Problems and solutions

- **Expository texts**

Introduction

You're going to watch a video (on Moodle) in which Cosmin Mihaiu, co-founder of *Mira Rehab* (a cross-platform framework written in C++), talks about software developed by his company. Watch attentively to try to understand the general situation.

What is the video about? Summarize it in your own words.

Activity 1

Below is part of the video tapescript. Read each part carefully. Then, in pairs or groups of three, think of a word or a short phrase (3-4 words max.) that summarizes the main idea in each paragraph. Write the phrase in the box.

Part 1

When I was growing up, I really liked playing hide-and-seek a lot. One time, though, I thought climbing a tree would lead to a great hiding spot, but I fell and broke my arm. I actually started first grade with a big cast all over my torso. It was taken off six weeks later, but even then, I couldn't extend my elbow, and I had to do physical therapy to flex and extend it, 100 times per day, seven days per week. I barely did it, because I found it boring and painful, and as a result, it took me another six weeks to get better.

Part 2

Many years later, my mom developed frozen shoulder, which leads to pain and stiffness in the shoulder. The person I believed for half of my life to have superpowers suddenly needed help to get dressed or to cut food. She went each week to physical therapy, but just like me, she barely followed the home treatment, and it took her over five months to feel better.

Part 3

Both my mom and I required physical therapy, a process of doing a suite of repetitive exercises in order to regain the range of movement lost due to an accident or injury. At first, a physical therapist works with patients, but then it's up to the patients to do their exercises at home. But patients find physical therapy boring, frustrating, confusing and lengthy before seeing results. Sadly, patient noncompliance can be as high as 70 percent. This means the majority of patients don't do their exercises and therefore take a lot longer to get better. All physical therapists agree that special exercises reduce the time needed for recovery, but patients lack the motivation to do them.

Part 4

So together with three friends, all of us software geeks, we asked ourselves, wouldn't it be interesting if patients could play their way to recovery? We started building MIRA, A P.C. software platform that uses this Kinect device, a motion capture camera, to transform traditional exercises into video games.

Expository texts

The video we have just viewed provides an example of **an expository text.**

Expository texts are organized around one *topic* and are typical of educational, academic, and professional settings. Expository *writing* is a type of writing whose purpose is to *describe*, *explain*, or *inform.* It is a non-fiction text, that is, it is not made up: it's based on *facts*. This type of writing might take different shapes, such as textbooks, news articles, magazine articles, informative websites, self-help books, how-to books, history books, encyclopaedias, science books, and so on.

Activity 2

Think back on the video we watched:

- In which setting was this (oral) expository text presented? Educational? Academic? Professional? How do you know?
- Which do you think was the purpose of the text?
- Can you identify and mention any *facts* that were presented?

Discuss your answers in pairs / small groups.

Let's move on.

The structure of expository texts refers to how the text is formatted and organized, and to how information is distributed in the text. The *text structure* is determined by the *text purpose*. Writers use different text structures, called *patterns of text organization.* Such organizational patterns can help readers anticipate the contents of the text they will be reading and therefore understand and retain what they read more easily. When readers can understand these text structures, they are also more able to achieve their reading goals, for example to locate specific information in the text.

In this module, we'll be looking at the pattern known as:

PROBLEM-SOLUTION

The problem-solution pattern is commonly used in identifying something that's wrong and in contemplating what might be done to remedy the situation. This pattern of text organization usually answers the question **WHY?**

Activity 3

Go back to the video once more:

- What was the problem?
- What was the solution?

