BIOMATRIX CURRICULUM
W/Holistic Societal Problem (Dis)Solving:
Kids to the Rescue of the World

Chapter 2:

Journey towards the IDEAL FUTURE

CHAPTER 2

WELCOME to *Chapter 2.*

This chapter consists of seven *Parts (see list of content).*

They tell you how we can solve complex problems - those of society and humanity as a whole, as well as our personal ones.

For more detail, read the *Biomatrix Books*, watch our videos or do a course offered by the *Biomatrix System Design School (see www.biomatrixweb.com)*

...and consider the following *NOTES* on *ITERATIVE LEARNING* and *EXERCISES*.

NOTE on Iterative Learning

W/Holism is not a linear body of knowledge, whereby one element builds on a previous one.

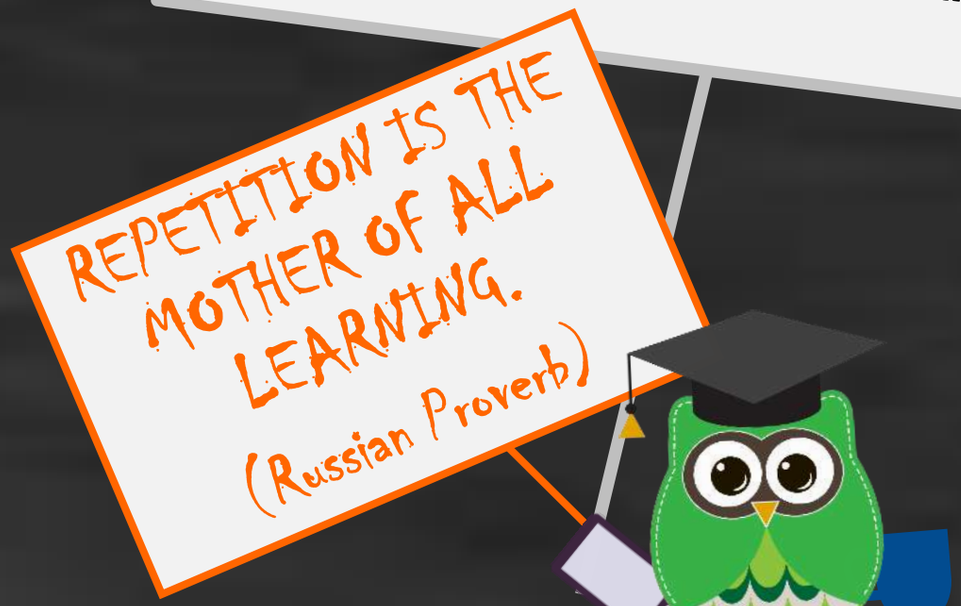
Rather, it is a body of knowledge in which one concept is explained by others.

This means, that you do not fully understand one concept before you do not understand all the others.

Therefore, to learn it you have to apply ITERATIVE LEARNING, which means going over the same material several times.

We suggest that you speed-read through the curriculum and glance at the pictures with the aim of getting an overview, even if some of it doesn't make sense to you yet. *(Yes, we know, it may be difficult to bear the "yes but" questions that may pop up along the way.)*

Then start from the beginning again and you will see how everything begins to fall into place and make sense to you now. *(If there are still a few "yes, but", you can go to the according parts, or read through the whole material a third time.)*



NOTE on EXERCISES

We also want you to reflect on the knowledge we present and apply it in exercises throughout the curriculum.

We therefore suggest that, before starting the study of Chapter 2 in depth *(i.e. after having speed-read through it once)* you choose a **CASE STUDY PROBLEM.**

WISE OWL will make some suggestions about it.

If you work alone, it is best to use a personal problem *(like your work-life, or a relationship problem).*

If you work in a team, you can also choose an organisational or industry related problem and tackle it TOGETHER *(whereby each team member should view it from a different perspective or sub-system).*

Through the exercises we will encourage you to reflect on the knowledge, apply it to your chosen problem and think about its relevance for your life in general.

CONTENT OF CHAPTER 2

PART 1:
Meeting the Futurist

The kids return from their epic journey to many of the world's experts.

They had hoped that one or some of them would help them to find out how to solve the problems of the world, but they are disillusioned....

Then they meet the FUTURIST, who makes them reflect on what they learned during their journey...

The return of the kids is heralded by the **POSTCARDS** which they sent to the citizens of the world during their journey to the experts.

(The whole collection of cards can be viewed on www.biomatrixweb.com Click on gallery and postcards from the future.)

Greetings from the journey

We are worried. The problems in many areas of life seem to be unsolvable and even get worse. **Fundamental change is required urgently!**

biomatrix web systemic management solutions

to:

all citizens of the world

Greetings from the journey

It was **FUN!!!** People are so nice everywhere! I 'll NEVER give up my search! **LET's PLANT TREES!**

biomatrix web systemic management solutions

to:

all citizens of the world

Greetings from the journey

Although we learned much, we feel like the journey has been a failure. We have not quite found what we were looking for.....

biomatrix web systemic management solutions

to:

all citizens of the world

At long last the kids have landed ...
... from their journey of exploration into the CURRENT FUTURE ...

...having met so many experts and having learned so much... they are changed...

...although the world they left before their journey remained the same, their perception of it is different now...

...they have become disillusioned (i.e. without their previous illusions)...

...they are awake to a new reality, yet nothing seems real...

...the old is clearly unsustainable, as are many of the solutions proposed by the experts...

...but where is the NEW, the SUSTAINABLE, the DESIRABLE, the INSPIRING...????

... and while they were still thinking about their journey and wondering about the future ...

...an odd looking shape emerged from thin air...

...it was faceless, ageless, genderless and timeless....

.....and this shape started to talk to them:

I heard you say that you consulted experts about solving the problems of the world and that you came back disillusioned and think that the problems are apparently **unsolvable.**

Now, what sort of problems prompted your journey?

The problems we had in mind were poverty, war, disease, environmental deterioration, resource depletion, unsustainable systems and the like...

Can such problems really be solved? And **HOW?**

The answer to your question of how we can solve the problems of the world is really quite simple:

It is that we need to get **EXPERTS** *(both mainstream and alternative)* such as you visited, to interact with each other in their area of expertise and in a new way in order to **collectively redesign** the current economic, political or cultural systems of society..

And as the systems begin to perform according to the new design, they get transformed and society's complex problems begin to **dissolve.**

All of them working together?

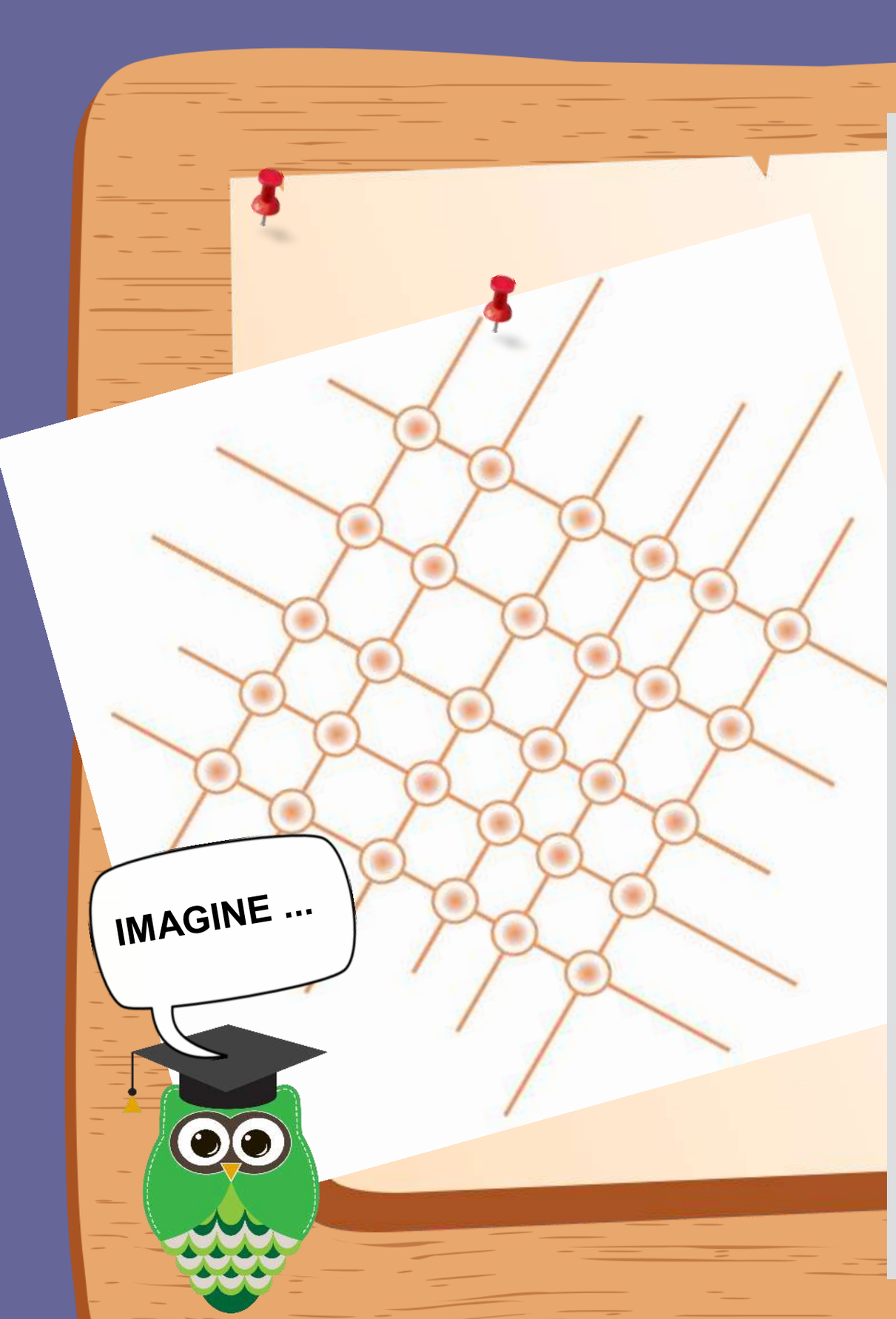
That could lead to extremely powerful results...

Q1: What do you mean by *“interacting in their area of expertise”?*

Q2: ...and what do you mean by *“a NEW WAY of working together”?*

A1: Simply put: acting in their area of expertise means that educationists redesign and manage the education system and not the electricity system or health care system *(and vice versa)!*

A2: A new way of interacting means that the interaction *(e.g. the public discourse, redesign, planning, etc.)* is based on a new worldview and methodology, namely that derived from W/Holism.



IMAGINE...

... that all persons, organisations and spaces you visited are linked together meaningfully ...

... that we use the www *(world wide web)* to connect us in a shared quest to redesign our systems, transform the way they function and thereby dissolve humanity's complex problems....

Every one is the centre of the web.

I am the centre, you are also the centre, so is my organisation and society and so are yours.

We can tap new resources and link up with each other and share them.

We can organise ourselves into larger wholes.

We are powerful.

We can co-create a sustainable world and a desirable future for all humanity and solve its complex problems

TOGETHER !!!

PS: And, of course, we are not only connected to each other, but we are also interconnected with all systems of nature!

A: Allow me to introduce myself:

I am Zeitgeist and I have different names in different cultures …

... some people call me the FUTURIST…

I am here to teach you the theory and methodology for w/holistic system redesign and transformation, as well as complex problem solving, based on *Biomatrix Theory**.

But first I would like to hear *your INSIGHTS* from your journey.

Q: Who are you that you are so certain about how to solve the world's problems?

ZEITGEIST

(Merriam Webster)

The general intellectual, moral, and cultural climate of an era.

ZEITGEIST

(Goethe)

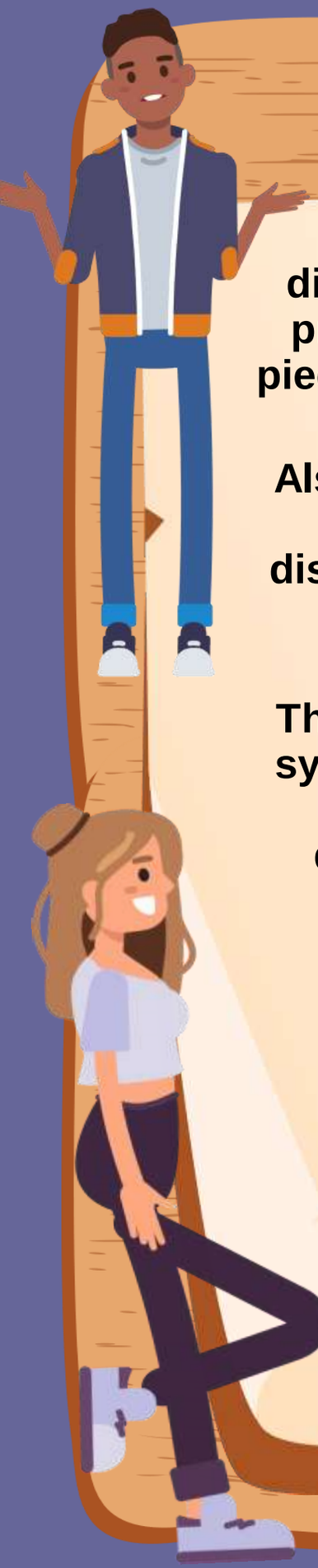
…"der …eigne Geist, in dem die Zeiten sich bespiegeln".

…your own spirit, in which the times mirror themselves.

***NOTE: Biomatrix Theory** is a theory of w/holistic system organisation, or meta-systems theory.

Find more about it on www.biomatrixweb.com

insights



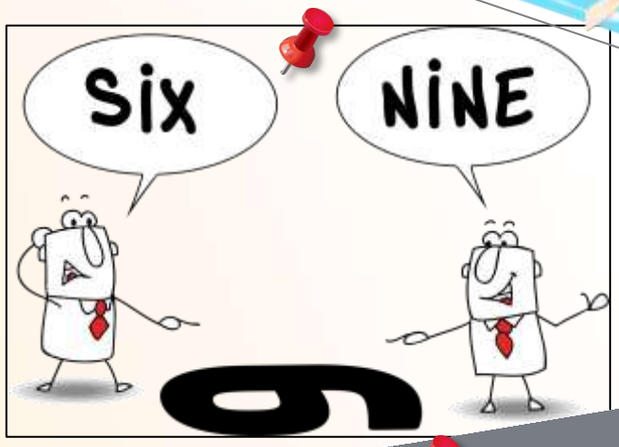
I noticed that different people have different **perceptions** of a system and its problems. Like everyone saw a different piece of the system and a different problem and thought that this is all there is.

Also, many solutions that the mainstream expert called desirable and good, the dissident or alternative expert often called bad and *vice versa (and usually for different reasons).*

This made us think that people's views of systems are **partial** and that the problems are **"shifty".** They seem to change depending on the observers and their perspective.

For me the biggest insight was, that systems impact on each other, that their problems overlap with and reinforce each other and in their interaction with each other co-produce new and additional problems.

In the end it seemed to be **one big muddle.**



Insights *(continued)*

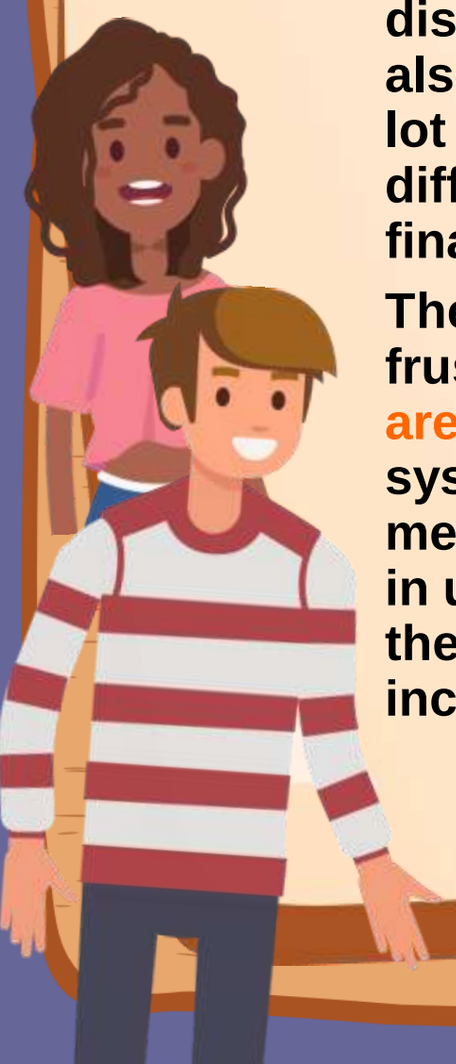
We found that the mainstream experts have lots of solutions and apparently many more in the pipeline.

They also seem to believe that given more time, the benefits from the existing solutions will trickle down to those who currently don't have them, like more economic growth, more investment, more consumer goods, more infrastructure, more education, more health care, more democracy, more laws, more media exposure, and so on.

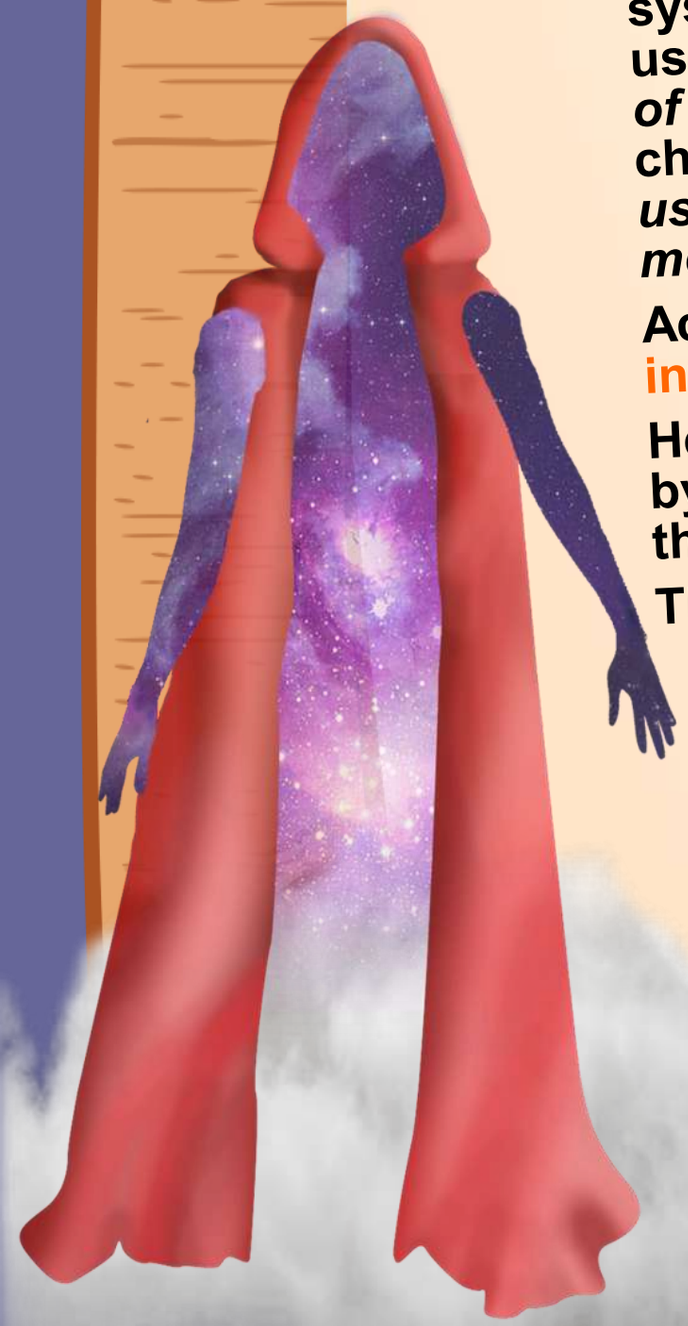
Alternative solutions and ideas:

We also found that some of the dissident or alternative experts also seem to have answers to a lot of problems, like about different education, health care, finance and other systems.

