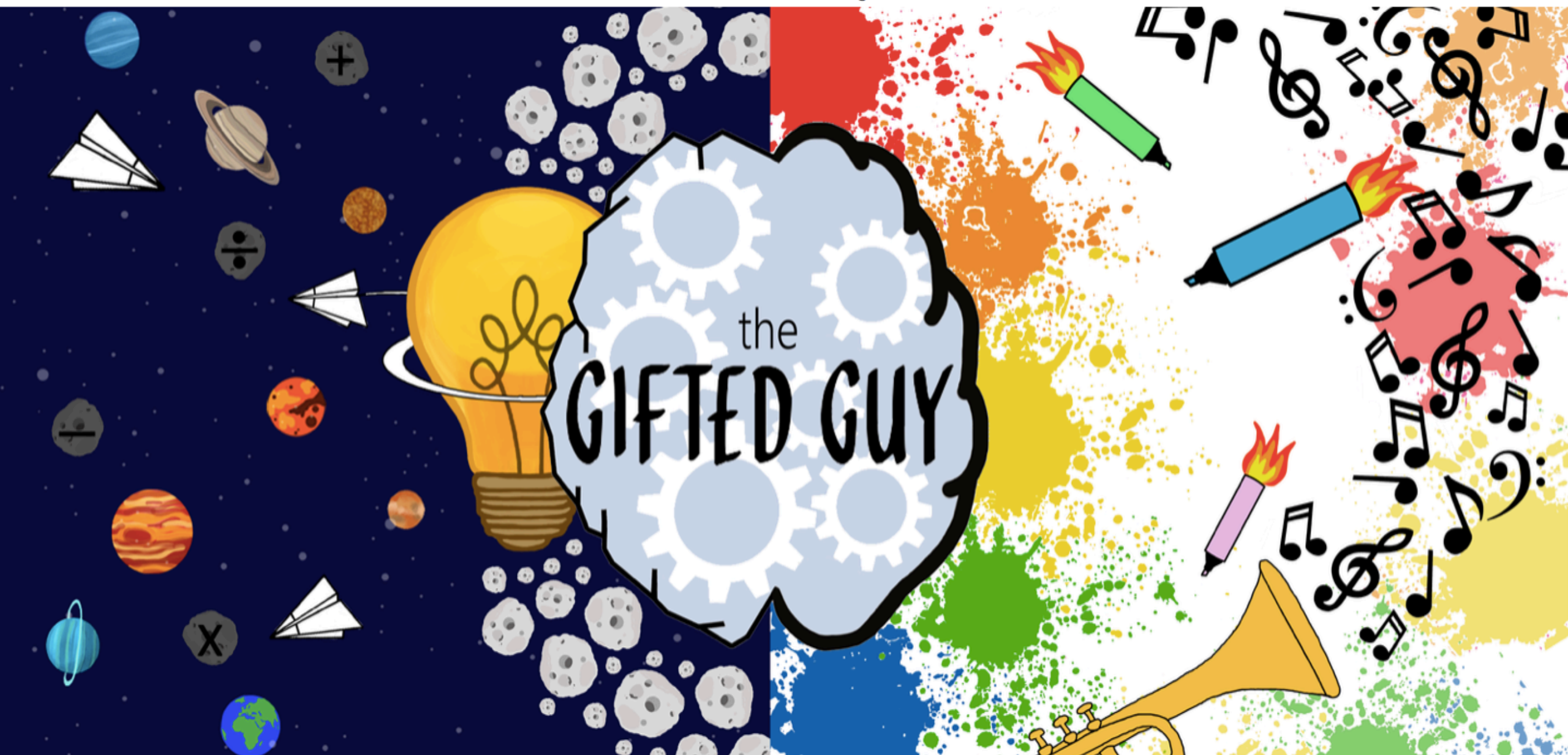


CASE-BASED LEARNING

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▶ Case-Based Learning (CBL) is often defined as:
...a teaching method which requires students to actively participate in real or hypothetical problem situations, reflecting the kinds of experiences naturally encountered in the discipline under study (Ertmer & Russell, 1995).

WHAT IS CASE-BASED LEARNING?

