DNA of a virus. Cas12 is originally a natural system of bacteria that used to defend virus. However, researchers discovered that they could guide Cas12 proteins to locate specific viral or bacterial gene fragments. It's like a smart robot who has a scissors, it can look for a targeted DNA fragments and cut it off. When the viral gene is

targeted, the CRISPR proteins will send out signals that could be detected by chemical indicator. Speaking in a simpler way, the test device will glow if the specific virus existed. If we borrow that earlier analogy of a robot, the scissors robot will become very exciting if it can find something to cut and let everyone know.

Remember what I mentioned about COVID-19? CRISPR diagnostic tools can detect SARS-CoV-2 and its variants! Also, these tools are much more economy-efficient than many traditional diagnostic methods. Also, if we can spend more time researching this technology, it could be expanded to detect more viruses. Let's imagine a future that's a little bit ahead, what if we could detect diseases before symptoms appear? That would be a massive breakthrough for medicine and diagnostics. It is a very exciting new for both of us, we can get huge benefits from it.

The most frightening aspect of a virus is its ability to spread. Can you imagine how convenient it would be if one day we could detect viruses using just a small device? It would revolutionize outbreak control. The future of CRISPR is a future of possibilities! When that day comes, we will no longer fear viruses.

Reflection

I translated an academic writing, “CRISPR diagnostics” into a TED Talk speech. The research paper is a peer-reviewed journal focusing on CRISPR-based diagnostics, which involves complex scientific concepts. The translation of the research article requires a skill of explaining academic concepts in a more understandable way to broader the audience of this academic writing. The goal of the writing project is to help knowing more types of writing genre, understanding each the difference between each type of genre, and exploring more academics topic to write about.

During the translation, the key point to consider is the audience shifting between different type of writing. The original paper was written for researchers familiar with CRISPR technology and molecular diagnostics. In contrast, TED Talks aims to a wide-ranging audience, including individuals with little to no scientific background.

The reason for choosing TED Talks as my translating genre is simple: TED Talks are known for their engaging, story-driven approach to presenting complex ideas. Also, the aiming of TED Talk - to inform and educate global audiences in an accessible way[2] is really attracting. I believed that this genre would effectively communicate the scientific findings from the original research paper to a broader audience because I can make a speech in a very oral style and share personal experience that is associated with my audience. Also, the aiming of TED also inspired me to write many encouraging words in the translation to excite my audience.

I used many translation techniques in my translation. The shift from academic article to TED talk required me to significantly adjust the level of technical detail in the script. In the original text, many biological terms are not explained. It means that understanding the essay relied

heavily on the audience's assumed prior knowledge, but in the TED Talk, I needed to explain complex concepts in a way that non-specialists could understand. For example, in the TED Talk script, I gave many definitions of those academic concepts, such as CRISPR, virus and Cas12. I used many simple words to explain those terms, such as "creature," "defend," and "tool." This change allowed the audience to understand the complex terms and to follow the speech without needing a deep understanding of molecular biology.

In the TED Talk speech, I began by referencing a shared experience from the COVID-19 pandemic – standing in a line and waiting for the tests. This opening not only captured the audience's attention but also made the topic more relatable.

When integrating content from the original academic text into the TED Talk, I made several key decisions about what to keep and what to modify. The first thing I did is to find a significant point that can make my topic more attracting and associated with the audiences. The idea that this technology can revolutionize diagnostics by providing rapid, low-cost testing for diseases is what I chose. In the whole translation script, I focused translating the part in the article that talks about the efficiency of CRISPR Cas12, such as the comparation between qPCR and the new technology. However, I had to simplify and reduce the parts that talking about the research methods and technical details. For instance, while the original paper included a thorough discussion of various CRISPR systems (Cas9, Cas12, Cas13), I chose to focus only on Cas12 for simplicity and clarity.

For what I had added, many personal touches that were not present in the academic paper is put in the speech. TED Talks often feature the speaker's voice and personal perspective, so I used a conversational tone and addressed the audience directly. Also, addressing my point

multiple times in different way can keep my audience to follow my speech. Like what Reid (2011) wrote in his article, the core idea of the essay needs to appear early and often, and key words may be used to connect your idea. For example, I posed rhetorical questions like, “Can you imagine how convenient it would be if one day we could detect viruses using just a small device? It would revolutionize outbreak control.” to encourage the audience to think about the real-world implications of the technology. These ending also reinforce my statements.

One of the primary challenges I faced was ensuring that the simplified explanations did not compromise the scientific accuracy of the content. In fact, understanding the terms in the article is not an easy mission for me. For example, DNA and RNA are the terms form biology academic area, and I’m not very familiar with those words. To solve this problem, I asked many questions to my friend who is a biology major student. He explained the definition of these words and the difference between DNA and RNA to help me understand more about the articles. Also, I find that if I want to maintain the balance between making the talk accessible and keeping the integrity of the original research while translating, that would be very challenging. I approached this by carefully selecting which technical terms to keep and which to simplify. For instance, while I simplified the explanation of CRISPR’s function, I retained terms like “Cas12” to ensure that the scientific foundation of the talk remained strong.

Another challenge was transforming the highly structured and formal tone of the research paper into an oral tone expected of a TED Talk. In the academic paper, information is presented in a logical, often dense format with significant emphasis on the methodology. However, the TED Talk required a more narrative-driven structure, leading me to focus on the reasoning, rather than the explaining details. Also, I have to put a plenty of “I”, “you”, or “we” in the speech,

which required me to wonder the situation in daily communication. I overcame this by focusing on storytelling techniques, such as using questioning and stories telling.

Through this translation, I developed several important skills. First, I enhanced my ability to simplify complex concepts without losing its core meaning. This will be particularly useful in future communication tasks, whether I am presenting research to non-specialists or writing public-facing scientific articles. I also learned to analyze my audience. Knowing the audience of your writing can be a huge factor affecting your writing styles. Additionally, I learned to appreciate the flexibility required when translating between genres. The academic-to-public translation is not just about simplifying language; it involves rethinking the structure, tone, and even the goals of the communication. As Lisa Bickmore (2016) said, "it's like doing field work: you bring your wits and your gear and you figure it out by observing and jumping in. This is where a writing class can be very helpful, helping you to attune yourself to a writing situation, to cues that will guide you in assessing expectations, conventions, and possible responses. In other words, your writing course can teach you about genre, but even more, it can teach you how to be sensitive to genre, the sets, systems, and ecologies in operation in a new writing situation, and how to more capably participate in the work going on in that situation." Doing this translation really helped me understanding to analyze genre. The original academic paper aimed to contribute to scientific knowledge, while the TED Talk aimed to inform, inspire, and make science more accessible.

In conclusion, this reflective process has highlighted the intricate balance required to translate academic work into more accessible formats like TED Talks. The experience reinforced the importance of tailoring content to the audience and using engaging storytelling techniques to

make complex science understandable. Moving forward, I will apply these lessons in my future scientific communications, ensuring that my work is both accurate and approachable to a broader audience.

Reference

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