They also seemed very frustrated that their solutions are not used by the mainstream systems, not reported on in the media, not further researched in universities, not bought by the corporates and not included in public policies.



Insights *(continued)*



Yes, you seem to understand the partial perception of systems and their complex problems nature.

It is interesting that you used the word muddle. Ackoff, a famous systems thinker, coined the term mess for this. Other systems thinkers use the term problematique *(which the dictionary defines as the totality of complex issues associated with a topic)* and yet others speak of a chaotic system, or simply chaos *(whereby the meaning of the word is used in the sense of muddle or confusion and not in the more specific meaning used in physics).*

Ackoff defined a mess *(or what you called a muddle)* as "a system of interrelated and mutually reinforcing problems".

He also said that we cannot solve a mess but that we need to dissolve it by changing the inter-active behaviour of the systems that co-produce the mess.

This curriculum will show you HOW!

"To manage a system effectively, you might focus on the interactions of the parts rather than their behaviour taken separately".

(Russel L Ackoff).

The concept of mess and how to dissolve it, as well as the redesign of systems will be explained in more detail in the following parts.

This mess business that we encountered in many societal and planetary systems seems very depressing.

Is there really any hope? Can we really do anything meaningful about this?

If a mess is created by the interaction of our current social systems and their impact on nature,

does this mean that we have to change our economic, political and cultural systems

before we can dissolve the mess?

Isn't that somewhat unrealistic...?

...and time consuming?

...and needing a lot of effort?

YES, we can do something about it.
And YES, we need to transform our economic, cultural and political systems.....

WARNING

You are warned that this is not a body of knowledge you can complete in a quick crash course. To understand and apply it requires some serious studying.

Are you ready for the challenge?
ARE YOU READY???!!!???

QUESTION: (frequently asked, when confronted with a Biomatrix course or book):
"Isn't that an awful lot of effort?"
"Isn't that a lot of theory?"

ANSWER: Surely, it requires a considerable effort and study of theory!
But would you allow yourself to be operated on by a surgeon who did a one day crash course in medicine?

So why should solving the complex problems of society be easier and need less knowledge and effort than solving the problems of the body?

NOTE: societal evolution

We are facing a transition from the INDUSTRIAL AGE to the INFORMATION AGE.

Our current cultural, economic and political systems are legacy systems of the industrial age, covered with some information veneer.

As the information age advances, they become increasingly problem riddled and need to be TRANSFORMED.

A: INDEED, here is an overview of how societal evolution is likely to unfold from an information age towards becoming an in-formation age.

(See also the NOTE on information versus in-formation)

Q: Can you tell us a bit more about the information age?

NOTE

Information is derived from the Latin "informare" and means "putting form into".

By information we usually mean meaningful data. The digital phase is mostly concerned with processing information in the sense of describing things.

By in-formation *(in dash formation)* we refer to the in-forming role, namely that information is a force that can change things in physical reality, *analogous to manipulating the genes of an organism and thereby changing its form and functioning.*

IN-FORMATION AGE

***Analogous to the STEAM, ELECTRICITY and ATOMIC phases of the industrial age,* the information age is likely to go through phases also:**

- **we are currently in the DIGITAL PHASE of the information age *(analogous to the steam phase),***
- **but already transitioning into the BIOLOGICAL PHASE which is concerned with manipulating information in biological and other systems of nature;**
- **this is likely to be followed by a CONSCIOUSNESS PHASE which will emphasise brain / mind technologies, different perceptions of reality and extended human capabilities associated with different states of consciousness.**

NOTE: See also later discussions on conceptual reality (in Part 2) and institutionalised power (in Part 7).

Q: Does social change happen by itself? Or can we influence it?

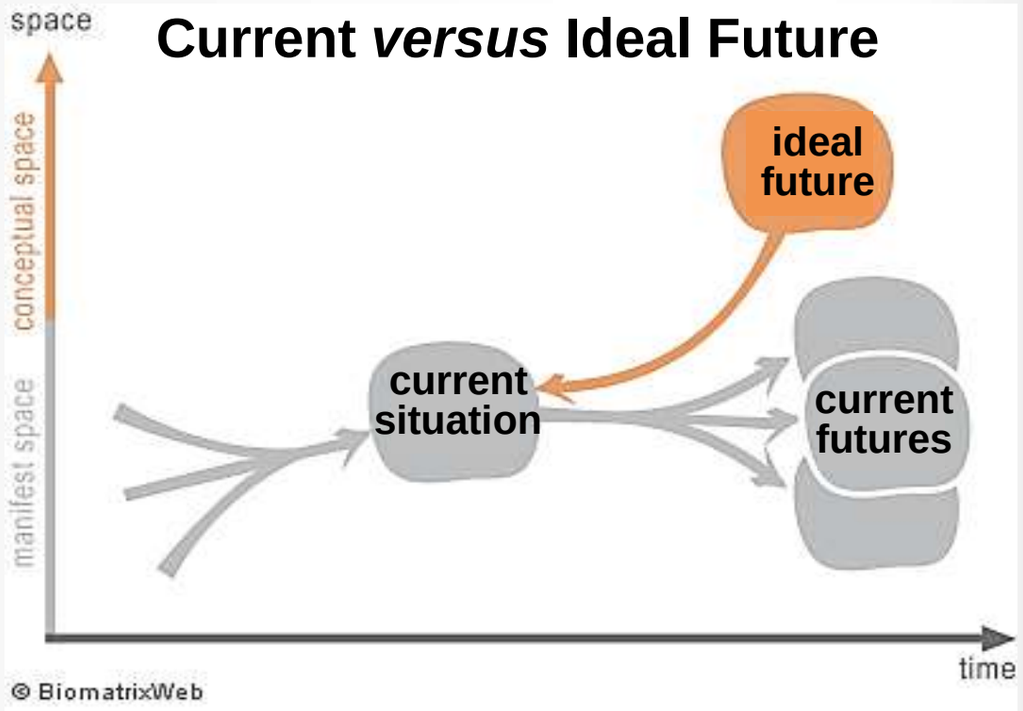
A: BOTH.

Past and current decisions have their impact on the future. Their influence continues. They have momentum. We futurists call this the **current future.**

Other developments are shaped by deliberate choice. We can choose a more **ideal future.**

The actual change emerges from the interaction of the two, as well as other *(e.g. planetary)* changes.

Let us study this in more detail and consult the ***Biomatrix Theory Book.***



CURRENT SITUATION

The current situation is the result of past decisions. If we had made different decisions in the past, we would be in another situation now.

The current situation has MOMENTUM, because the current thinking, structures, strategies, laws, resources, etc. keep existing and driving our behaviour and that of our systems, unless we deliberately change them.

Therefore, futurists distinguish between two types of future, namely a current future and an ideal future:

IDEAL FUTURE

To create a more ideal future implies that we make a deliberate choice of what we want our future to be.

We need to design it and then put effort into bringing it about through according actions.

Thereby we begin moving into a better future.

Designing an ideal future requires a new way of thinking!

CURRENT FUTURES

If we carry on doing what we are / have been doing all along, we land up in a current future.

We arrive in the future by default.

Because the environment keeps changing and will impact on our situation, the future will be different to our current situation. Therefore, different kinds of current future scenarios are possible.

Not choosing the future deliberately means choosing to be the victim of one's default settings (i.e. habits).

NOTE: Current versus Ideal Future

And let us be clear:

Being a futurist does not mean telling the future like a fortune teller, or anything like that…. .

It also does not mean predicting the future, because the future cannot be predicted. We have free will *(at least to some extent)*!

We can however explore what could happen, if we carry on doing what we have always been doing. This is the default option that leads us into a current future.

We can also explore what kind of future we would prefer and then making a choice about it. This is the design option that leads us towards a more desirable ideal future.

The world's problems cannot be solved by moving into a current future *(which is based on more of the same strategic thinking).*

Instead, it requires doing things differently from now on, based on a different worldview, namely w/holistic thinking.

Based on this new thinking, we must make an ideal design of our economic, cultural and political systems and then put effort into implementing the designs. As soon as the systems function according to the new designs *(i.e. are transformed)* they create new outcomes that will not reproduce the current problems.

If we don't do this, the current systems – and their problems – will perpetuate themselves and worsen.

"One cannot solve a problem with the thinking that gave rise to it." (Einstein)

What is your CHOICE going to be? A current future by DEFAULT or an ideal future by DESIGN?

We definitely choose the IDEAL FUTURE!

But HOW can we do this?

We are only a bunch of kids!

What impact can we have?

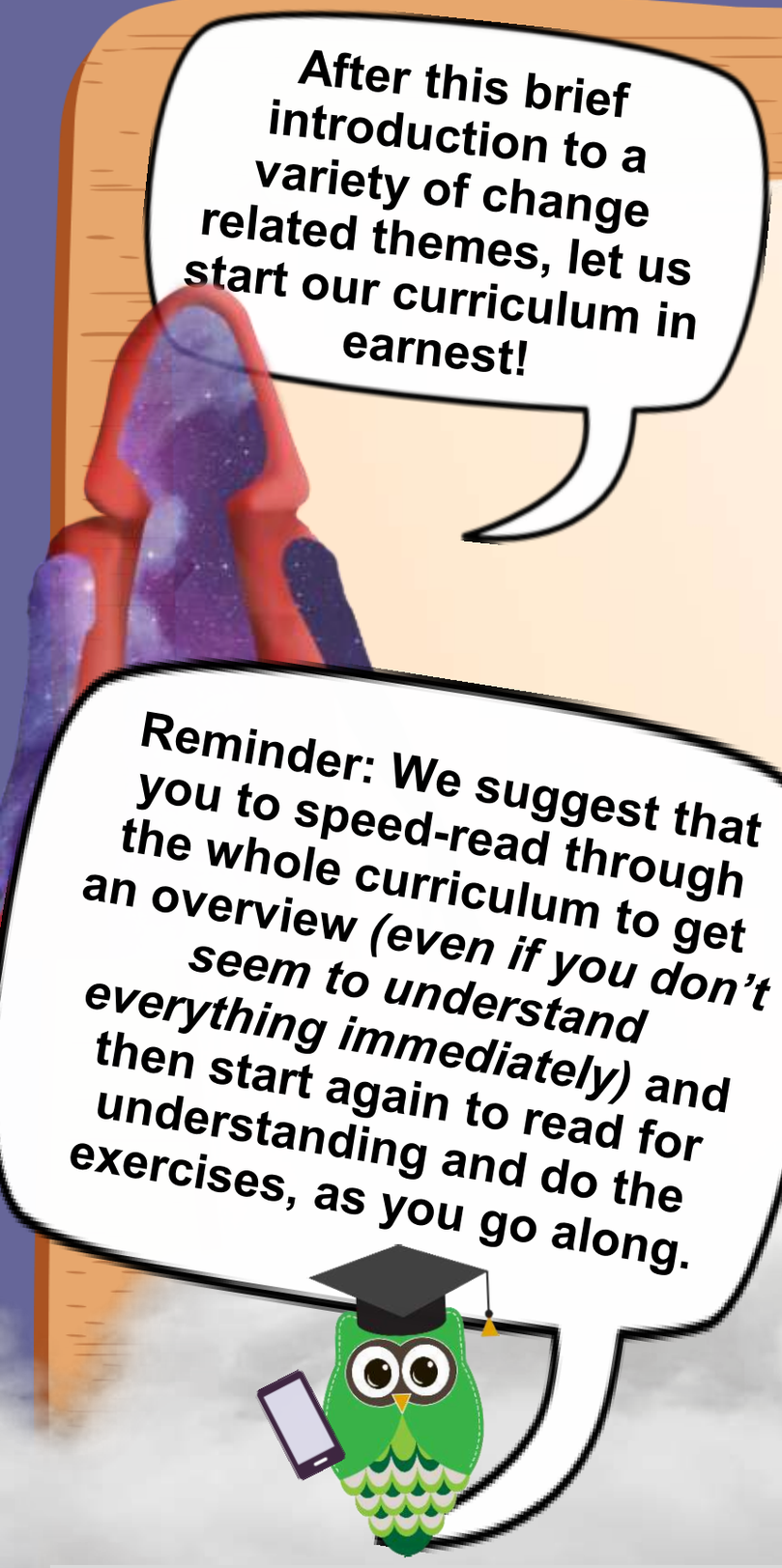
CONGRATULATION!

It takes a lot of courage to take responsibility for a larger whole, let alone to take on the world's problems.

To answer the first of your questions
"How you can we do this?"
I will teach you what you need to know through this CURRICULUM. You need to STUDY it and then APPLY it!

(More about application later. First you need to understand the methodology explained in this curriculum.)

CURRICULUM



NOTE: Remember, you deal with a new worldview that you are not familiar with. So it may take a little more time to understand!

CONTENT

PART 2: Worldview

describes the worldviews of reductionism and w/holism and how worldview impacts on the way we perceive the world and shape it

PART 3: Theory of W/Holism

introduces *Biomatrix Theory* as a theory of w/holism which explains how system are organised and change. It explains some of its concepts that are relevant in redesigning systems and managing change.

PART 4: Understanding Complexity

explains the messy characteristics of complex problems, how they are co-produced by many co-factors which impact on each other and thereby make the messy situation "shifty" (i.e. it changes continuously).

PART 5: Understanding System Change

explains the difference between problem solving and dissolving, reformative and transformative change and introduces generic frameworks as context to guide the change of a specific system as content.

CURRICULUM *(continued)*

CONTENT

PART 6: W/Holistic Change Methodology

explains how to dissolve a mess *(or system of complex problems)* and describes the 9 steps involved in (re)designing and transforming an activity system *(or function),* based on *Biomatrix Theory.*
These steps are (1) choosing the framework, (2) current system analysis, (3) brainstorming solutions, (4) compiling *Design Notebooks*, (5) creating an ideal design, (6) assessing impact, (7) conduct design iterations, (8) make an implementation plan, (9) implement the design.

PART 7: W/Holistic Change Management

explains how to manage and facilitate change w/holistically, based on *Biomatrix Theory:*

7.1. Change Management Principles

provides some insight about how systems change

7.2. W/Holistic Leadership

explains the concept of w/holipart and the distinction between context and content leaders

7.3. Change management structures and procedures

outlines the structures and procedures involved in managing change in a formal and informal manner and their institutional context

7.4. Change Management in Society

refers to w/holistic participatory democracy and w/holistic public discourse and discusses revolutionary versus evolutionary change and a digital r/evolution.

PART 8: SUMMARY

...as the word implies

POST SCRIPT

A new world confronts the kids...

NOTE:* Part 7.4. is presented only in overview. It is described in more detail in the *Curriculum in W/Holistic Participatory Democracy.

A: This curriculum was designed in answer to exactly this question. It can be summarised as follows:

To dissolve the complex problems of the world requires the transformation of most of the current problem-riddled cultural, economic and political systems *(which are an outdated legacy of the industrial age).*

As the systems get transformed *(and provided that the transformation is based on a w/holistic worldview),* their current problems will dissolve, *analogous to dissolving disease by introducing health.*

And how do we go about changing those systems?

Firstly, we need to redesign them. This answers the question: How should the new system look like and function? *(What we can't imagine, we can't create!)*

Secondly, we need an implementation plan. This answers the questions: Can the design be implemented and function as designed *(given the available resources)* and how long will it take before the system is changed? *(If it can't be implemented, the design is only a daydream!)*

Thirdly, we need change management. This answers questions such as: How can we get the current power structures to change and how can we ensure that stakeholders participate, support and implement the change? *(This can require leadership, voluntary self-organisation and r/evolutionary strategy.)*

The three areas of change need to be coordinated, even if each of them has its own methodology, strategies and participating stakeholders. If one of the areas is missing, the desired change will not happen. *(The system will change in some other way, driven by other forces of change.)*

Q: You did not mention analysing and understanding problems. Is that not necessary?

A: There are different schools of thought among systems thinkers:

The one school focuses on how the current system functions and where it gives rise to problems *(see the later discussion on systems dynamics)*. The inherent problem with this approach is that it keeps the mind stuck in the logic of the current system.

The other school follows a blank page approach according to the dictum: *"Pretend that the system has been destroyed over night and only its resources remain. Now redesign it in a new way"*. In our experience, the problem with this approach is on the one hand that few people are creative enough for it and on the other hand that most participants do not believe that such a design would get rid of their problems.

Our approach is to start with the identification of problems and use them to brainstorm higher order solutions, which are integrated into alternative designs based on the generic principles of *Biomatrix Theory*. *(See the steps involved in a system transformation in Part 6.)*

A: It is a good start. It certainly makes you more of a w/holistic thinker.

However, to facilitate the redesign of a large social system *(e.g. an organisation, an industry or a government function)*, you will need a more detailed w/holistic knowledge of *Biomatrix Theory* and *Biomatrix Change Methodology (as explained in Part 6).*

Q: Does this curriculum make **w/holistic leaders** from us?

NOTE

Our webpage (*www.biomatrixweb.com*), books and video lectures provide some more information on *Biomatrix Theory and Change Methodology.*

The *Biomatrix System Design School* offers courses in the theory and methodology, including template driven assignments for transforming a case study system chosen by a course participant.

Corporate clients *(e.g. business organisations, industries, government departments)* can manage their transformation through an in-house application of the appropriate *Biomatrix Transformation Programme*. The programme guides selected members of the client system to redesign the collective system and facilitates the implementation of the design through which the system will be transformed.

Back to your question:
What impact can we have?
One cannot create what one cannot imagine. We cannot create a better energy, education, health care or whatever system and dissolve its complex problems, before we have not made a design of it.

You live in the information age.
Information is a click away.
Design is information!
You can facilitate the redesign of any system you choose.
Of course, you cannot redesign a large system by yourself.
You will need to engage its stakeholders.
Social networking can be your tool.
(The Biomatrix Jamming and Design Conferencing Programme can provide you with the necessary w/holistic structures).

NOTE

BIOMATRIX JAMMING is an online method that allows you to engage the stakeholders of a system to identify and analyse problems, as well as identify existing solutions and brainstorm new ones.

Also check out *Art Jamming on the biomatrix webpage*. It is FUN!

BIOMATRIX DESIGN CONFERENCING is a method for engaging stakeholder representatives in integrating the brainstormed information from the jam into a coherent system design.