- ▶ Used heavily in the medical and law fields
 - ▶ Lawyers look at past cases and try to learn from how they were handled and the outcome
 - ▶ Doctors review cases of patients to see if they could have done something different to get another result
- ▶ The business field has taken to using case-based learning
 - ▶ Build cases around real businesses and try to predict outcomes
- ▶ Science has realized the benefits of CBL
 - ▶ Cases can be used not only to teach scientific concepts and content, but also process skills and critical thinking. And since many of the best cases are based on contemporary, and often contentious, science problems that students encounter in the news, the use of cases in the classroom makes science relevant.

ORIGINS OF CASE-BASED LEARNING

- ▶ Has real world relevance
- ▶ Is ill-defined, requiring students to define tasks and subtasks needed to complete the activity
- ▶ Comprises complex tasks to be investigated by students over a sustained period of time
- ▶ Provides the opportunity for students to examine the task from different perspectives, using a variety of resources
- ▶ Provides the opportunity to collaborate
- ▶ Provides the opportunity to reflect
- ▶ Can be integrated and applied across different subject areas and lead beyond domain-specific contents
- ▶ Is seamlessly integrated with assessment
- ▶ Creates polished products valuable in their own right rather than as a preparation for something else
- ▶ Allows competing solutions and a diversity of outcomes (Reeves)

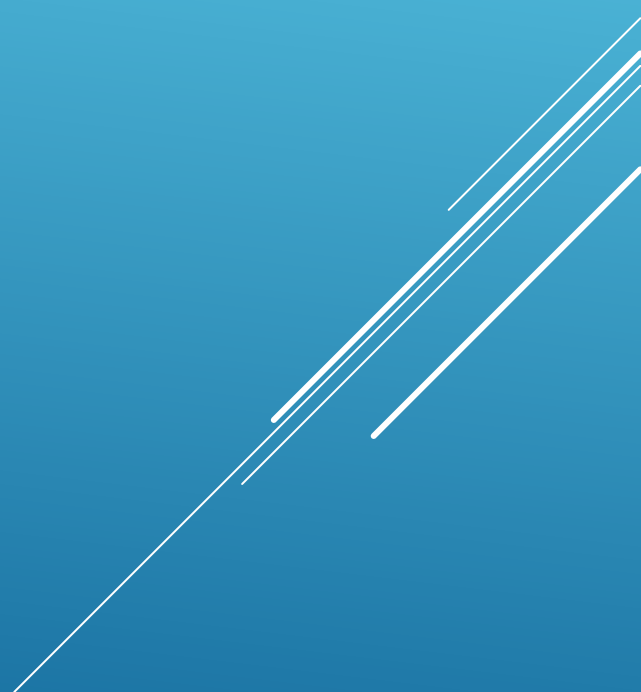
ADVANTAGES OF CASE-BASED LEARNING

1. Case is presented – this is an introduction to the case which is usually provided by the teacher.
2. Case is looked over by the group – the group begins to break it down, determining what they already know as well as what new information they will have to find in order to be successful.
3. Brainstorming of ideas – the group collaborates together to try and figure out an approach to this case.
4. Create learning objectives – through their approach students will figure out what they are going to learn throughout the process. These become learning objectives which can be assessed once the results are shared.
5. Sorting out the research – students combine what they already knew with what they learned together to try and create a product that compasses their solution.
6. Presentation of findings – the results of the case-study are shared with either peers, parents, a panel of experts, or some other public forum.
7. Reflect – this is where a lot of the learning will come because not only will students reflect on the end results, they will reflect upon the process they took to get there (Williams, 2004).