There are probably more ways to organize a problem-solution approach, but but here are three very common possibilities:

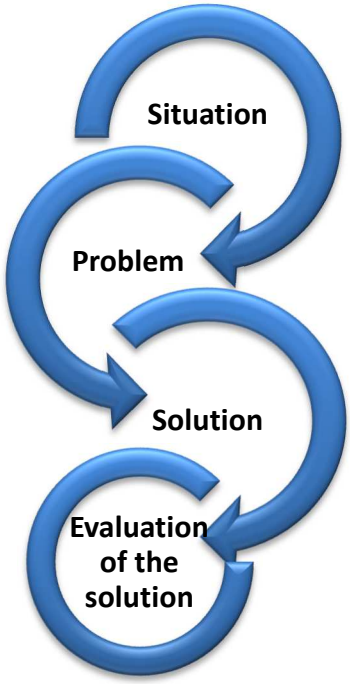
- A description of a problem followed by a solution (plus an evaluation of the solution).
- A description of a problem followed by several solutions, one of which is singled out as the best (plus an evaluation of this solution).

or

- A suggested solution followed by a decription of the problem that motivated it.

Similarly, writers may sometimes present the problem, then show why other solutions do not work, to finally suggest why their solution is better than other solutions.

Here's a summary of this pattern:



IMPORTANCE / RELEVANCE?
What is the current situation? Why does the problem require attention?

CAUSES? CONSEQUENCES?
What is wrong with the current situation? What is needed / lacking?

WHAT?
What are its features? How does it work?

ASSESSMENT
What makes it a "good" solution? Why is it the best solution? How effective is it?

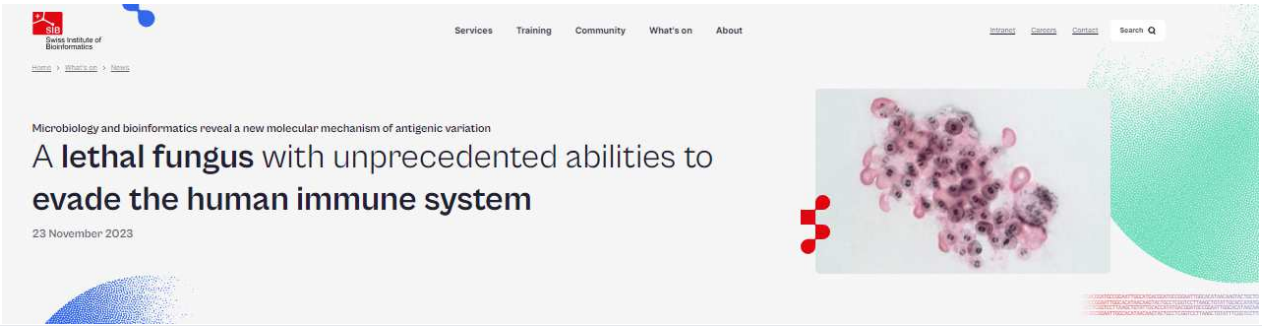
Activity 4

Below are six (6) excerpts from articles published in different popularizing magazines. As you read each fragment, identify and explain the following in your own words, using English as far as possible:

a) What is the **problem** addressed by the researchers.
b) What is the **solution** they provide for the problem.

Use different colours to underline the problem / solution.

TEXT 1



An international study shows the unprecedented ability of the *Pneumocystis* fungus to outwit the human immune system. Philippe Hauser at the Lausanne University Hospital (CHUV) led the work, and the uniqueness of the molecular mechanisms involved was revealed based on bioinformatics analyses led by Marco Pagni at SIB. The findings are published in Nature Communications.

Microbial parasites that cause serious illnesses in humans, such as malaria or sleeping sickness, must evade the immune system to multiply in the human body. The laboratory of Philippe Hauser (CHUV) has been collaborating with SIB's Marco Pagni and other key partners, to study the mechanisms used to achieve this by the *Pneumocystis* fungus, which causes lethal pneumonia in immunocompromised patients, those receiving organ transplants or those suffering from blood cancer, for example.

A new molecular mechanism of antigenic variation revealed

The study, published in the journal Nature Communications, reveals that this pathogen uses random shuffling of thousands of its genes occurring across its worldwide populations, to create a novel set of 80 genes in each strain. Within this set, a single gene is then expressed per individual cell of the fungus, to cover its surface with a 'coat' that the immune system cannot recognize and fight, because it has generally never encountered it before. This molecular mechanism of antigenic variation at cell level was hitherto unreported, and adds to those already known, for example in the trypanosome that causes sleeping sickness. Individual cells of the fungus then frequently change their 'coat' to avoid recognition by the immune system that develops during infection. Understanding these unique camouflage mechanisms, could lead to a new therapeutic strategy to combat the disease.