As to your remark:
We are ONLY a bunch of kids!
Of course you are a bunch of kids doing all the kids' stuff. But you are also exceptional kids! You have done an extraordinary journey, met many people and – most importantly – you have done a lot of thinking and self-reflection!
Armed with knowledge of *Biomatrix Theory and Change Methodology*, you can have a significant impact on the world by merely inspiring the rethinking of your favourite system of concern *(such as the education system)!*
SO WHY NOT START THE BALL ROLLING?

And don't forget to have fun with it all!

As a start, I hereby grant you the honorary title of W/HOLIPARTS...

... and send you as w/holistic leaders on a mission to save the world!

Q: What IS a w/holipart?

A: The word *w/holipart* suggests

- that each of us is a WHOLE,
- but is also a PART of a larger whole.

As w/holistic thinkers we have to bear this in mind all the time, as most decisions involve the balancing of self-interest with the interest of the larger whole.

NOTE

Instead of the term larger whole we also use the word containing whole in the case of an *entity system* and overarching whole in the case of an *activity system.*

(NOTE: We will explain later that there are two different types of system in the web of life, namely ENTITY SYSTEMS (like a person, organisation, society and planet) and ACTIVITY SYSTEMS (like a function and an industry).

W/Holiparts

What is a w/holipart?

W/Holiparts are leaders who think w/holistically.

They are able to assume the perspective of the greater *(or containing or overarching)* whole, as well as its parts *(i.e. the self as part and the other parts).*

They also know when and how to identify with and act from the perspective of the whole and / or a part.

What does a w/holipart do?

W/Holiparts are w/holistic leaders. They inspire others to think and act w/holistically.

They are ready to take responsibility for the whole, including for the co-creation of a more sustainable society.

They know that this involves a w/holistic transformation of all social systems *(e.g. education, transport, finance, electricity)* and the (dis)solving of their complex problems.

How does the w/holipart do this?

W/Holiparts learn as much as possible about *Biomatrix Theory* and *Biomatrix Change Methodology* in order to become competent and w/holistic change promoters.

They take the initiative to apply this knowledge to the redesign of their system of concern and facilitate its transformation.

The *Biomatrix Jamming and Design Conferencing Method* can guide them in this, especially when transforming large public systems, as it encourages widespread stakeholder participation.

Q: Why do you spell w/holism in this unusual way?

A: This spelling of w/holism indicates the dual perspective of a system as

- BEING a whole in the sense of being complete in itself and
- ACTING holistically* which means that it acts as part of a larger whole and interacts with its environment in a self-organising and adaptive manner.

*NOTE

Some researchers also use the term systemic instead of holistic, as systems thinking and w/holistic thinking are related bodies of knowledge.

Q: You mentioned a few times w/holistic thinking.

What is it and and can you tell us more about it?

A: Yes, let us continue to explore how we view the world and compare reductionist and w/holistic thinking *(in Part 2)*.

Then let us delve deeper into a theory of w/holism, namely *Biomatrix Theory* and learn more about a w/holistic organisation of systems *(in Part 3)*.

This will equip you to have a deeper understanding of the complex problems you encountered on your journey *(see Part 4)*, how systems change *(see Part 5)* and how you can change systems *(see Parts 6 and 7)*.

Q: Why is it important to learn about w/holistic thinking?

A: If you perceive the world differently, you will interact with it differently.

You will analyse it differently and you will find different ways of solving its problems!

If your only tool is a hammer, you will treat the world as if it were a nail!

(Abraham Maslow)

Enlarge your toolbox with w/holistic tools!

PART 2:
Worldview: *Reductionism and W/Holism*

The REDUCTIONIST WORLDVIEW looks into things in isolation from each other and analyses them.

The W/HOLISTIC WORLDVIEW LOOKS at the interaction of things within a larger whole and synthesises them.

Q: Why do we need to learn about worldview?

A: The way we perceive the world is how we respond to it.
Currently, the dominant worldview is **REDUCTIONISM.** It looks into things. It is the worldview of science and has shaped the current economic, cultural and political institutions in most parts of the world. It is also the root cause of the world's complex problems and most of the proposed solutions which you encountered on your journey *(in Chapter 1).*
A change in worldview will allow us to view the world differently and come up with a different perception of and solutions to the current problems. This worldview is **W/HOLISM.** It allows us to perceive things as being *(part of)* wholes and as interacting with each other.

If you change your worldview, your beliefs and values will also change accordingly!

Role of Worldview

Worldview determines the way we are, by determining our:

- **PERCEPTION (how we observe the world)**
- **LOGIC (how we think and interpret what we observe)**
- **JUDGEMENT (how we evaluate what we observe)**
- **ORIENTATION (how we plan our actions)**
- **MOTIVATION (why we act and choose things)**
- **MORALITY (the way we act)**

Biomatrix Theory

Be careful how you think;

your life is shaped by your thoughts.

(Proverb)

You become what you think!

(Proverb)

REDUCTIONISM

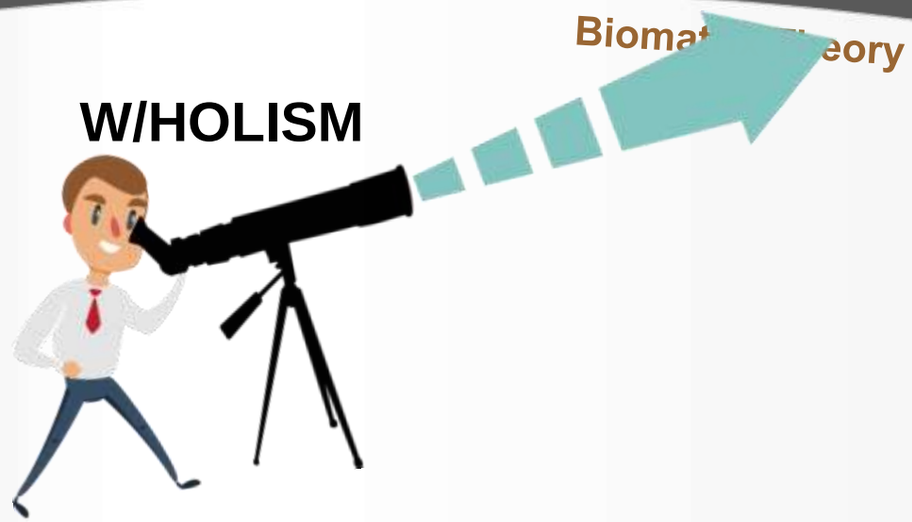
In essence, REDUCTIONIST THINKING looks into systems and analyses them, while keeping their environment constant *("ceteris paribus").* It aims to replicate and predict system behaviour.

It focuses on parts of the world and sees them as separate from each other.

It leads us to identify more and more parts of "things" and therefore has a tendency to lead us deeper into materialism.

It gives us a partial truth of how things are. It also gives us the illusion that we can solve problems in isolation from each other, while being unable to deal with complex problems.

W/HOLISM



In essence, W/HOLISTIC THINKING looks at the larger picture. It leads us to identify larger wholes and describes the relationship between systems, their mutual impact on and thereby co-production of each other.
It also explores the in-formation (i.e. non-material) reality of systems and observes the synergy and new qualities that emerge from the interaction, which explain that the whole is greater than the sum of its parts.

The interconnectedness and mutual co-production of all things implies that they seem to change from moment to moment. If this change is not harmonious, it gives rise to complex problems that are messy, shifty and apparently unsolvable, until we learn that those complex problems dis-solve as systems become more w/holistic in their functioning and interaction.

Reductionism *(continued)*

Reductionist thinking is the currently dominant worldview, including that of science. It is an extension of mechanistic thinking.

This worldview is a legacy of the industrial age. It has led to much knowledge and scientific progress, but sadly, it also gave rise to the complex problems of the world and the systems that create them. Thus, in final analysis, the root cause of humanity's complex problems is the reductionist worldview.

W/Holism *(continued)*

W/Holistic thinking represents a transformation in worldview. It is the worldview of the information age.

***Biomatrix Theory* is a theory of w/holism.**

It describes how systems are organised.

In application the theory gives rise to a methodology for system (re)design and transformation.

The two worldviews do not necessarily contradict each other, but should ideally complement each other.

Each worldview is appropriate in a different context and for a different purpose.

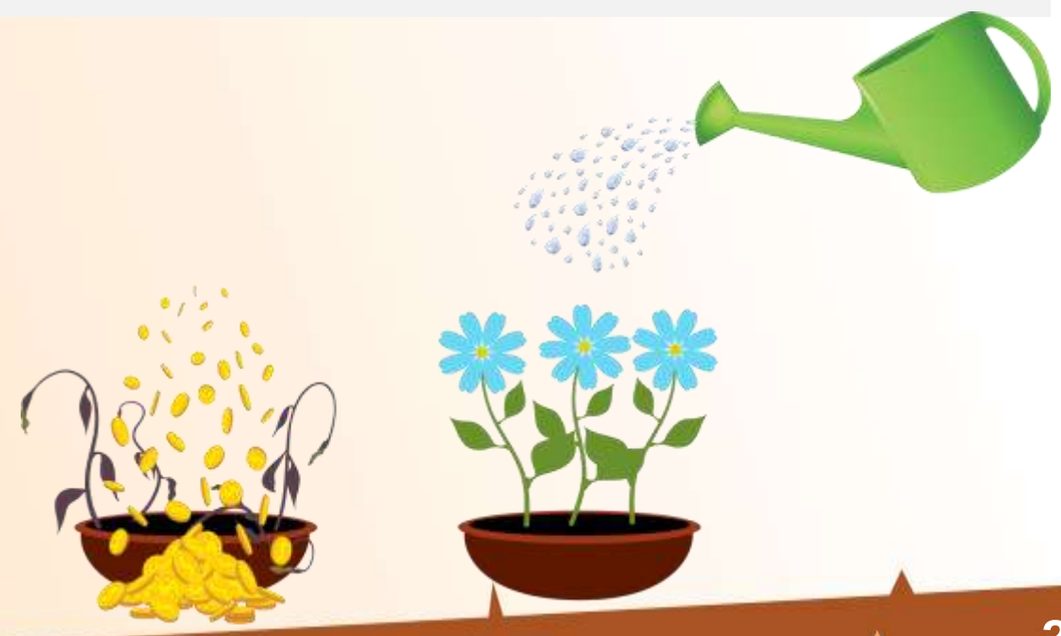
NOTE: transform your worldview

Let us remind ourselves of Albert Einstein's observation that one cannot solve a problem with the thinking that gave rise to it. Or to paraphrase him: The logic of the problem is not the logic of the solution.

Society's current problems were and continue to be created by the way how we think and how this thinking shapes our economic, cultural and political systems and their functioning.

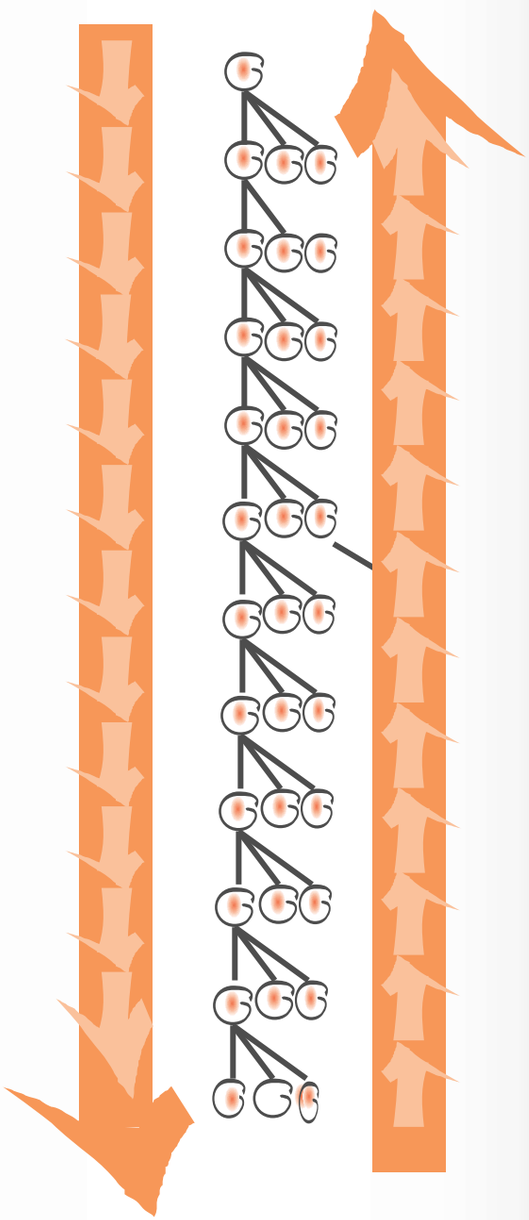
So, if we agree with Einstein, WE NEED TO TRANSFORM OUR WORLDVIEW!

Our systems need to function and interact with each other on the basis of a new logic that is derived from a w/holistic worldview.



W/HOLISM

system type	system hierarchy
galaxy	
planet	
society	
institution	
organisation	
group, family	
individual	
organism	
cell	
molecule	
atom	
particle	



Biomatrix Theory

REDUCTIONISM

scientific discipline
e.g. astronomy, astro-physics, etc.
e.g. ecology, climatology, etc.
e.g. sociology, ethnology, etc.
e.g. economics, culture, politics, etc
e.g. managerial, engineering, etc.
e.g. social psychology, etc
e.g. psychology, etc.
e.g. medicine, physiology, botany, etc.
e.g. biology, bacteriology, etc.
e.g. chemistry, mineralogy, genetics, etc.
e.g. physics, nuclear sciences, etc.

reductionist *versus* w/holistic science

The previous Figure illustrates that
systems are located at different LEVELS
in the containing systems hierarchy of life
(symbolised by the Figure between the two orange arrows
and listed in the left column).

They are studied by DIFFERENT SCIENTIFIC DISCIPLINES
(symbolised by the grey horizontal arrows).

Reductionist science studies the disciplines
in isolation from each other,

while w/holistic science also investigates
interdisciplinary interaction
(symbolised by the two vertical orange arrows).

Each view reveals different aspects of a larger truth.

NOTE: Some would argue that reductionism and w/holism are mutually exclusive views, while others would regard w/holism as the overarching view of which reductionism is merely a part, or special case.

SCIENTIFIC METHOD

REDUCTIONIST SCIENCE uses the traditional scientific method which involves ANALYSIS, which means studying a system by breaking it down into its parts and investigating them.

Its approach is

- **a-contextual by keeping the environment constant *(ceteris paribus)***
- **predictable through repeatable causation**
- **value-free through a neutral observer**

It presumes that a system can be fully understood if there is complete knowledge of its parts.

Biomatrix Theory

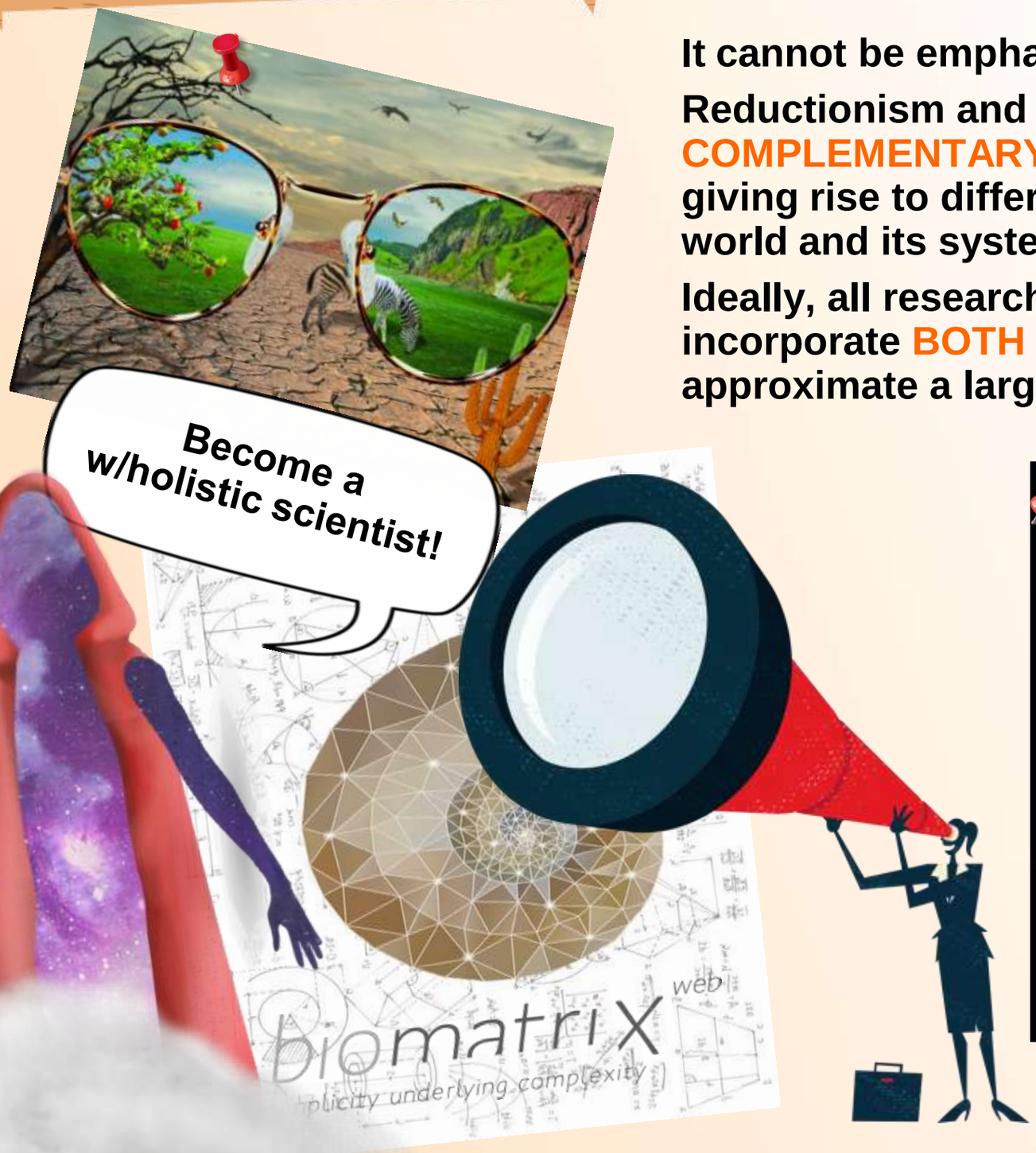
W/HOLISTIC SCIENCE is trans-disciplinary. It studies the interaction, co-production and continuity of systems across levels.

It extends the traditional scientific method through SYNTHESIS.