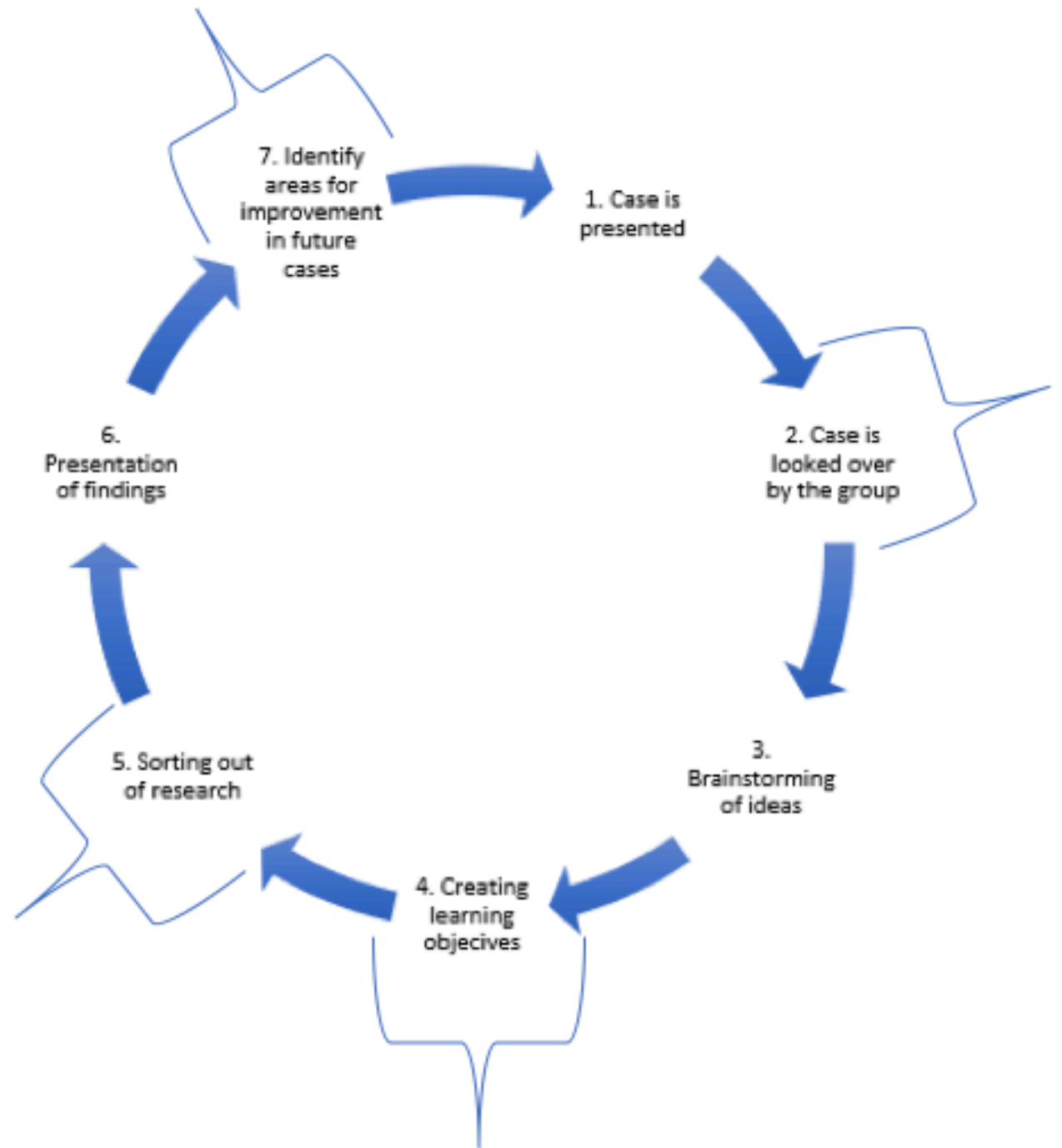
STEPS TO CASE BASED LEARNING

- ▶ Introduction to the case
- ▶ Discussion over the main points, ethical dilemmas
- ▶ Conferencing with students
- ▶ Interrupting strategically
- ▶ Finding an authentic audience
- ▶ Closing the case (reflection)

ROLE OF THE TEACHER



Meddler in the Middle



- ▶ This case study examines the issues surrounding the Chernobyl nuclear accident that occurred in Pripyat in the Ukraine on April 25-26. Students need to consider the two causes of the nuclear accident and what could have been done to have either stopped or prevented these from happening.
- ▶ Cause #1: During the testing of a turbine generator, the workers disconnected the technical protection systems, specifically the Emergency Core Cooling System. It is believed a combination of a lack of nuclear reactor physics as well as engineering led to this mistake. As a result, the reactor was being run with its key safety systems turned off. Might these have prevented the accident from occurring and why would it?
- ▶ Cause #2: In addition to this human error, there were flaws in the reactor itself that might have led to the accident. The reactor had a large positive void coefficient of reactivity, which is very dangerous. A void coefficient is a measurement of the reactor and how it is affected by an increase in steam formation in the water coolant. Because Chernobyl used solid graphite to slow the neutrons down, it actually began to absorb the neutrons causing the reactor to become unstable even at low power levels.
- ▶ There was also a problem with the control rods. These are typically inserted in the water to slow down the reaction. These particular rods were 1.3 meters shorted than should have been. This space created between the rods caused the reactors power to actually increase when the desired effect is to reduce the power.
- ▶ Students should investigate both of these causes to first see if they are viable, and then to determine what could have been done differently in order to avoid the disaster. This will involve research to find out further information. From this the students will role play what actions the workers specifically might have taken in order to avert the problem.