***Pneumocystis* is a very difficult pathogen to work on. As it cannot be cultivated *in vitro*, we need to be able to say more with less, and this is where bioinformatics comes in.**

Marco Pagni
Team Lead Computational Biology, Vital-IT group

You can access the full article at https://www.sib.swiss/news/a-lethal-fungus-with-unprecedented-abilities-to-evade-the-human-immune-system

TEXT 2

SAFETY

Crews working in wetlands prioritize environmental sustainability and their own safety and protection

Sept. 8, 2020

This article published as "Finding Harmony" in September 2020 issue of Roads & Bridges

By: Jeff Niesz

Building in environmentally sensitive areas, such aswetlands, poses challenges beyond just navigating waterways and stream channels.

It is critical to preserve plant and animal life and ensure that contractors are safe, even from potentially aggressive wildlife native to the habitat. In many cases, there are protected species to consider. The ongoing sustainability of the wetland is the key to performing such permitted work.

Fortunately, contractors do not have to manage these challenges alone. Specialty contractor partners in the rental business are experienced in providing recommendations for turnkey matting and access solutions. They can also oversee their installation in accordance with work specifications, permit requirements, and environmental standards. Renting the equipment and having experts on access solutions available helps facilitate the project's success, allowing contractors to focus on the infrastructure construction at hand.

You can access the whole article at https://www.roadsbridges.com/safety/article/10652928/crews-working-in-wetlands-prioritize-environmental-sustainability-and-their-own-safety-and-protection

TEXT 3

Fluorescence Lifetime Imaging Could Improve Cancer Surgery Outcomes

BOSTON, Oct. 24, 2023 — Extreme precision is required to surgically remove a cancerous tumor without damaging the surrounding healthy tissue. Yet surgeons often must rely on their eyes and hands to determine where to cut. Fluorescence lifetime (FLT) imaging, developed at Mass General Brigham by researchers who collaborated with several other institutions to evaluate the technique, could improve the precision of cancer surgeries.

FLT imaging, a visualization technique for targeting cancer, combines high-speed cameras and injectable fluorescent dye to distinguish tumor tissue from normal tissue with a high degree of accuracy. Instead of relying solely on dyes to identify cancer cells, the FLT technique also uses cameras to rapidly detect changes occurring in the properties of the light emitted by the tissue.

In studies in preclinical models, the researchers found that in mice, malignant tumors injected with indocyanine green (ICG), a near-infrared dye, had a longer fluorescence lifetime compared to normal tissue injected with ICG. The researchers could accurately distinguish between tumor tissue and normal tissue by measuring the difference in their FLT.

You can access the full article at
https://www.photonics.com/Articles/Fluorescence_Lifetime_Imaging_Could_Improve/p1/a69417

TEXT 4

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Published: December 12, 2019 10.57am GMT

The infectious disease burden in Africa is very high, particularly for tuberculosis (TB), malaria and HIV/AIDS. In 2018, nearly a quarter (24%) of TB cases in the world were in Africa. The region accounted for 93% of malaria cases. The continent also bears the brunt of the HIV epidemic: 20.6 million of the 37.9 million people living with HIV are in eastern and southern Africa.

To solve the disease problems, scientists in Africa need to push boundaries and think outside the box. And I believe that we can do so.

My research is based on using computers to understand biological problems at the protein level. This is part of bioinformatics, a young but broad discipline. Its applications are wide and range from understanding the genome sequence of any organism to drug discovery.