Its approach is to

- **study the emergence of a system from the interaction of its parts and its interaction with other systems in the outer and inner environment**
- **contextualise knowledge *(e.g. through meta-disciplinary frameworks)***
- **acknowledge free will (especially in human systems) and therefore the unpredictability of social systems**
- **view systems from multiple perspectives**
- **recognise that observation changes the system**
- **explore a system through the lens of w/holistic principles of system organisation**

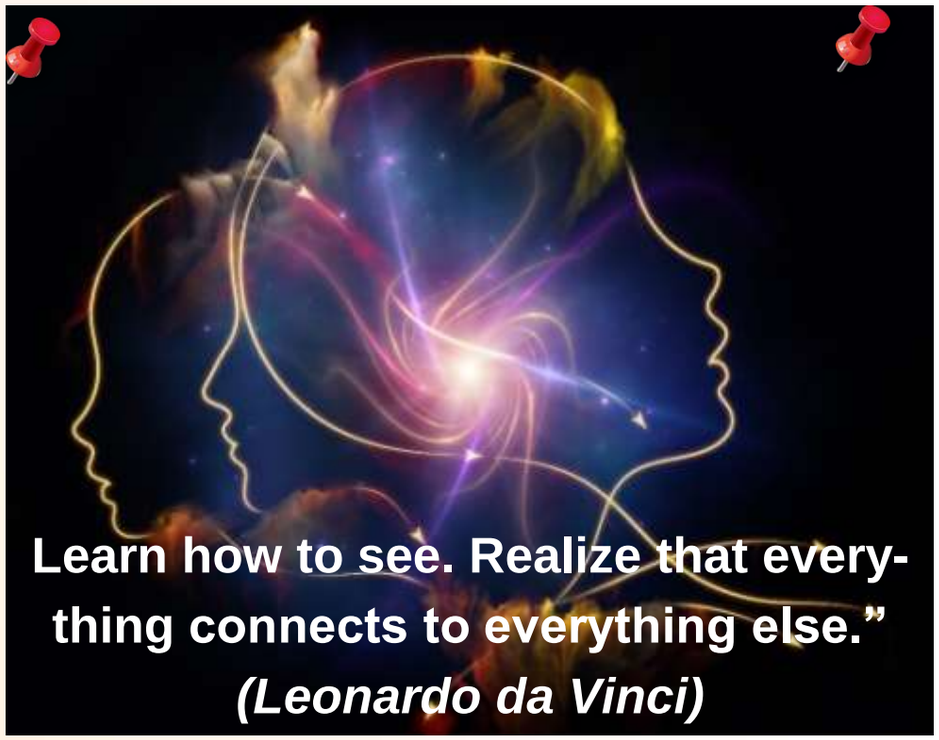
w/holistic *versus* reductionist science



It cannot be emphasised enough:

Reductionism and w/holism are COMPLEMENTARY views of the world, each giving rise to different theories of how the world and its systems works.

Ideally, all research designs should incorporate BOTH views in order to approximate a larger truth of those systems.



Q: WHY are the reductionist and w/holistic way of looking at the world equally important?

A: The short answer is, that reductionism separates and distinguishes, while w/holism puts together and integrates.

If we have not separated, we cannot put together. If we have not distinguished, we cannot integrate.

If we only see the whole, we do not see the distinct things within it. If we only see separate things, we do not see the whole.

Not either / or, but as well as !

And there is another aspect of w/holism that needs to be considered, namely that systems have a **physical reality** and a **conceptual reality** *(consisting of in-formation fields, while religious and esoteric traditions regard it as a spiritual reality).*

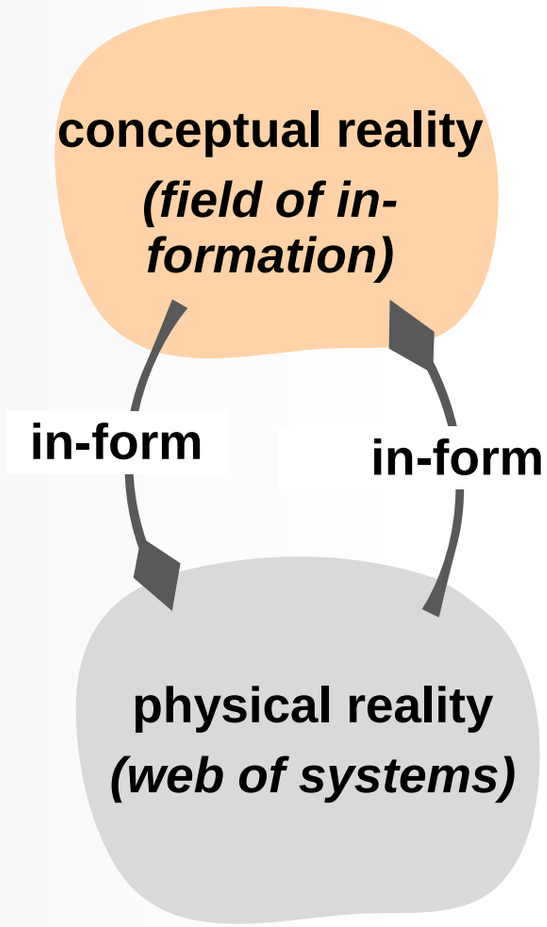
Traditional science deals with the observation of the physical reality of the universe. It is materialist in nature and tends to ignore that there is a conceptual reality *(let alone a spiritual one)* behind the physical reality.

Since religion and spiritual experiences have been part of human experience throughout history, they have to be considered as part of a w/holistic understanding of the world and in change management.

Let us explore the two realities in more detail.

Some say that the current problems of the world are the result of a spiritual, or conceptual, or thinking crisis *(whereby the terminology depends on who says it)!*

Physical *versus* Conceptual Reality of the Biomatrix



Biomatrix Theory

Biomatrix Theory **suggests that systems have a**

CONCEPTUAL REALITY

and a

PHYSICAL REALITY,

analogous to the idea, design and plans *(representing conceptual reality)* that give rise to a building in physical reality.

Physical *versus* Conceptual Reality of the Biomatrix *(continued)*

The PHYSICAL REALITY refers to the "things" in the material world we live in.

It is IN-FORMED by a conceptual reality. Put differently, the conceptual reality puts form into physical reality, *analogous to a house being built according to an idea and plan.*

In turn, physical reality can also IN-FORM a change in conceptual reality. For example, if a mistake or obstacle arises in physical reality, the system will have to re-plan *(i.e. change its conceptual reality).*

Biomatrix Theory

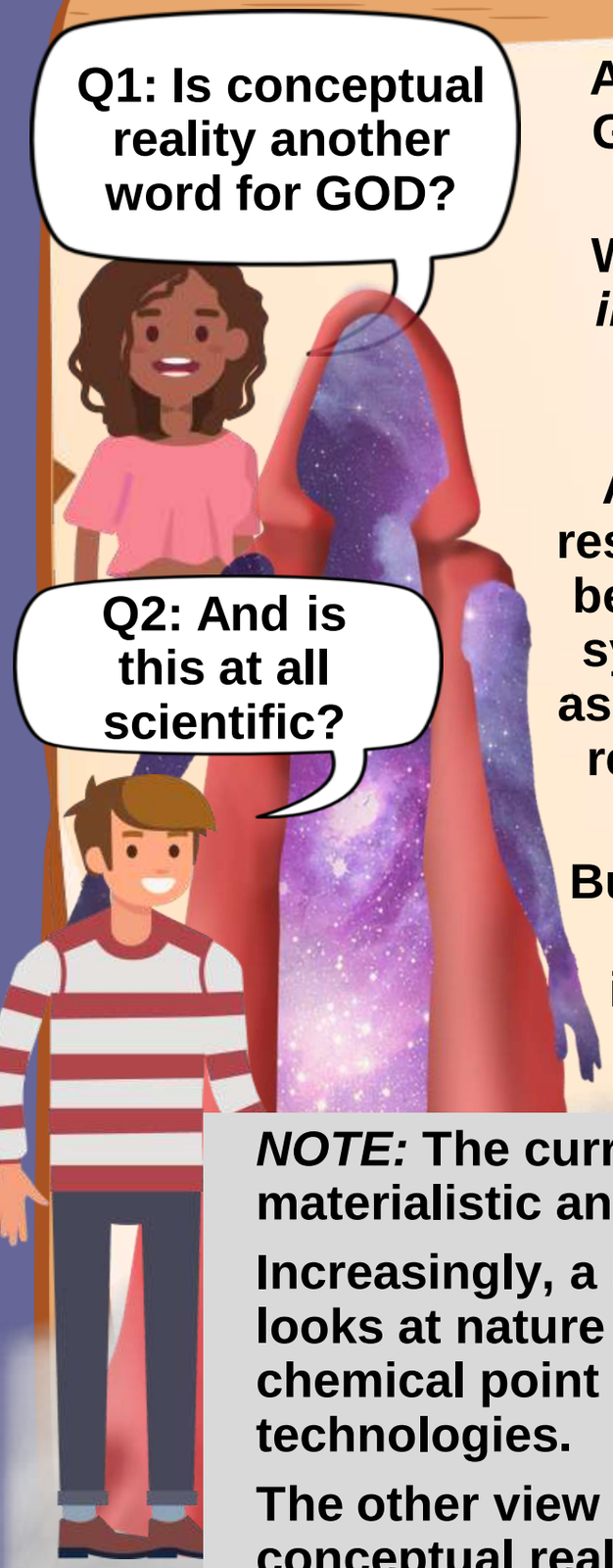
The CONCEPTUAL REALITY is a field of information that represents an abstract blueprint of the system *(or "things")* we observe.

It is described by the ideas, designs and plans of social and technological systems and the laws of nature of natural systems.

According to the two realities, *Biomatrix Theory* proposes the dual view of seeing the world as a WEB of interacting discrete systems and as a FIELD of information from which they arise.

Note: Other terms for in-formation field, or conceptual reality are ethos field *(our preferred term),* morphogenetic field *(R. Sheldrake),* implicate order *(D. Bohm), noosphere (K.E. Boulding)* and field of Akasha *(E. Laszlo).*

NOTE: conceptual reality



A1: No. I presume that most mystics and theologians would agree that GOD is all – physical and conceptual reality *(while scientists claim that God doesn't exist anyway).*

What you probably allude to is questions such as: *"Is there a universal intelligence and divine order that is the final cause of everything?" " Is there an a-priori order and in-formation?"* or *"Is there a spiritual dimension of life?"*

A2:Because the traditional material science does not acknowledge or research the spiritual aspect of life, it regards the intelligence of nature as being an emergence *(or epiphenomenon)* of the evolution of the material systems of nature. It also regards human thought, feelings and emotion as by-product *(or epiphenomenon)* of brain functioning. As such, it would regard the notion that conceptual reality is the primal cause of physical reality, as unscientific.

But since we do not spend much effort in science to explore the spiritual dimension of life, the answer is that we don't really KNOW, if there is an underlying spiritual dimension, or how it functions.

We have still a lot to learn ...

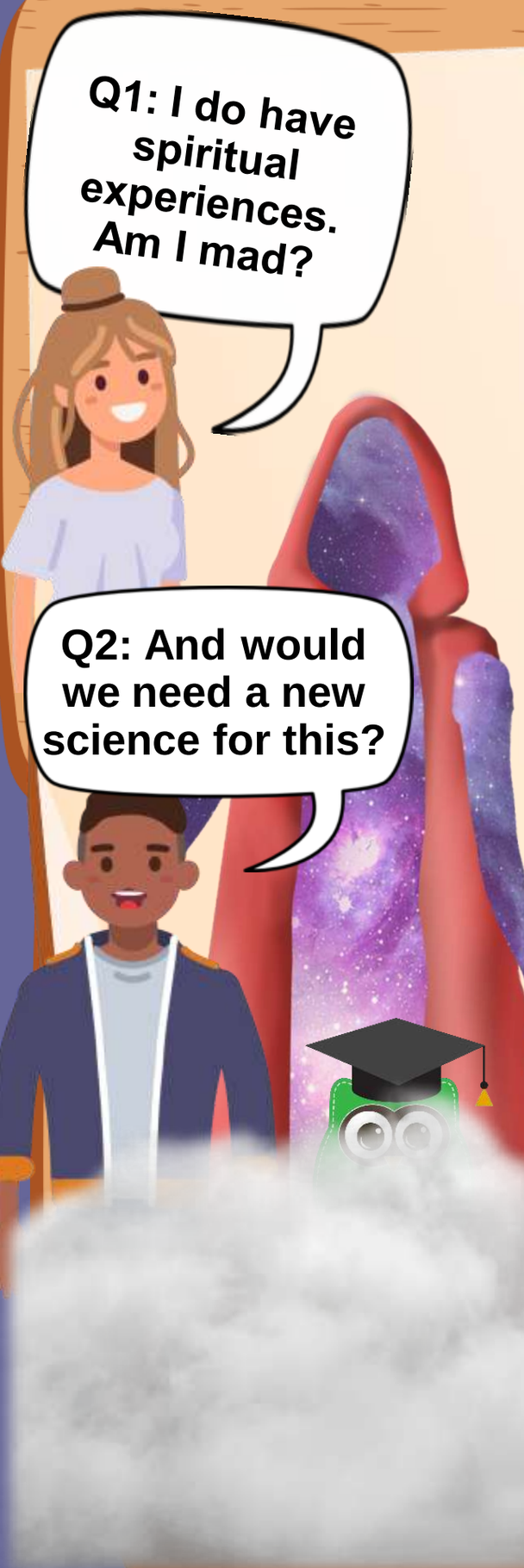
***NOTE:* The current reductionist scientific paradigm leads to materialistic and deterministic thinking.**

Increasingly, a biotechnological worldview is emerging that looks at nature and its systems exclusively from a physical and chemical point of view and wants to improve them through technologies.

The other view of seeing the world, based on the existence of a conceptual reality *(in the sense of a spiritual reality that can exist independently from physical reality)* is largely ignored. *(There is however some interesting research on consciousness, even if it is not much talked about by mainstream science.)*

... after all, we have barely entered the biological phase of the in-formation age, let alone the consciousness phase!

NOTE: conceptual reality (continued)



A1: No, you are not mad! Throughout the ages and in all cultures, people have described and lived by their spiritual experiences.

A w/holistic worldview needs to recognise, incorporate and explain the spiritual perspective - at least in the sense that we recognize its existence in terms of human experience and religious traditions and must therefore consider them in the design of our societal systems.

Apropos science: Have you forgotten that during your journey *(in Chapter 1*), you met some neuro-scientists and psychologists who do research on different brain states *(e.g. the beta, alpha, theta and delta states)* and their association with different states of consciousness *(e.g. waking, dreaming, hypnotic and deep sleep)?*

And I know that you also met some mystics and representatives of the esoteric traditions of different religions *(even if they told you not to talk about it, so as not to "cast pearls ...").* They explained to you that there are also transcendent states of consciousness *(such as a cosmic, God, or unity consciousness)* and that the knowledge of the world changes with each state of consciousness!?!

A2: As to science: Scientists *(like we all)* work mostly from the waking state of consciousness and a few creative ones also from the dream *(or alpha)* state. In the absence of having a deep personal knowledge of transcendent states of consciousness, they will not be able to meaningfully research and evaluate the time / space transcending spiritual reality of which the mystics talk. *By analogy, a blind person will have difficulty in structuring appropriate research on the nature of colour and its experience.*

So yes, once we know more, there could be a new science emerging!

NOTE: conceptual reality *(continued)*

Q: On our journey we encountered the view that not only our knowledge of the world changes with different states of consciousness, but also the world itself *(in its physical reality)*!

Can this be true?

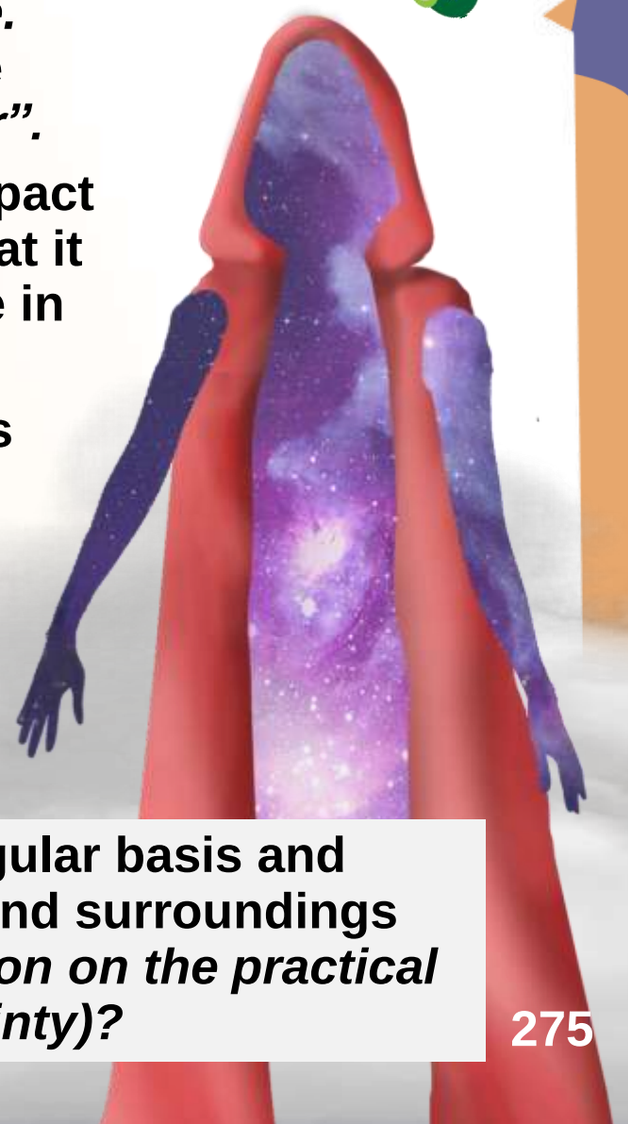
A: Those are indeed challenging notions, which are also of huge importance from the perspective of understanding the role of worldview.

There is indeed some very interesting scientific research on consciousness, especially in connection with meditation, prayer and other spiritual practices and their beneficial effect on the physiology *(besides the psychology)* of their practitioners. This confirms that changing conceptual reality in-forms *(i.e. creates change in)* the physical reality of the practitioner, demonstrating *"mind over matter"*.

Even more impressive is the research on the impact of meditation, if practiced in a group, namely that it can create beneficial *(and inexplicable)* change in society and even the physical environment.

We suggest that you find out more about this spectacular research.

Welcome to a peek into the consciousness stage of the in-formation age!