EXAMPLE OF A CASE – THE CHERNOBYL DISASTER

- ▶ Can tailor it specifically to your class and its personalities
- ▶ Can better align your required curriculum and the objectives of the case
- ▶ Allow you to have a good grasp on all aspects of the case since you are the one who wrote it
- ▶ Better understand the process of how a case is set up
- ▶ Control the case a little better because you are the one who created it

WHY WRITE YOUR OWN CASE?

- ▶ Choose a topic that aligns to your curriculum
- ▶ Choose a topic that would be of high interest to students either because of its timeliness or relevance
- ▶ Choose a topic controversial that will provide plenty of meat for students to sink their teeth in
- ▶ Choose a local issue so that students can actually put their solution into action
- ▶ Choose a topic that will allow students to use skills that you are wanting them to learn

CHOOSING A TOPIC

THE FAILURE OF THE BLACKBERRY



- ▶ You might think the title of the case has no bearing on its effectiveness as a learning tool but there are instances where it actually does.
- ▶ Keep in mind, the title is the first impression a student has when presented with a case.
- ▶ You want to have something that is going to grab their attention and make them excited to take on the case.
- ▶ If you have a title that is general or off-putting, they might not be enthusiastic about doing it.

COMING UP WITH A TITLE

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EVERYONE HAD TO HAVE ONE

- ▶ These act as the backbone to the case and usually are the big picture or overarching themes
- ▶ These should be thought-provoking and open-ended as much as possible to allow for some room for students to form their own opinions
- ▶ You can think of essential questions as the takeaways. When a student finishes the case, these are the main ideas you would like them to have an understanding of.

BIG PICTURE QUESTIONS TO PONDER

- ▶ What about the BlackBerry made it popular in the first place?
- ▶ What changed about the way people perceived the BlackBerry?
- ▶ Were there changes BlackBerry could have made in order to avoid failing?
- ▶ What were changes BlackBerry could try to make their product better than what is on the market?

CONSIDER

- ▶ The executive summary gives a brief overview of the case so that students can get a general idea of what they are going to be in for.
- ▶ It is always better to have a basic premise before students do a deep dive of the issues.

EXECUTIVE SUMMARY

Shares in the Canadian maker of BlackBerry smartphones peaked in August of 2007, at two hundred and thirty-six dollars. Seven months earlier, in January, Apple had introduced the iPhone at San Francisco's Moscone Center. Executives at BlackBerry decided to let Apple focus on the general-use smartphone market, while it would continue selling BlackBerry products to business and government customers that bought the devices for employees.

Six years later, BlackBerry's stock was worth just over ten dollars a share, and in 2013 announced that it has formed a "special committee" to explore ways to sell the company or form a joint venture with another business, among other options. Basically it was trying to salvage what was left of a crumbling company.

▶ A tale of two stories

WHAT OR WHO IS YOUR CASE STUDY ABOUT

Hypertrophic cardiomyopathy refers to an abnormal growth of muscle fibers in the heart. Because the heart muscle is stiff, it makes it difficult for it to relax and for blood to fill the heart chambers. While the heart squeezes normally, the limited filling prevents the heart from pumping enough blood.

HCM is most often diagnosed during infancy or adolescence. It affects up to 500,000 people in the United States, with children under age 12 accounting for 10% of all cases. It is considered to be one of the most common causes of death in young people under 35 years of age. Children with HCM are usually asymptomatic and the overall annual mortality beyond the first year of life is 1%.

One blood donation can potentially save three lives. Every two seconds, someone needs blood. Blood cannot be manufactured. It can only be supplied by people such as yourself. Why wouldn't you want to give blood?