Author

Ozlem Tastan Bishop
Professor and Director of Research Unit in Bioinformatics (RUBi), Rhodes University

Disclosure statement

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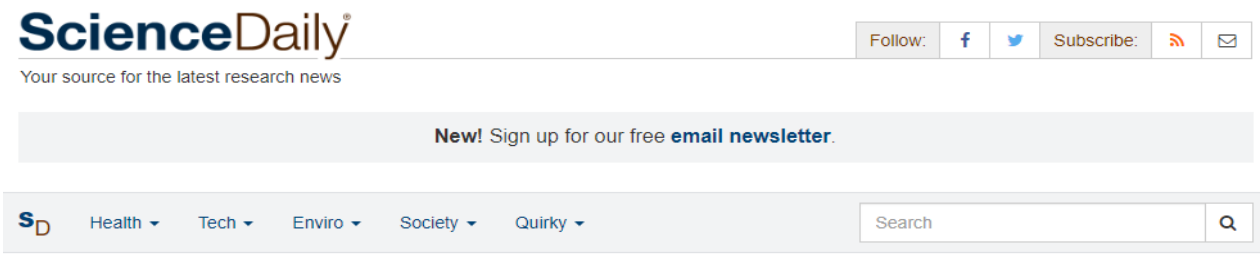
You can access the full article at https://theconversation.com/we-are-using-computer-models-to-fight-drug-resistance-128176

TEXT 5



Science News

from research organizations

New algorithm maps safest routes for city drivers

Date: July 25, 2023
Source: University of British Columbia
Summary: Most navigation apps can show you the fastest possible route to your destination and some can even suggest an eco-friendly route calculated to produce the least amount of carbon emissions. But what if they could also map the safest route with the lowest possible risk of a crash? A new algorithm could make this a reality.

FULL STORY

Most navigation apps can show you the fastest possible route to your destination and some can even suggest an eco-friendly route calculated to produce the least amount of carbon emissions.

But what if they could also map the safest route with the lowest possible risk of a crash?

A new algorithm developed by UBC researchers could make this a reality. Led by Dr. Tarek Sayed, professor in the UBC department of civil engineering, and PhD student Tarek Ghoul, the group developed a new approach which identifies the safest possible route in an urban network using real-time crash risk data, and can be incorporated into navigation apps such as Google Maps.

You can access the full article at https://www.sciencedaily.com/releases/2023/07/230725172001.htm

TEXT 6

Wearable Sensor Could Detect Postpartum Blood Loss

Postpartum hemorrhage, the leading and most preventable cause of maternal mortality, can be hard to detect, because physiological compensation mechanisms can mask excessive bleeding. In the early stages of hemorrhage, the sympathetic nervous system becomes activated to ensure adequate perfusion of vital organs and, in turn, vital signs remain stable.

Worldwide, the most common methods of diagnosing postpartum hemorrhage are visual estimation of blood loss or monitoring of vital signs. Blood loss is routinely underestimated beyond the point of early intervention.

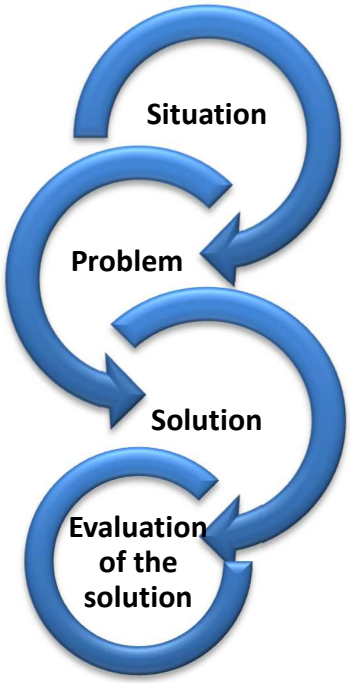
To diagnose postpartum hemorrhage in its early stages, a multidisciplinary research team at Washington University in St. Louis developed a wearable optical device that is worn on the wrist. The device uses laser speckle flow index (LSFI) to continuously monitor the body's compensatory mechanisms triggered by blood loss elsewhere in the body.

You can access the full article here at
https://www.photonics.com/Articles/Wearable_Sensor_Could_Detect_Postpartum_Blood_Loss/p1/a69365

What linguistic elements helped you find the problem and the solution in each text? Go back and underline them.