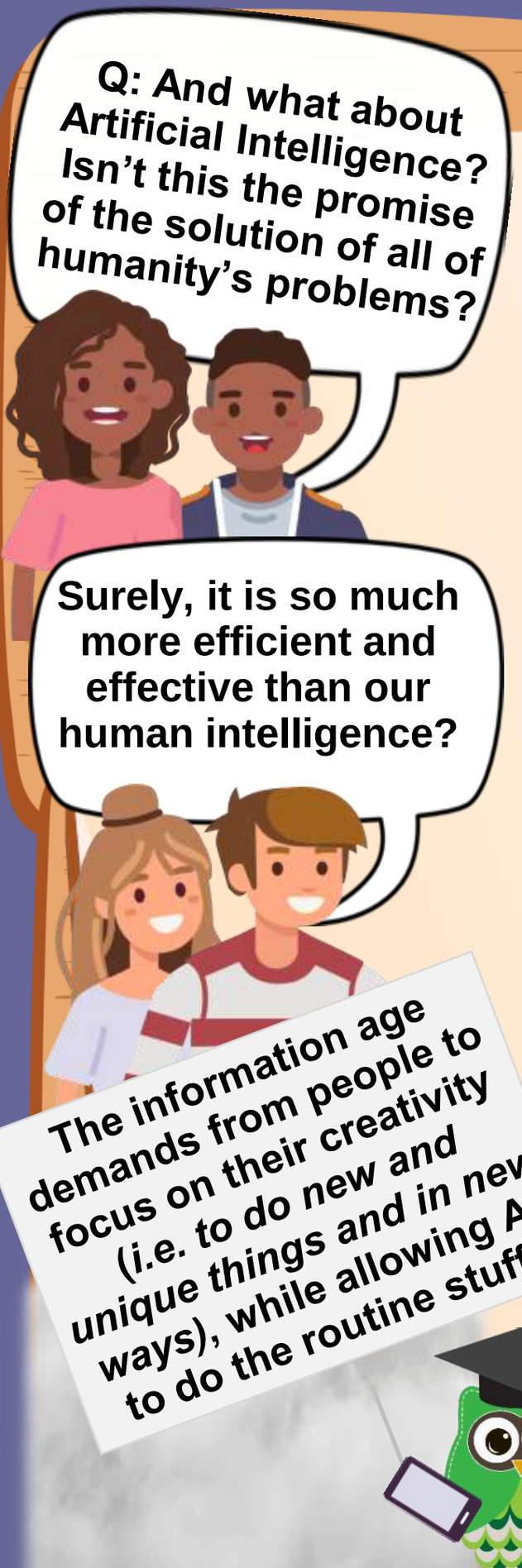


Knowledge is structured in consciousness *(Maharishi)*

You are equal to the spirit you understand. *(Goethe)*

NOTE: Why not start to **meditate** on a regular basis and experience its impact on your personal life and surroundings *(which would allow you to answer your question on the practical use of all of this with some certainty)?*

NOTE: conceptual reality *(continued)*



A: Like all technologies, Artificial Intelligence will solve some problems and create others.

To evaluate the efficiency and effectiveness of AI, we need to explore the issue of "intelligence" some more. The dictionary defines it as *"the ability to acquire and apply knowledge and skills".*

This involves the interaction between a knower, the process of knowing and what is known.

As a human being, I am a self-referring and self-reflective knower. Through the process of knowing, I tap *(actively or passively)* into existing knowledge *(i.e. various "databanks")*, besides generating my own unique knowledge and meaning.

Accessing existing knowledge and applying it, is a learned skill. It is needed as technical knowledge in all our daily functions. It is the basis of personal expertise in different areas of life, while generating unique knowledge involves creativity. Creativity can be the result of serendipity or emergence *(because information is synergistic)*, or it can arise from imagination.

By comparison, AI can be a self-referring "knower", but it is not a self-reflecting one that contemplates meaning, nor is it capable of the creativity of imagination *(beyond programming and serendipity).* It lacks what the most creative humans throughout the ages called the imagination or "divine spark". Thus, while AI is certainly more efficient in applying existing knowledge to a given task, it lacks the knowledge that is most needed in system design and change management, namely generating imaginative creativity and meaning. These are the fruits of human consciousness and not of automation.

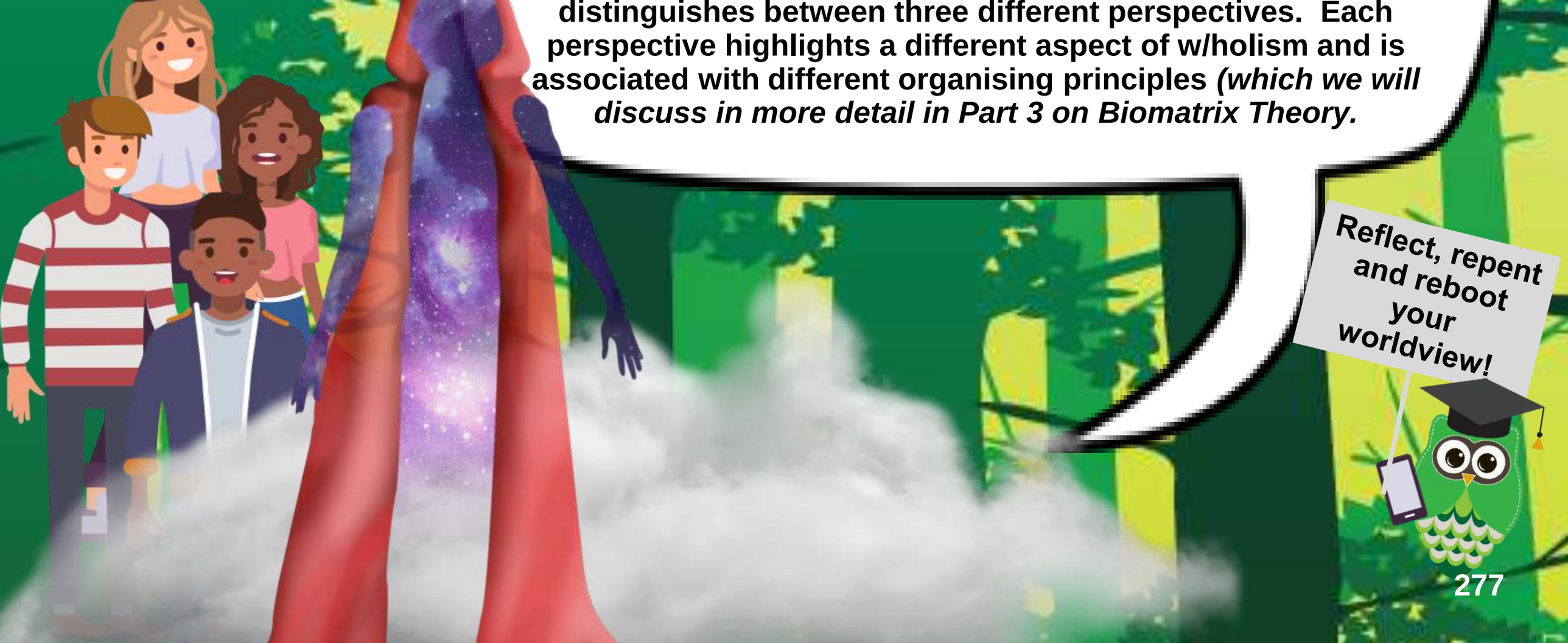
After this detour *(prompted by your questions)* into the more esoteric, consciousness-related aspect of the field-like conceptual *(or in-formation)* reality of the biomatrix, let us return to reductionism and w/holism.

We mentioned that the currently dominant worldview is reductionism. We are very familiar with it, as we learned it through science, education and the media.

We also said that we need to change our worldview and become w/holistic thinkers, if we want to change the world fundamentally.

The following *(somewhat flippant)* descriptions and illustrations summarise the essence of reductionist and w/holistic thinking.

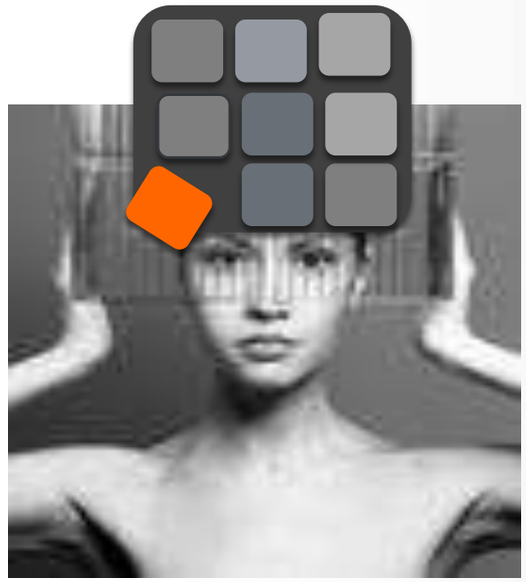
Note that - derived from w/holistic theory - w/holistic thinking distinguishes between three different perspectives. Each perspective highlights a different aspect of w/holism and is associated with different organising principles *(which we will discuss in more detail in Part 3 on Biomatrix Theory.*



Reductionist thinking is
BOXTHINK.

It sees systems as being isolated from each other, relatively independent from their environment and acting in their self-interest.

I am separate from you!



W/Holistic thinking is
W/HOLIPART THINK.

This thinking spans the knowledge that one is a whole and a part *(together with other parts)* of a containing whole.

It emphasises levels, because the whole *(i.e. the system)* exists on a different level than its parts *(i.e. its sub-systems).*

It sees the world as a being organised as a containing systems hierarchy, in which systems at each level are connected to and co-produced by systems in their outer and inner environment.

I am a whole and a part!

W/Holistic thinking is also

WEBTHINK.

This thinking describes the systems in physical reality as linking up and exchanging mei *(Matter, Energy and Information)* with each other across their system boundaries. Thereby they impact on and co-produce each other.

I am connected to and interact with you!

Biomatrix Theory

W/Holistic thinking is also

FIELDTHINK.

This thinking emphasizes the conceptual reality of a system, namely that a system is determined by an information field *(or ethos)* and that this field overlaps with the fields of other systems, merges with them and creates synergies in interaction with them, without there being discrete boundaries between them.

You and I are one!

Q1: Some of the experts we consulted didn't think that w/holistic thinking *(or its derivatives of systems and complexity thinking)* is all that successful in solving the world's problems!

A1: Indeed. Any partial and fragmented change interventions – be they derived from reductionist thinking or the partial application of a w/holistic / systems / or complexity approach – cannot succeed in dissolving the world's complex problems. Rather they make them worse.

Only a w/holistic worldview that is derived from a coherent theory of w/holism and is applied through a practical and comprehensive w/holistic methodology can make a difference...

(We believe that Biomatrix Theory and Change Methodology are such a theory and methodology.)

Q2: And what has this worldview stuff to do with the REAL world?

A2: Watch our video on our webpage about the "State of the World" to find out!

PART 3:
Theory of W/Holism *(Biomatrix Theory)*

3.1. Overview

3.2. Web of the Biomatrix

3.3. Activity System

3.4. Entity System

3.5. Activity and Entity System Analogies

3.6. Levels and Dimensions

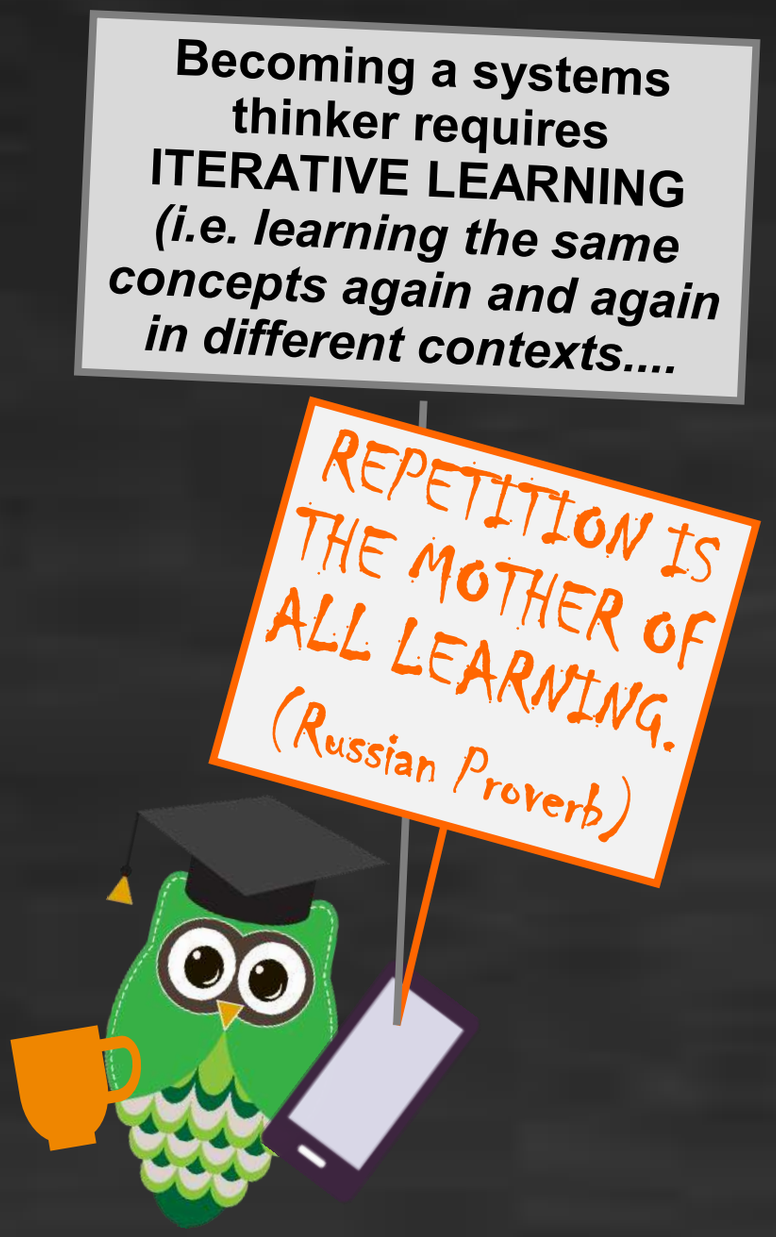
3.7. Seven Forces of System Organisation

NOTE on Repetition of Concepts

All *Biomatrix Curriculum Books* are based on *Biomatrix Theory.*

Therefore in each curriculum book the sections on *Worldview* and *Theory* contain the same basic concepts, as well as some additional ones that are relevant to the topic of the specific curriculum.

Nevertheless, if you have read them before in another book, we hope that you will not skip reading those sections again!



3.1. Overview

A WORLDVIEW needs to be underpinned by a THEORY of how the world is organised and functions.

We propose *Biomatrix Theory* as a theory of w/holism.

It describes different types of systems and explains their nature, functioning and development.

This part provides some of the key concepts of the theory that are relevant to complex problem dissolving. These and other concepts are explained in more detail on our webpage, in our publications and the various courses of the *Biomatrix System Design School.*

The scientific foundation of the theory has been argued in four PhDs and a number of scientific articles *(they are listed on www.biomtrixweb.com)*

A: A lot of people think that they are w/holistic thinkers because they believe and even perceive that everything is connected to everything else and that complex problems emerge from the interaction of systems and therefore stakeholders have to be involved in analysing and solving problems.

While all this is true, it is insufficient, if we want to change systems. For this we need a more detailed theoretical understanding, as well as a practical methodology. *(See also the analogy.)*

To get an idea about the comprehensiveness of *Biomatrix Theory and Methodology*, look at the following Mind Map.

Q: Why do we have to learn a lot of theory? Isn't a new worldview enough?

ANALOGY

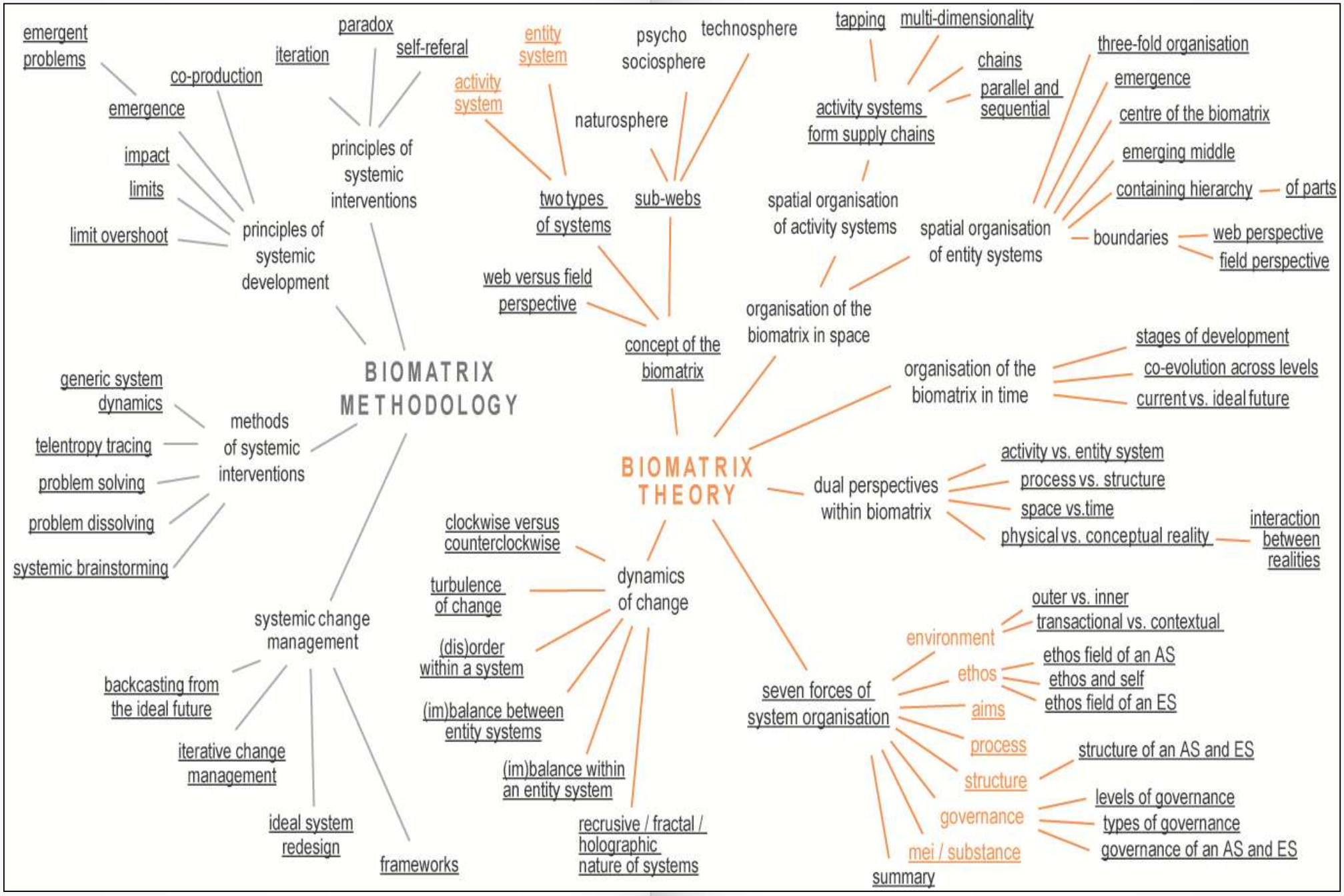
Knowing the law of gravity and therefore understanding why bridges and high-rise buildings don't collapse and airplanes don't fall out of the sky, doesn't *per se* help to design bridges, buildings and airplanes. More knowledge than that is needed (*which requires years of studying engineering at a university*).

Designing economic, political and cultural systems that do not give rise to complex problems needs a similar effort of knowing generic organising principles, as well as knowing how to apply them.

This curriculum is a start. Doing a *Biomatrix Design Course* could be your next step.