Right after being born, Amelia's parents learned their daughter had severe hypertrophic cardiomyopathy, a disease that makes it harder for the heart to pump blood to other parts of her body.

Amelia's condition meant she would need a new heart but in order to get to that point, she would need several blood transfusions. That meant she would rely on the donations others to provide blood. Without these donations, she would not have the blood she needed and would likely die.

After several blood transfusions, at 8 months old Amelia was able to leave the hospital with a new heart. A new heart that would not have been possible without the kindness of blood donors. Would you be willing to give blood so that others like Amelia can live a long and prosperous life?

- ▶ Similar to Blockbuster video, the BlackBerry company is a case of recognizing the changing market a little too late, even being stubborn in failing to recognize that the market was changing. It was the story of the Innovator's Dilemma. Disruptive innovation describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up the market, eventually displacing established competitors.
- ▶ When the iPhone came out. The executives at BlackBerry couldn't see what the fuss was all about. They didn't believe business people wanted a touch screen -- and they were the market for smartphones. They knew people were very addicted to their product and loved the keyboard. They were confident in their product and why not. They invented the market and were the leader.
- ▶ First incumbents get disrupted by new technologies not because they are unaware of them...but because they rationally choose to ignore them." The executives at BlackBerry did just that.

- ▶ By breaking down and analyzing the problems with the real case, it provides context
- ▶ This context allows them to design a solution to the same problem that should work
- ▶ Also provides students with different perspectives

PROBLEMS THAT WERE FACED

- ▶ Slow to react to market changes
- ▶ Bad designs and bizarre names
- ▶ Corporate slowdown
- ▶ Apple and Android exploded


REASONS FOR ITS DOWNFALL



- ▶ Budget
- ▶ Time
- ▶ History
- ▶ Culture
- ▶ Science/Technology

CONSTRAINTS OF THE CASE

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- ▶ Limited market (already two major players, Apple and Android)
 - ▶ Consumer focus has changed so the features need to as well
 - ▶ Cannot make a carbon copy of what is already out there, what will make the BlackBerry stand out
 - ▶ Must use technology from 2013 when BlackBerry began to fail
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- ▶ You might provide only a single document which would act as your sole guide for students and where a majority of their information would come from that shapes their case.
- ▶ You might provide two documents, each that argues a side of the case so that students are seeing multiple perspectives and takes on the case.
- ▶ You could offer multiple documents, a mix of both primary documents and secondary that give the students a well-rounded explanation of the case.
- ▶ Can also use videos as a resource as well.

RESEARCH THAT SUPPORTS OR REFUTES THE CASE

The Fatal Mistake that Doomed BlackBerry

<http://business.time.com/2013/09/24/the-fatal-mistake-that-doomed-blackberry/>

The Rise and Fall (and Rise Again) of BlackBerry

<https://digit.hbs.org/submission/the-rise-and-fall-and-rise-again-of-blackberry/>

Interview with author who wrote book on the fall of BlackBerry

<https://www.youtube.com/watch?v=LNZ8X1h2hlc>

LINKS TO RESOURCES

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- ▶ Because there will be times your case is based on something from the past that has a known outcome, there is no mystery as to the solution that actually occurred.
- ▶ This of course does not mean that your students have to come up with the same solution. In fact, many times they will want to be avoiding the actual solution because it either did not work or there was a better solution that was not used.
- ▶ However, it is important for students to analyze the actual outcome so that they can learn from it and any possible mistakes or oversights that were made.

OUTCOME OF THE ACTUAL CASE FOR DISCUSSION

- ▶ BlackBerry's business has increasingly relied on licensing. The unit is responsible for *supporting* handsets and all other hardware. BlackBerry has largely completed its move to a licensing-only model. In other words, it has gone from hardware to software.
- ▶ BlackBerry is no longer making any hardware or manufacturing any devices. The company is still selling some phones, but only those that were already built. You can no longer buy a new BlackBerry from BlackBerry.
- ▶ BlackBerry products are still being made by their licensees though and in 2019 released the BlackBerry Key2.



CASE STUDIES AND CASE-BASED LEARNING

Inquiry and Authentic
Learning That Encourages
21st-Century Skills

TODD STANLEY