Language focus

Understanding the language of expository texts also involves acquiring the specific language that is usually used in expository writing, in this case following a problem-solution pattern. This includes developing a range of expression and specific vocabulary, which act as transitional or *signal words* – that is, words that help you follow and interpret the text. Examples of this includes understanding nouns, adjectives, verbs, connectors, and so on.



IMPORTANCE / RELEVANCE?
major, important, relevant, significant, urgent, etc.

PROBLEM, ISSUE, DILEMMA
Causes, consequences, past solutions:
- Showing contrast: however, nevertheless, despite, although (BUT)
- Using synonyms and paraphrase: danger, drawback, disadvantage, weakness, shortcoming, obstacle, need (for), challenge, danger, etc.
- Using negative words: limited, few, little, no, none.

WHAT IS THE SOLUTION? HOW DOES IT WORK?
Nouns: solution, answer, remedy, improvement, approach, strategy, method, model, means, measure, etc.
Verbs: solve, address a problem, find out, find a solution, work out, develop, etc.
Causative connectors: therefore, as a result, thus, hence, etc.

HOW EFFECTIVE IS THE SOLUTION?
Nouns: benefit, advantange, development, etc.
Verbs: provide, offer, enable, allow, etc.
Adjectives: effective, reliable, efficient, safe, useful, etc.

Go back to the previous texts and find examples of the language used to signal the situation, the problem, the solution and the assessment of the solution.

Activity 5

Test yourself! Choose the correct words to indicate problem-solution.

1. Photoimmunotherapy targets cancer cells with microscopic, nano-engineered cancer drugs that are light-activated at the lesion site. **Although** / **In addition** / **Thus** the technology is increasingly used to treat metastatic cancer, tools to improve the effectiveness of photoimmunotherapy in gynecologic oncology have been **abundant** / **effective** / **lacking**.

   Responses to treatment vary from person to person, and no method has existed to readily monitor whether the drugs are delivered effectively or have the desired therapeutic effect. Researchers from the University of Maryland (UMD), in collaboration with medical laser manufacturer Modulight, **demonstrated that** / **solved** / **developed** the efficacy, safety, and consistency of photoimmunotherapy can be improved by integrating targeted, light-based techniques for drug delivery with laser-assisted endoscopy and fluorescence-guided treatment planning.

   Is the solution positively or negatively evaluated? How do you know?

   Source: https://www.photonics.com/Articles/Lasers_Improve_Phototherapy-Drug_Delivery_Platform/p1/a69449

2. Cardiovascular disease continues to be a global health **crisis** / **remedy** / **challenge** in Europe, affecting over 85 million people and this number is still on the rise**. Also** / **Despite** / **Thus** significant advances in therapy, it is still the most common cause of death, with a substantial socio-economic impact.

   This calls for urgent action and has led to the formation of iCARE4CVD, funded by the Innovative Health Initiative. Short for “Individualised CARE from early risk of Cardiovascular Disease to established heart failure,” iCARE4CVD is an international public-private research consortium that has launched to better understand cardiovascular disease and optimise future prevention and treatment.

   Is the solution positively or negatively evaluated? How do you know? What words help you decide?

   Source: https://www.sib.swiss/news/personalizing-strategies-to-better-tackle-cardiovascular-diseases

3. Southwest Research Institute (SwRI) **has developed** / **has discovered** / **has found** a proof-of-concept system to autonomously detect compressed air leaks on trains and relay the location of the leaks to mechanical personnel for repair. The automated system could reduce the time, costs and labor needed to find and repair air leaks, and it could lower the locomotive industry's overall fuel consumption and exhaust emissions.

   Trains use compressed air for a variety of functions, including air brakes, valve actuation, radiator shutters, horns and bells. Each year it is estimated that the rail industry loses between 2-3% vehicle efficiency due to air leaks that occur at various points throughout trains. Additionally, these leaks can have a **minimal** / **beneficial** / **detrimental** effect on train operability and safety.

   Is the solution positively or negatively evaluated? How do you know?

As you read this type of texts, make sure you keep notes of any new language patterns that might might be used to enlarge your vocabulary and to enhance your reading ability.