Biomatrix Theory

Key Concepts of *Biomatrix Theory*



This mind-map shows the key concepts of *Biomatrix Theory and Methodology* which can be studied in more detail on our webpage www.biomatrixweb.com *(click on theory).*

A: YES, you need all this knowledge, if you actually want to facilitate a change in a large system *(e.g. a public policy design, organisation and industry transformation or public governance design).*

NO, you don't need all this knowledge, if you just want an initial understanding of w/holism and how it can change the world *(and maybe if you want to start a Biomatrix Jam).* But...

BUT, you still need some basic theoretical knowledge.

The most important is to understand the concept of the biomatrix *(or web of life)* and the sub-systems and components, of which it consists *(as explained on the following pages of the Biomatrix Theory Book).*

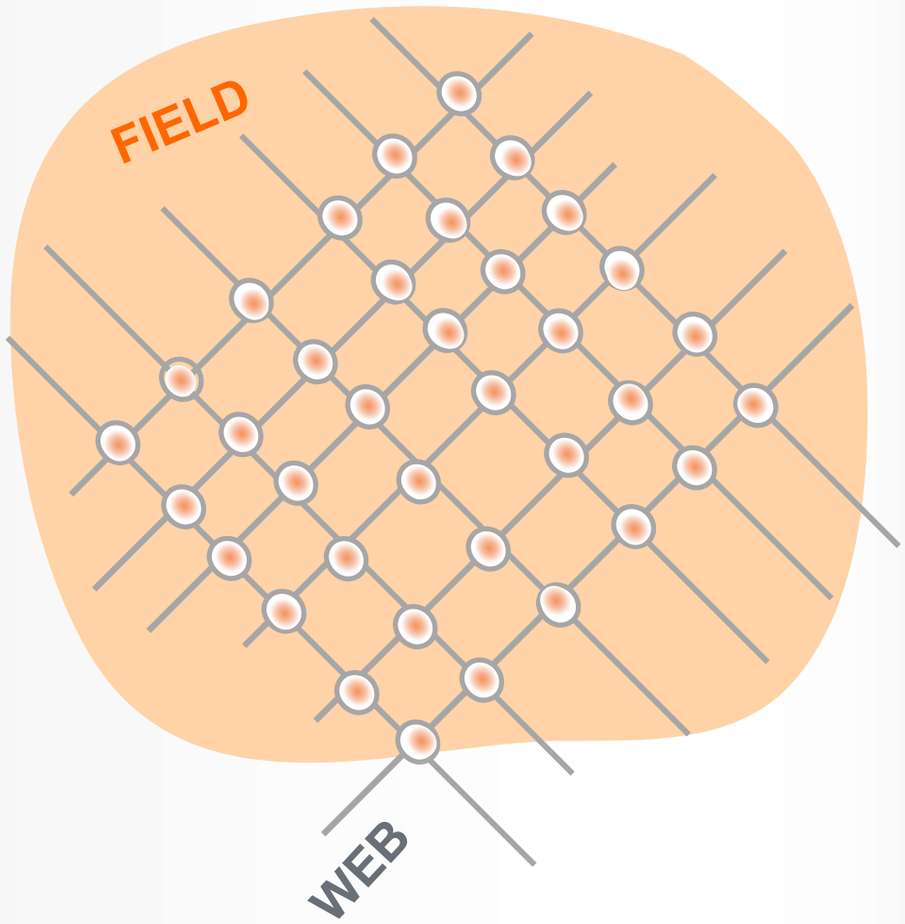
Q: Do we really have to know ALL those concepts?

C: This is overwhelming!

C: Phew! This is too much!

3. 2. Web of the Biomatrix

BIOMATRIX



Biomatrix Theory

The BIOMATRIX is the meta-system that contains all systems we can observe, both living and non-living.

One can view it from two perspectives, from a

- **WEB perspective which views the systems and their interconnectedness and**
- **FIELD perspective which represents the in-formation or conceptual reality (*as referred to above.)***

NOTE on terminology

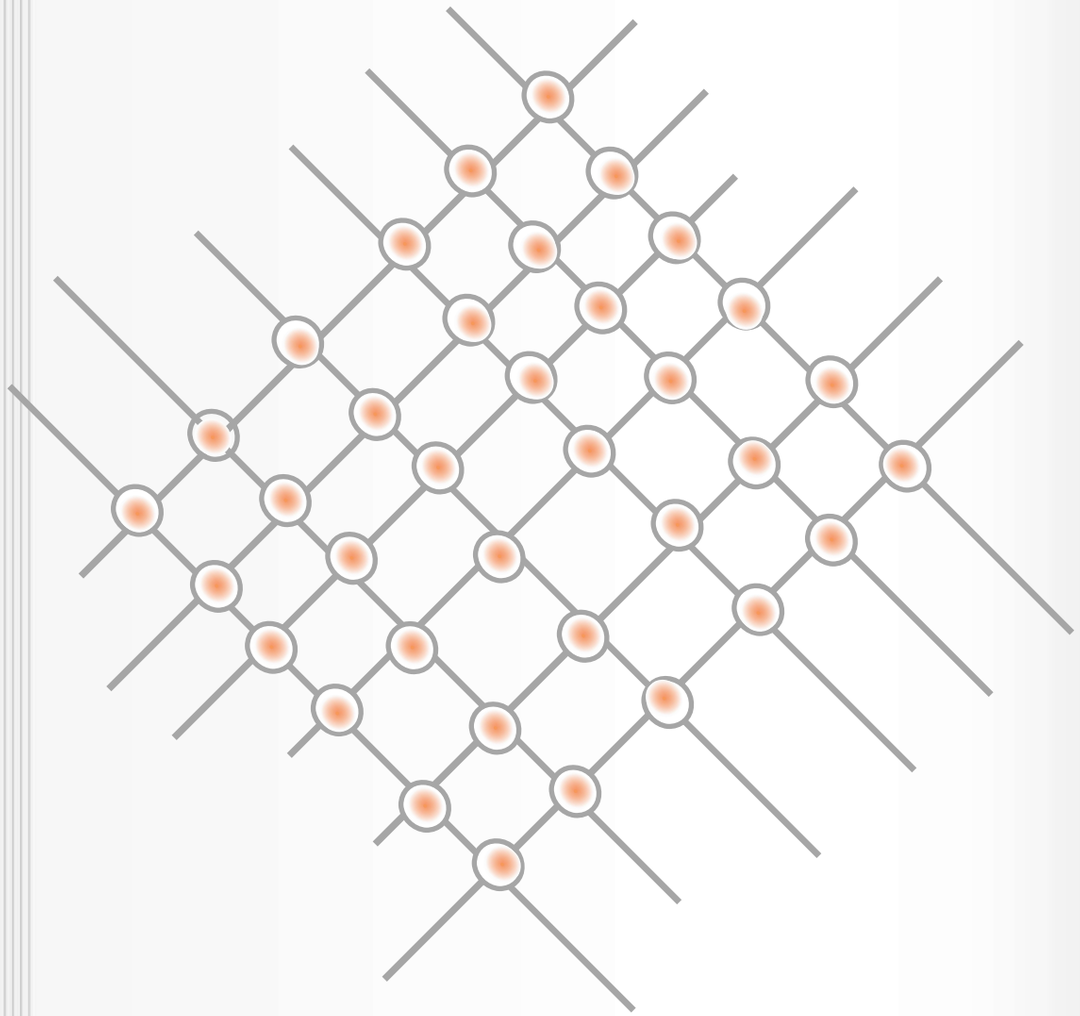
We call the universe the biomatrix.

The word biomatrix is derived from

- **Latin bios, meaning life and**
- **Greek matrix, meaning pattern or womb.**

Freely translated this means: How life's systems are patterned or organised.

BIOMATRIX: Web Perspective



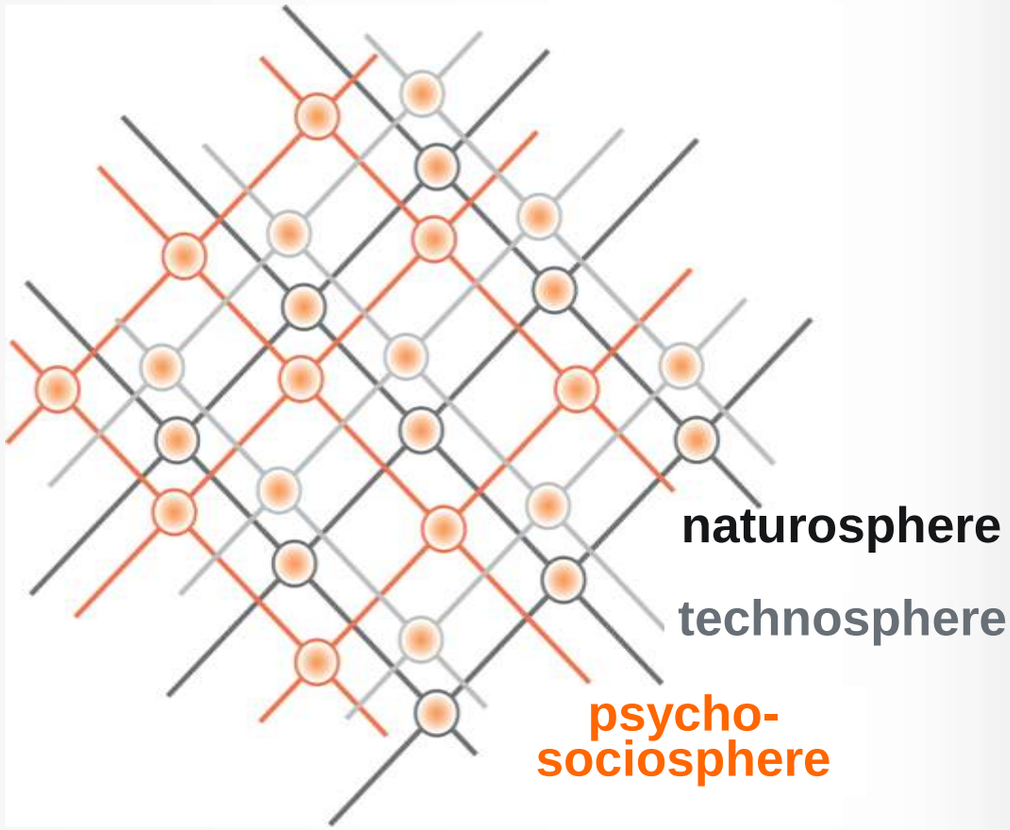
From a web-perspective, the systems of the biomatrix form a web of inter-connectedness in space, *analogous to a fishing net,*

As they connect with each other, the systems mutually impact on, adapt to and co-produce each other.

Because of this they co-evolve with each other through time.

Biomatrix Theory

SUB-WEBS of the BIOMATRIX



Biomatrix Theory

Within the web of the biomatrix one can distinguish three interacting and mutually co-producing sub-webs, namely the

- **NATUROSPHERE**

  This refers to the web of the systems of nature, such as ecological, biological and physical systems.

- **PSYCHO-SOCIOSPHERE**

  This implies the web of psychological and social systems, *(whereby social systems are classified as cultural, economic and political).*

- **TECHNO-SPHERE**

  This describes the web of technological systems.

SUB-WEBS of the BIOMATRIX
(continued)

The naturosphere gives rise to the psycho-sociosphere, which creates the techno-sphere.

The three spheres are interconnected, impact on each other, interact and thereby co-produce each other.

There is also a fundamental difference in the way they function.

Biomatrix Theory

Difference in functioning:

- **NATURO-SPHERE**

  The systems of nature function mostly in a law-like manner. Hence they are predictable.

- **PSYCHO-SOCIO-SPHERE**

  The psychological and social systems *(at least the human ones)* are influenced by their free will.

  They can be changed according to their will and are therefore not predictable in the sense of a law-like predictability *(merely on the basis of their habits and structures – which they can change, of course).*

- **TECHNO-SPHERE**

  Technological systems function according to their design and are therefore predictable.

  However there are no limits to human creativity *(other than the laws of nature)* in producing new technologies.

(See also the NOTE below concerning the conceptual reality of each sphere.)

NOTE: conceptual reality

We spoke earlier *(see Slides 271 and 272)* of the physical and conceptual reality of systems. Let us explore this further in the context of the different spheres *(without another detour into asking for a final cause).*

In the systems of the naturosphere, we observe regularity and order in their functioning and surmise a conceptual reality from this. For example, the genes are a set of instructions according to which the organism unfolds in form and functioning *(given the "right" environment)*. They embody this *(surmised)* conceptual reality of the organism. Of course, we observe that the systems in the naturosphere evolved in the course of time *(i.e. through BIOLOGICAL EVOLUTION).*

By comparison, the systems in the psycho-sociosphere are shaped by human intent, even if they are also influenced by physical reality *(such as brain functioning)*. We can change those systems, if we choose to do so, based on different ideas we have about them. Thus the conceptual reality of those systems is an outflow of our field of ideas and worldview *(such as the idea of democracy)*. And yes, ideas change *(evolve)* over time. This is referred to as NOOGENETIC EVOLUTION *(a term coined by K.E. Boulding)*

In the case of the techno-sphere, we observe that all technological systems originate from human thought. We design them deliberately and the design represents their conceptual reality. Technologies also evolve as part of NOOGENETIC EVOLUTION.

Thus, there is scientific acknowledgement of a conceptual reality, albeit without serious research regarding its origin *(i.e. being the a-priori cause of physical reality versus being an epiphenomenon of physical reality).*

SUB-WEBS of the BIOMATRIX
(continued)

In each of the three spheres one can observe systems that have specific qualities. These are referred to as DIMENSIONS.

As systems interact with each other, they reflect qualities of other systems. As one views a system from different dimensions, its different qualities are highlighted. Thus systems are MULTI-DIMENSIONAL.

For example, if one views the education system from a psychological, cultural, economic, political, ecological, biological or physical perspective, different realities of the system are revealed.

Biomatrix Theory

NATURO-SPHERE

The broad dimensions of the naturosphere are the *ECOLOGICAL, PHYSIOLOGICAL, BIOLOGICAL* and *PHYSICAL* dimensions *(one can of course make finer distinctions).*

PSYCHO-SOCIO-SPHERE

The *PSYCHOLOGICAL* dimensions include cognitive, emotional and spiritual ones.

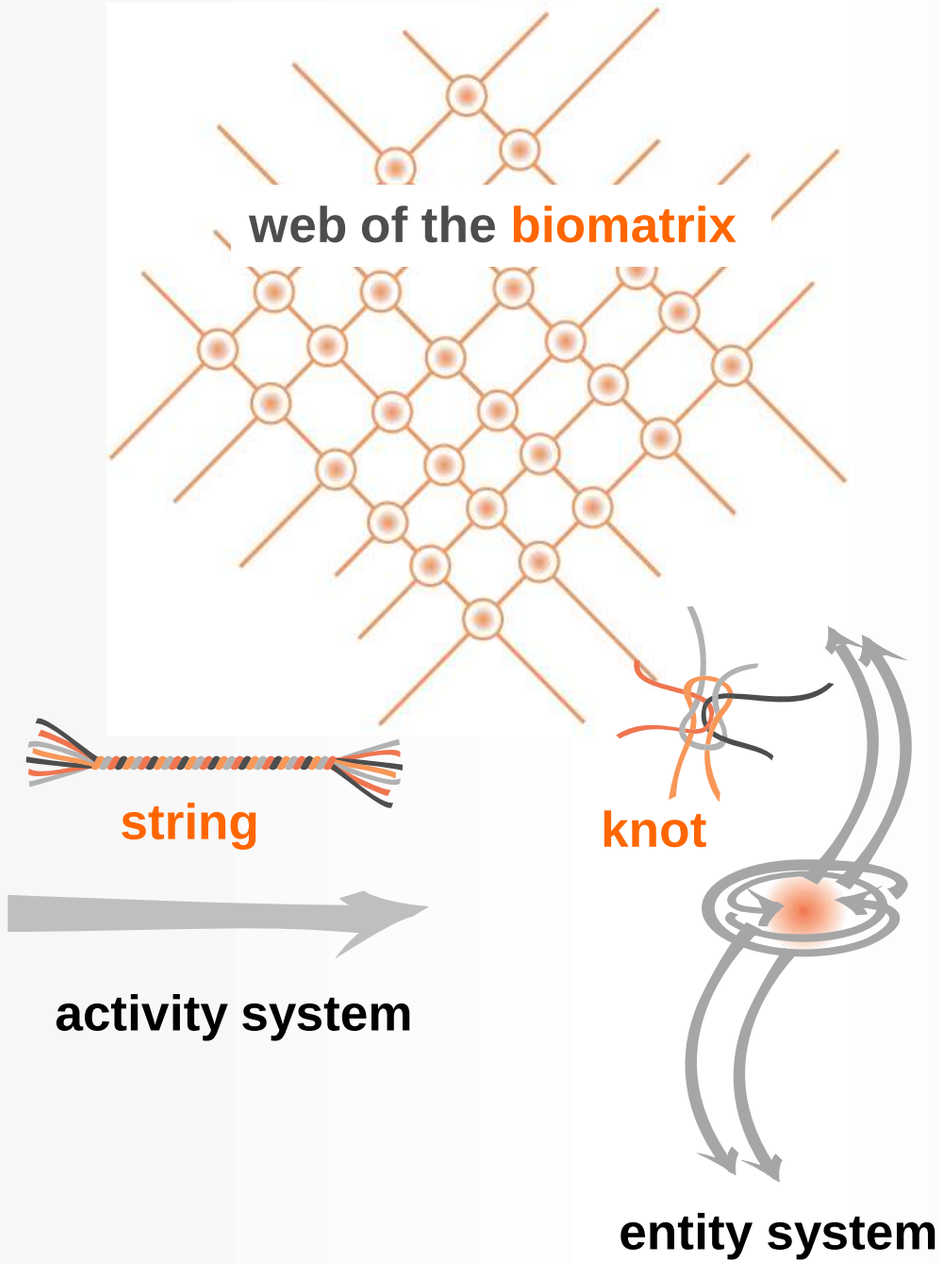
The societal dimensions are derived from

- ***CULTURE* which is concerned with the pursuit of the good *(i.e. ethical and moral behaviour)*, truth *(i.e. science, media)* and beauty *(i.e. arts),***
- ***ECONOMY* *(i.e. the pursuit of plenty through production and exchange of goods and services)* and**
- ***POLITICS* *(i.e. the pursuit of peace and justice)***

TECHNO-SPHERE

The dimensions of the technosphere are associated with different types of functions *(such as transforming, transporting and storing different types of substance - see Functionality Grid, www.Technoscan).*

Web of the Biomatrix:
TWO TYPES OF SYSTEMS



Biomatrix Theory

Analogous to a fishing net which is made up of strings and knots, **the BIOMATRIX consists of two types of systems:**

1. **String-like ACTIVITY SYSTEMS**

   Examples are the functions of an organism *(e.g. breathing, neural and digestive system),* person *(e.g. thinking, eating, work and parenting function),* or society *(e.g. education, electricity and transport system).*

   An activity system is depicted as an arrow.

2. **Knot-like ENTITY SYSTEMS**

   Examples are systems like a cell, organism, person, society, or planet.

   An entity system is depicted by bundles of arrows with an orange dot in the middle.

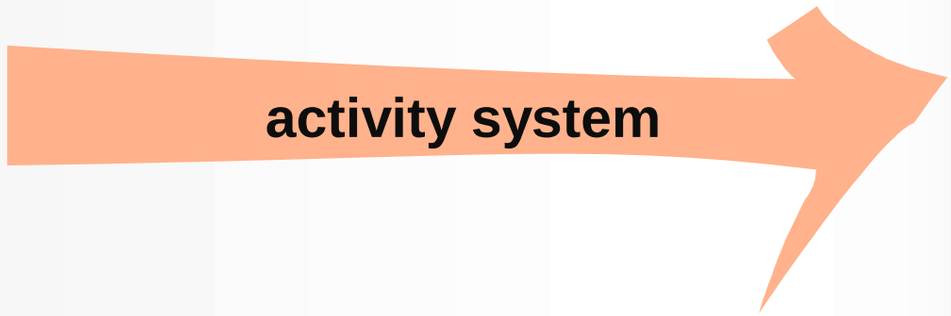
Let us start with **ACTIVITY SYSTEMS,** because when we talk about societal problems and how to dissolve them, it is mostly activity systems or societal FUNCTIONS *(such as education, health-care, building, electricity, transport, finance and nutrition systems)* that need to be analysed and changed.

Let us now explore in more detail how activity and entity systems are organised.

We need to know this, in order to be able to change systems so that they produce more desirable outcomes.

3.3. Activity System

Activity System: DEFINITION



NOTE: **The name of an activity system *(or function)* is typically derived from its aim, as for example a person's *work and nutrition system, or society's education and transport system.***

NOTE: **An activity system can be a function or a project. The difference between the two is that a FUNCTION belongs to an entity system *(e.g. a person, or society)* and typically exists as long as that system is alive, while a PROJECT ends when its aim is achieved.**

Both are organised in the same way.

Biomatrix Theory

An activity system can be defined as being an ORGANISED PROCESS. *(It can therefore also be referred to as PROCESS SYSTEM.)*

The organisation of the activity system involves

- **SUBSTANCE or mei *(which means that we observe it as having existence)***
- **PROCESSING *(which means doing some work by manipulating some substance or "things")* in order to achieve a specific**
- **AIM *(which means prescribing an intended outcome)* according to an**
- **ETHOS *(which refers to the values and beliefs of the system),***
- **STRUCTURE (*which refers to the "things" or substance that do the work)* and**
- **REGULATION *(which implies making sure that the system functions in such a way that its aim is achieved).***

These aspects of organisation are described in more detail below.

Activity System: SUBSTANCE

mei
(substance)

Substance is symbolised by a grey mei dot.

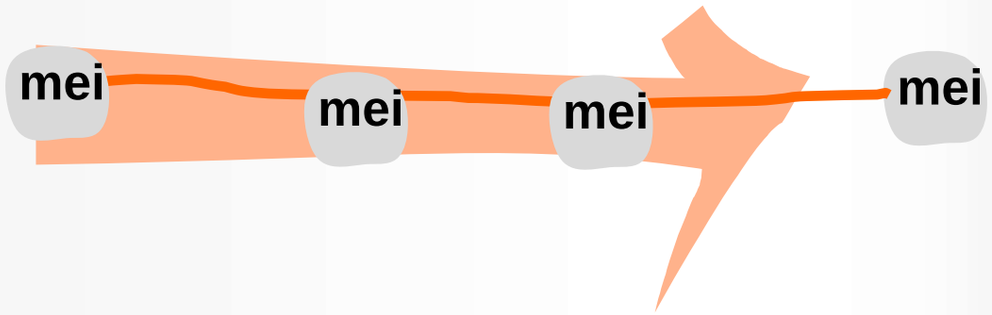
Biomatrix Theory

The substance of the "things" we observe in the universe is mei *(which is short for matter-energy-information)*.

Those three elements always occur together in different combinations and they interact to make up the unique mei field that characterises each specific "thing".

Put differently, each "thing" is an mei field, whereby a material "thing" *(like a person, house, or car)* can be depicted as Mei field, an energy "thing" *(like electricity)* is am mEi field and an information "thing" *(like a communication, relationship or software)* is an mel field.

Activity System: PROCESSING



NOTE: **Processing is symbolised by the orange line along which the substance flows.**

Biomatrix Theory

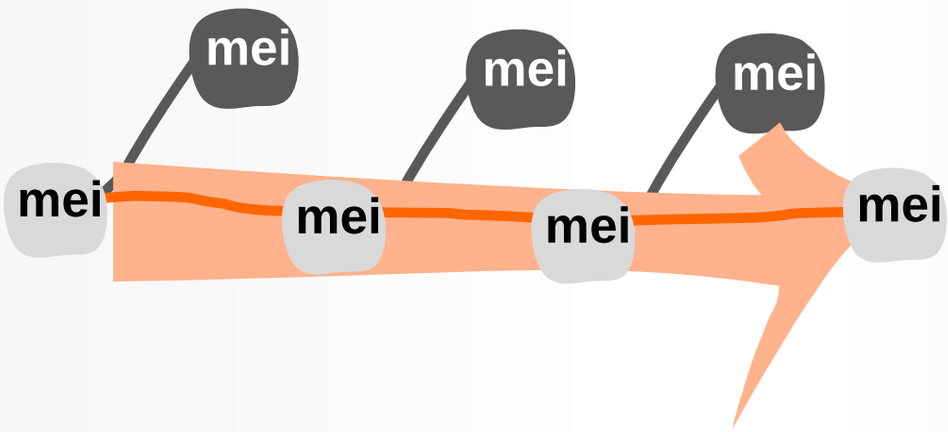
PROCESSING means that substance *(or mei)* flows through the system and is worked on.

More specifically, input substance is processed or worked (during which it is called throughput substance) to achieve the aim of a specific output substance.

For example, in my cake baking activity system, the input ingredients *(like eggs, flour, sugar)* are mixed to become the throughput substance of dough, which is baked to become the desired output of a cake.

Likewise, an education system processes *(i.e. teaches)* pupils to become educated, a health-care system processes *(i.e. treats)* patients to become healthy, and the electricity system processes renewable or non-renewable energy sources to generate electricity.

Activity System:
PRODUCTS and BY-PRODUCTS



mei products

mei by-products

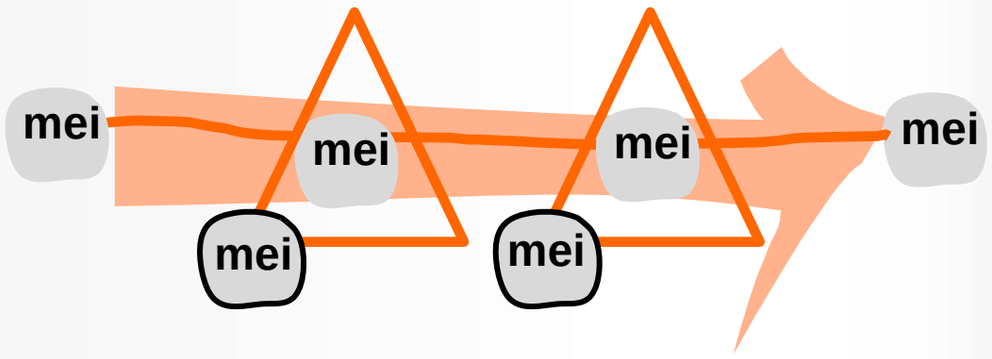
Biomatrix Theory

During processing, the mei fields *(i.e. "things")* that are being processed split up and are recombined *(i.e. trans-formed)* into new mei fields, namely intended PRODUCTS and often undesirable BY-PRODUCTS.

For example, the by-products in preparing a cake are wrapping materials and egg-shells, dirty dish-washing water and heat in the kitchen from baking.

The by-products in education can be confusion, misunderstanding and stress; in health care it is iatrogenic disease *(i.e. disease as a result of medical treatment),* in agriculture, mining and manufacturing systems toxic substances are released into soil, air and water and the advances in information technology lead to increasingly totalitarian controls.

Activity System: STRUCTURE



Structure is symbolised by the orange triangle and the mei dot with the black outline.

Biomatrix Theory

Structure refers to the substance *(or "things")* that do the processing.

One can distinguish an acting substance *(i.e. the structure that does the work)* and a support substance *(i.e. the things that support the processing, such as infrastructure).*

For example, in the cake baking example, the acting substance is the cook, while the support substance includes baking trays, the kitchen counter, etc.

In the case of the education, health-care and electricity system the acting substance are the teachers, doctors and generating machines, respectively, while the support substance includes buildings, equipment and transport infrastructure.

Activity System: ETHOS, AIMS, REGULATION

NOTE:
***Ethos** is symbolised by the orange ethos dot.*
***Aim** is depicted by the orange arrow tip.*
***Regulation** of the system is illustrated by the orange bracket.*

NOTE: **Determining the ethos, aims and regulation of a system comprise the GOVERNANCE of the system.**

Biomatrix Theory

The AIM of a system describes the outcome it should achieve.

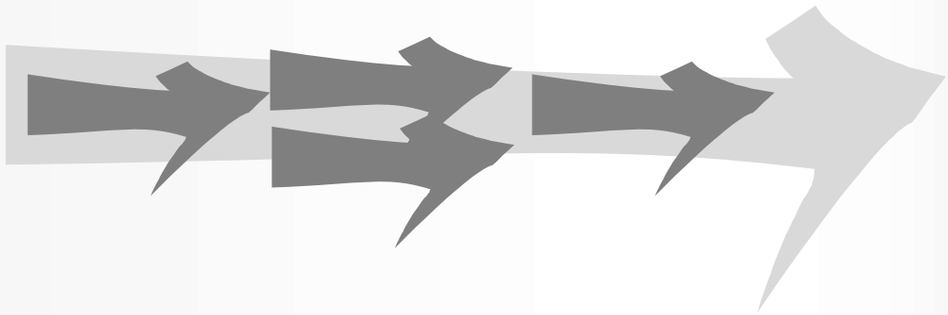
Although an activity system has an overarching aim, which is also described as purpose, it will also have different sub-aims that derive from this overarching aim, such as longer-term objectives and shorter-term goals.

The ETHOS of a system describes its values *(i.e. what is desirable)* and beliefs *(i.e. how the world works),* which are an outflow of its worldview. Ethos influences both the aims and regulation.

The REGULATION consists of the feed-forward *(i.e. planning and decision-making)* and feedback *(i.e. monitoring and evaluating)* mechanisms that adjust the functioning of the system so that it can achieve its aim.

For example, the broad aim and ethos of education is the development of the pupil, as interpreted through a curriculum, which also guides the regulation of teaching and learning.

Activity System: SUB-SYSTEMS



An activity system consists of sub-systems.

These link up with each other to form a value and supply chain.

NOTE: Sub-systems can be sequential or parallel. ***For example to generate coal and wind electricity occurs in parallel sub-systems. They feed their output into the same electrical grid (which is a sequential sub-system).***

Biomatrix Theory

Each different type of activity or processing phase within an activity system can be regarded as a sub-system.

For example, the cake baking activity system can consists of the ingredient assembly, preparation, dough mixing baking, decorating and cake serving sub-system.

There are generic type of subsystems, namely the functions of

- **TRANSFORMING substance** ***(e.g. ingredients become dough, or the dough becomes a cake),***
- **TRANSPORTING substance** ***(like pouring the dough into a baking tray)***
- **STORING substance** ***(like storing ingredients, or freezing the dough for later use),***
- **ETC.**

Q: You mentioned the terms *value chain* and *supply chain*. Are they the same?

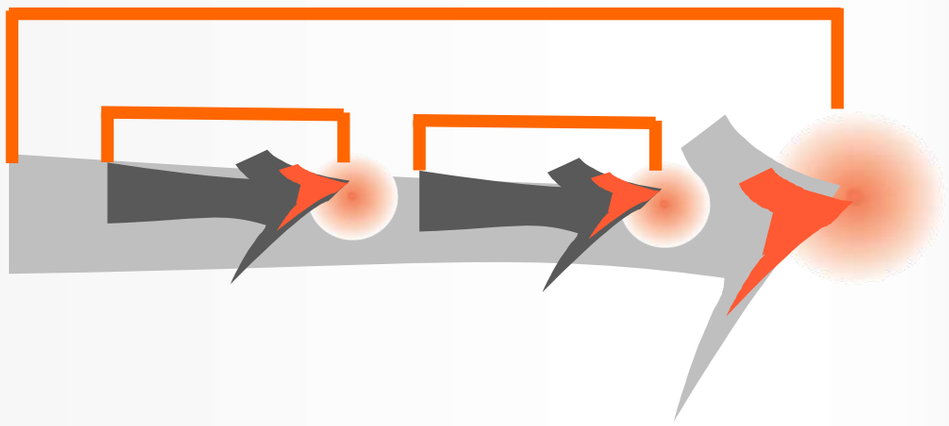
A: The term SUPPLY CHAIN means that substance *(i.e. "matter, energy and information "things")* flows through the chain, whereby the output of one system becomes input to the system it links up with, which processes it into another output, etc. Thus, supply chain refers to the physical reality of an activity system and its sub-systems.

The term VALUE CHAIN means that the output produced in each link of the chain *(i.e. in each sub-system)* represents value *(or new qualities).* Thus value chain describes the information or conceptual reality of an activity system and its sub-systems.

Thinking of the pleasure of a chocolate cake... ...what supreme value!!!

Activity Systems

CASCADING GOVERNANCE



NOTE: **Cascading implies adhering to the spirit of the overarching governance within the unique reality of the system.**

For example, if the aim and ethos of the whole electricity supply chain is renewability, they will also guide the sub-systems that work with non-renewable resources. For the coal industry this could mean changing its business model from being a continuous energy generator to being a complementary one to the renewable industry.

Biomatrix Theory

To ensure coherence of the whole value / supply chain, the governance needs to be cascaded throughout the supply chain.

This means that the overarching ethos and aim of the whole chain needs to be adhered to by each sub-system and that the overarching regulation needs to be appropriately interpreted for each sub-system, so that the aim of the supply chain, according to its ethos can be achieved.

For example, to ensure healthy nutrition implies that the growing, processing, transporting, storing and distributing of food are aligned with the ethos of health and the aim of producing healthy foods.

If any sub-system violates this aim and ethos, the final product cannot be healthy.

Q: Is the idea about an overarching aim and ethos not somewhat naive?

We can't see that agriculture, or the food processing industries are influenced by an overarching aim of healthy nutrition for the body!

A: Let me qualify your observation:

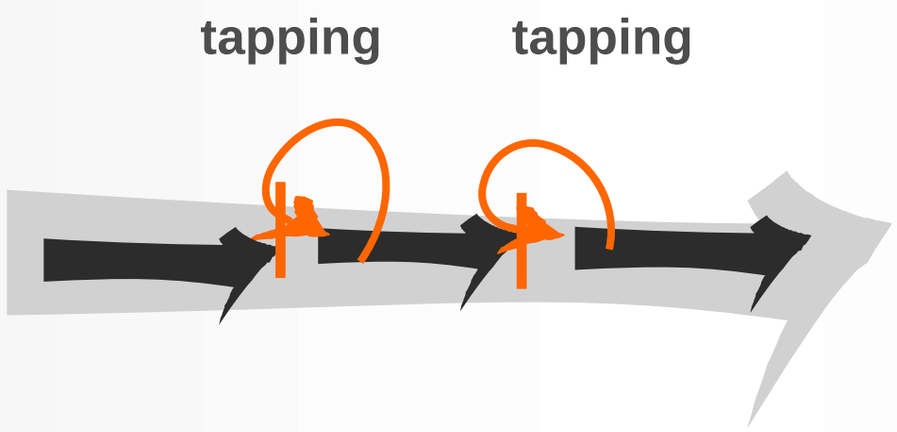
No, we must not be naive regarding the overarching aim and ethos of those industries, which in the current economy is maximising profits, not health *(which is at best an afterthought – if at all)*!

Yes, we must have the courage to be naive in formulating and pursuing ideal aims and ethos when we redesign and transform systems, *such as society's nutrition activity system!* Only by creating systems that function on the basis of such lofty ideals, can we hope to dissolve society's complex problems!

Are you still surprised that there are so many problems in the world?

… and why the neo-liberal economic order makes the existing ones so much worse, besides creating numerous new ones?

Activity System:
TAPPING



NOTE: **Tapping is symbolised by the rounded orange tapping arrows.**

Biomatrix Theory

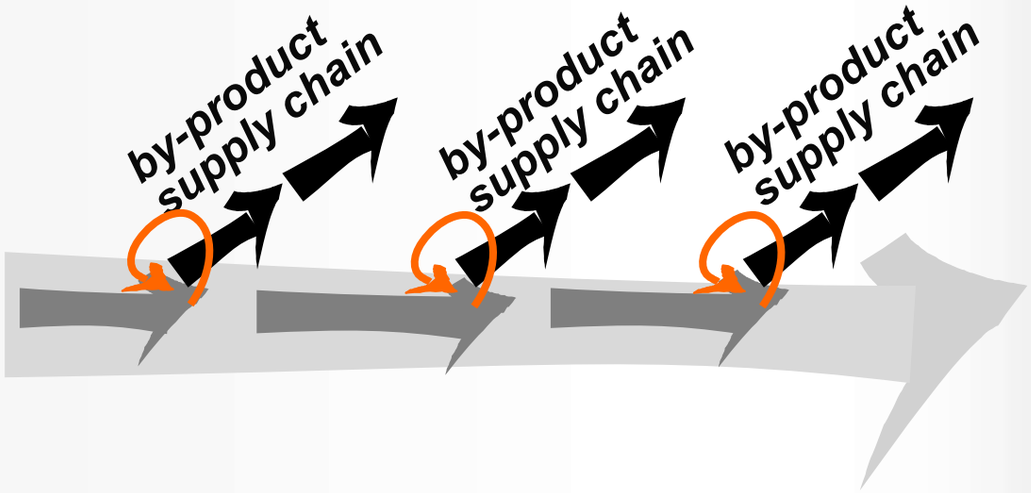
TAPPING facilitates the continuity of the flow of substance *(i.e. of material, energy and information "things")* along a supply chain. More specifically, the output of one sub-system needs to be tapped as input by the following sub-system.

Through tapping, systems link up with each other, as for example our linking up with each other, as you read this book that I wrote. Without tapping, there would be no linking up and no continuity of the flow of goods and services.

***Analogous to opening a tap to allow the water to flow,* typical tapping functions are switching on, buying, requesting, questioning, linking up, coupling and meeting, as well as selling, marketing, promoting and advertising.**

Tapping occurs at the boundary between two (sub-) systems. It is the foundation of self-governance.

Activity System:
BY-PRODUCT SUB-SYSTEMS



NOTE: **IMPACT ASSESSMENT is concerned with considering and evaluating the impacts of both, products and by-products.**

Biomatrix Theory

The by-products that are generated in each processing phase are tapped by and become part of different supply chains.

For example, waste and rubbish can become part of refuse processing systems, organic waste can be composted, pollutants are absorbed by water, air and soil and are ingested by other systems, etc.

In analysing and redesigning systems, the supply chains of their by-products become an important consideration *(i.e. during impact assessment)*.

Q: What do you mean by tapping being the foundation of self-governance?

A: Self-governance involves two types of FREEDOM, namely that of giving out *(i.e. freedom of expression)* and that of taking in *(i.e. the freedom of accessing or tapping).*

Through tapping, a system decides what mei *(i.e. matter, energy and information "things")* it allows to enter its space.

At the tapping interface, the responsibility shifts from one system to another. *For example, it is my responsibility to write this curriculum book, but it is your responsibility to read through it and absorb its ideas and apply them, or not. By analogy, one can lead the horse to the river, but the horse must drink.*

Tapping is also the interface at which conflict and power games between systems occur *(e.g. overwhelming the other system through force, propaganda, dumping of toxins),* which raises the issue of responsibility of a system *vis a vis* the rights of others.

The mediation of conflict between systems also takes place in the tapping interface.

(For more detail see the Biomatrix Curriculum in W/Holistic Participatory Democracy.)

PS: Most sinister: Through chipping, people lose their freedom of tapping!

Activity System: MULTI-DIMENSIONALITY

NOTE: **Each dimension involves different stakeholders and their requirements.**

Biomatrix Theory

Although an activity system serves one overarching aim (or purpose), it also interacts with other systems from different dimensions and therefore has to meet their aims also.

For example, the education function of a society can be viewed from the

- **economic dimension** ***(e.g. financing of education)***
- **psychological / cultural dimension** ***(e.g. language, curriculum, ethical and aesthetic considerations)***
- **political dimension** ***(e.g. who makes decisions at what level of the system and how; who plans, how is the system monitored and evaluated, who determines the evaluation criteria)***
- **technological dimension** ***(e.g. role of e-learning; equipment used in support of education)***
- **ecological dimension** ***(including physiological, physical, biological, physical)*** ***(e.g. brain functioning ; health of pupils and their environment)***

A policy design needs to be considered from all perspectives, whereby the importance of a specific dimension can differ from system to system.

Q: Sometimes you speak of activity and then of activity systems. Are they the same?

A: An activity system is an organised activity. This means that it is structured and regulated to achieve an aim (*like the education activity system)*.

Within this activity system many activities take place that are of the same type, like the many teaching / learning activities that happen on a daily basis within the education system.

(For a more detailed explanation, see the following Notice Board.)

Analogous to a riverbed channelling the water, the actual flow of activities are organised within the activity system.

NOTE: activity system versus activity

Biomatrix Theory **defines an activity system as a process that is structured and regulated to achieve its aim, whereby a process is defined as a flow of substance *(i.e. matter, energy and information)*.**

An activity is a flow of substance *(i.e. something moves, be it a material, energy or information "thing").* Thus an activity system can also be referred to as a process system, or as an organised process.

(NOTE for managers: When the management literature speaks of process, it usually refers to a process system, or what we call activity system. When we speak of process, we merely mean a flow of substance.)

An activity can be a random, *like if I accidentally drop my cup of coffee.* It is a random process, because the cup and coffee move. It is not organised to achieve a specific aim. *(By the way, a mess typically also contains random activities, like accidents.)*

If an activity is intentional and purposeful, *like serving you a cup of coffee,* it is part of an activity system *(such as a coffee shop activity system, or a client service activity system or a socialising activity system).*

purposeful activity

COFFEE SHOP
we serve the best
coffee in town

activity system

random activity (i.e. accident)

NOTE: activity system versus activity *(continued)*

ANALOGOUS to a riverbed that channels the flow of the water, **an activity system channels various activities.**

For example, the education system and its sub-systems of teaching and learning involve numerous specific lessons that are being taught by a teacher and learned by a pupil.

The riverbed is the CONTEXT within which the water flows as CONTENT. Likewise, the activity system *(e.g. the education system)* is the context, within which the activities *(e.g. the different teaching and learning situations)* flow as content.

While the context remains the same, its content changes continuously. *For example, while the education system remains the same, no two lessons taught by a teacher are ever exactly the same and no two learners absorb the same lesson in exactly the same way*.

Q: This is a lot of theory. Why is all this important for solving society's complex problems and transforming its systems?

A: Only if you know how a system functions, can you change it successfully. Thus, anyone who is serious about transforming the current societal functions *(like the education, electricity, transport, finance, health-care or governance system)* needs to know *(in summary)* that

- such a system is an activity system that consists of various parallel and sequential sub-systems that are linked together as a value / supply chain
- the chain needs to function as a coherent whole, governed by an overarching aim, ethos and regulation
- the processing in each link produces products as well as by-products which impact on other systems which need to be considered in a system (re)design and
- the whole system and each of its sub-systems is multi-dimensional and that the interests of the stakeholders in each dimension need to be considered in the (re)design and ongoing management of the (sub)system(s).

Q: And do we really need to KNOW all this?

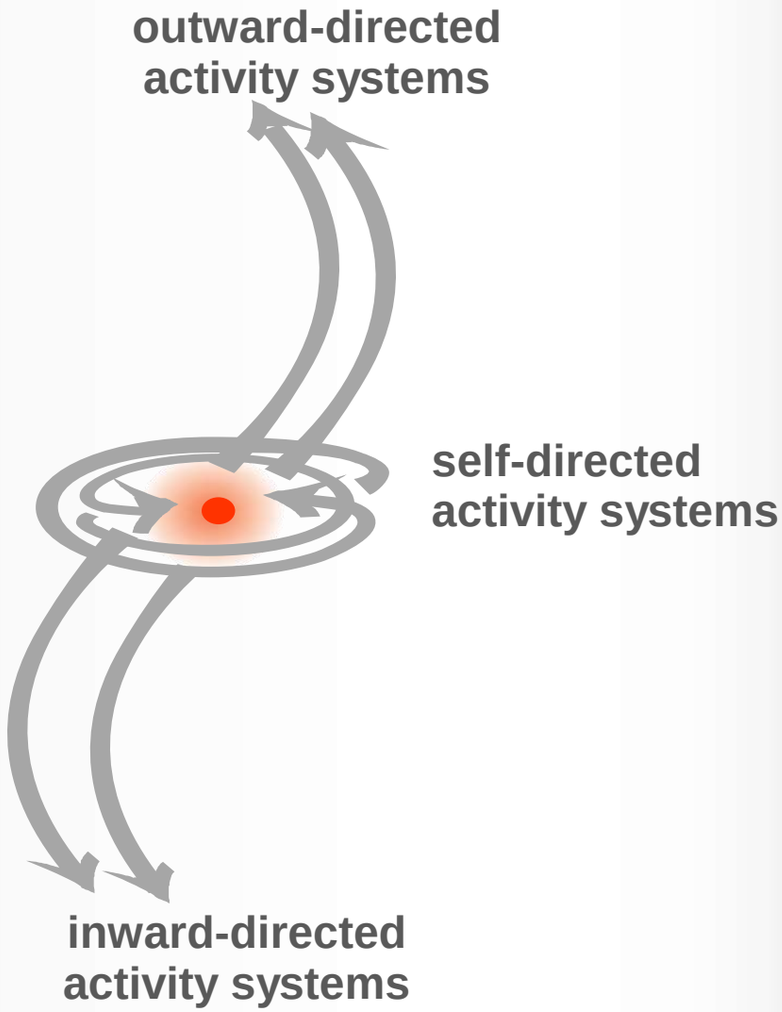
A: **YES,** you need to know all of this if you are the facilitator of a system redesign, because the knowledge allows you to formulate the relevant questions that are explored during the design process *(see Part 6)*.

NO, you don't need to know all *(or even any)* of this if you are a stakeholder who participates in the (re)design of your system of concern, if the design is facilitated by someone who understands the theory and methodology.

So far we have discussed how ACTIVITY SYSTEMS (or *functions)* are organised. However, we also need to understand some more about ENTITY SYSTEMS and their organisation.
So let's carry on reading the *Biomatrix Theory Book.*

3.4. Entity System

ENTITY SYSTEM: Three-fold Organisation



NOTE: **The ETHOS is depicted as a fading orange dot, the SELF by the sharp and darker point in the centre.**

Biomatrix Theory

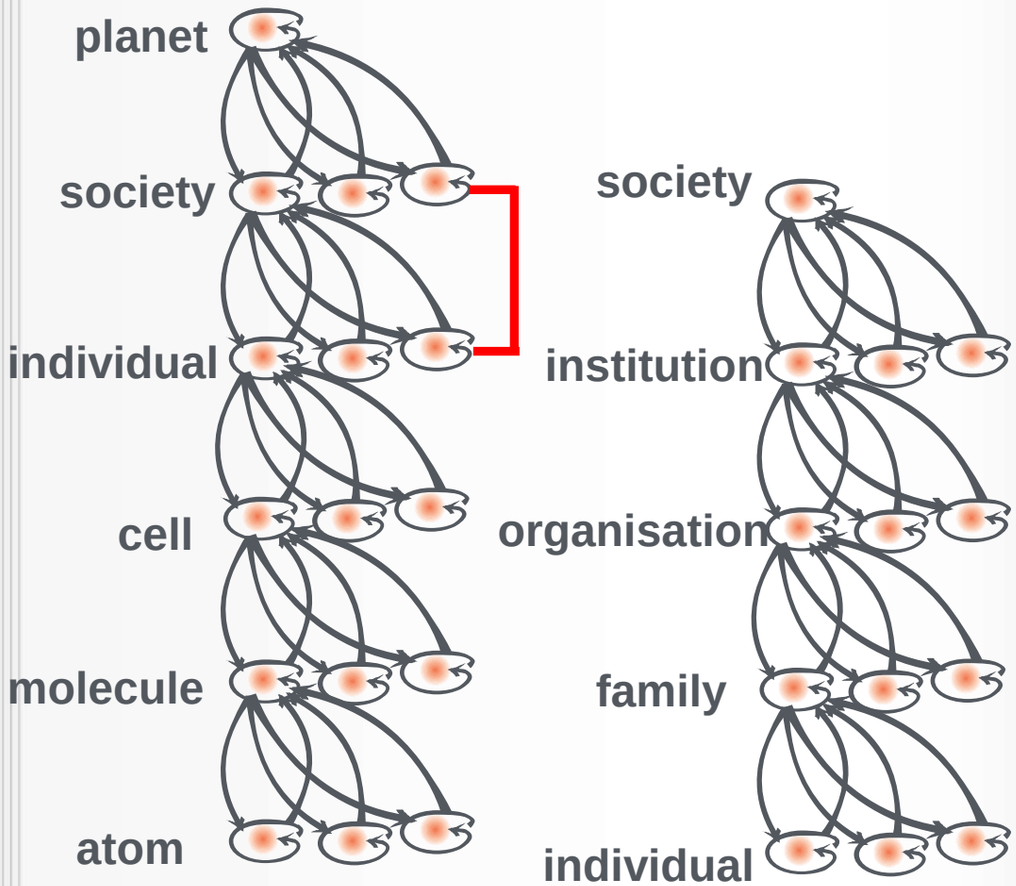
An ENTITY SYSTEM is a multi-functional system, which consists of bundles of activity systems *(or functions)* that connect it to other systems in its outer and inner environment and to itself, *such as a person's outward-directed work and parenting functions, inward-directed eating and sleeping functions and the self-directed thinking and learning functions.*

Thus, an activity system is a part of an entity system that connects it with other entity systems, *analogous to the strings in a fishing net that on the one hand form the knots and on the other hand connect them with each other.*

Within an entity system, its activity systems interact with each other in a matrix fashion *(i.e. as a three-dimensional organisational matrix).*

An entity system is organised around an ethos which has a self at its core. The ethos is an in-formation field that contains the unique values that characterise the entity system.

ENTITY SYSTEM:
Hierarchical Organisation



NOTE: **A *containing* hierarchy is NOT a *control* hierarchy, because control flows from outside in and inside out as well as from itself to itself.**

Biomatrix Theory

The web of the biomatrix is organised as a CONTAINING SYSTEMS HIERARCHY, whereby the planet contains different societies *(human, animal, plant, etc.),* which contain individuals, which contain cells, etc.

Likewise, human society contains sub-systems, such as institutions, organisations, families, individuals, etc.

Entity systems link up with each other through their activity systems.

Through its functioning an entity system at the inner level contributes to its containing system, thereby co-producing it *(such as the cells co-producing the organism and individuals their society)*.

In turn, the containing system distributes resources *(e.g. nutrition, information, governance)* to its contained entity systems, thereby co-producing them *(such as the organism distributing nutrition to the cells and a society resources to its individual members).*

The different types of systems mark different LEVELS in the systems hierarchy, such as the planetary, societal, individual and cellular level.

3.5. Activity and Entity System Analogies

Q: The idea of string-like systems in the biomatrix makes us wonder, if this has something to do with *String Theory?*

A: No, *String Theory* is a theory in physics.

Nevertheless, theories developed in one scientific discipline can serve as an analogy for theories in other disciplines, or even for science as a whole.

For example, physics tells us that light can be wave or particle. This can serve as an analogy for viewing the world from the perspective of string-like activity systems and field-like entity systems.

Likewise, string theory can serve as an analogy for the interaction of entity and activity systems: Analogous to a *String* being attached to a *Bran (i.e. field-like membrane),* a string-like activity system is attached to a field-like entity system. As the string vibrates, it also affects the vibration of the bran *(and vice versa)*, so a change in one of its activity systems reverberates through the whole entity system (*and vice versa).*

For example, the change in the ethos of a society towards renewable energy, affects different activity systems *(i.e. industries and behaviour of consumers).* Or, changes in its health care system due to a pandemic reverberate through the whole of society as an entity system.

Analogies stimulate patterned thinking! They suggest that similar patterns exist and shape life in different areas of life and at different levels of reality. They facilitate the rethinking of the familiar!

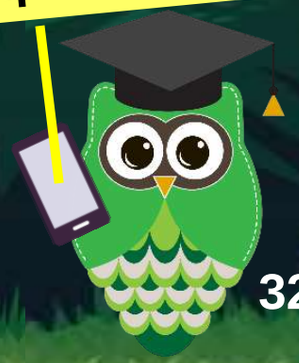
3.6. Levels and Dimensions

We have learned that there are different sub-systems in the biomatrix and that they are associated with different DIMENSIONS *(i.e. the dimensions of the naturosphere, psycho-socio-sphere and techno-sphere).* Thus, the web of the biomatrix is MULTI-DIMENSIONAL, which is also reflected in each of its activity and entity systems.

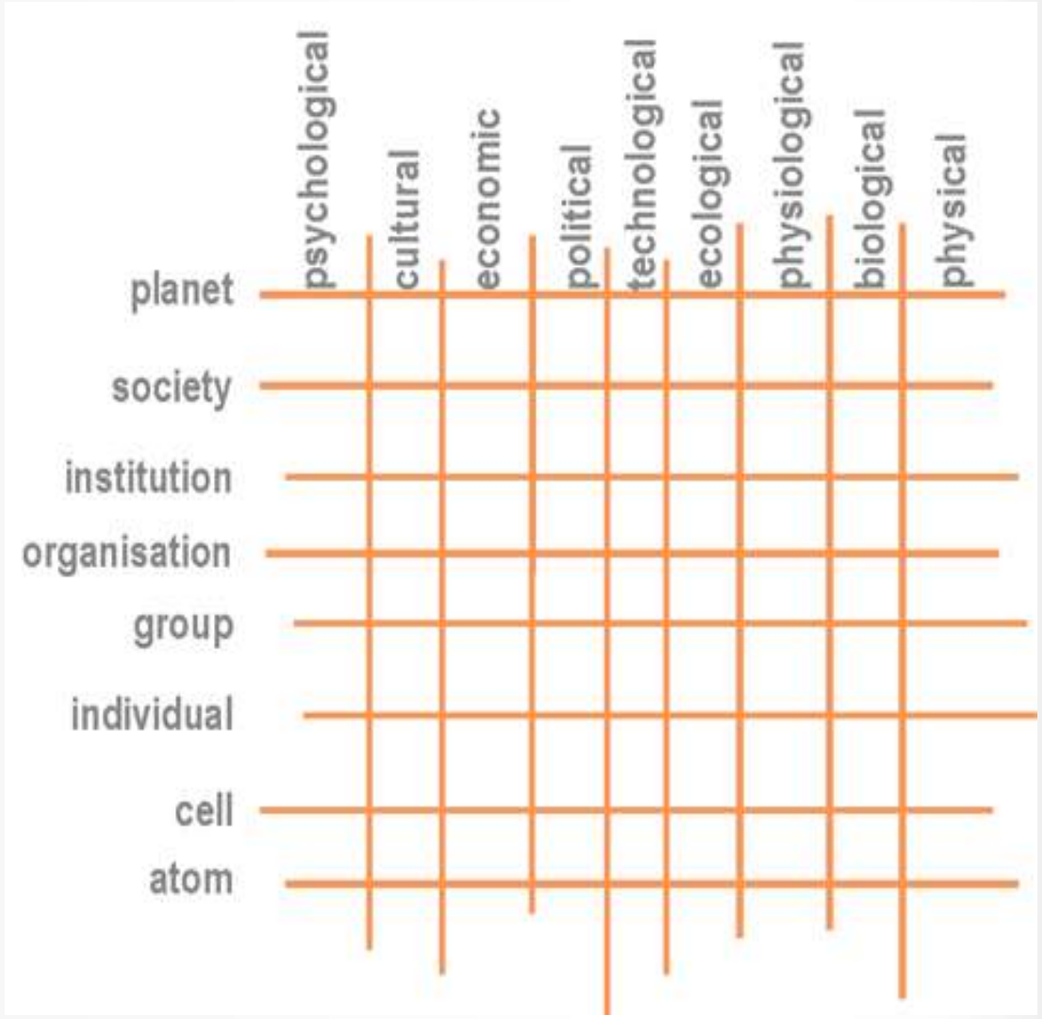
We also learned that the entity systems are organised as a containing systems hierarchy and thateach type of containing system marks a LEVEL in the web of the biomatrix, making it MULTI-LEVEL.

If we look at the biomatrix in terms of levels and dimensions at the same time, we get the spatial framework of the biomatrix, namely as a multi-dimensional and multi-level web.

This is a powerful way of viewing the world!
It shows complexity in a simple way!



Biomatrix Spatial Framework



NOTE: **For a more detailed analysis of an issue one can insert sub-levels and sub-dimensions between the broad generic ones shown in this Figure.**

Biomatrix Theory

The *Biomatrix Spatial Framework* is derived from combining the LEVELS of the containing systems hierarchy and the DIMENSIONS associated with the generic types of systems of the naturo-, psycho-socio- and techno-spheres of the biomatrix.

It is thus a multi-dimensional and multi-level framework.

It is especially suitable for dissecting a complex issue by identifying the different co-factors in each dimension and at each level.

It is also one of the FRAMEWORKS that can be used to contextualise a public discourse around a specific governance issue.

It is important to note that each dimension and each level is associated with different types of systems and their stakeholders, who have different interests in the issue.

(See also the according section in the video on "The role of the ideal future and how to get there", Part 2, on our webpage www.biomatrixweb.com).

3.7. Seven Forces of System Organisation

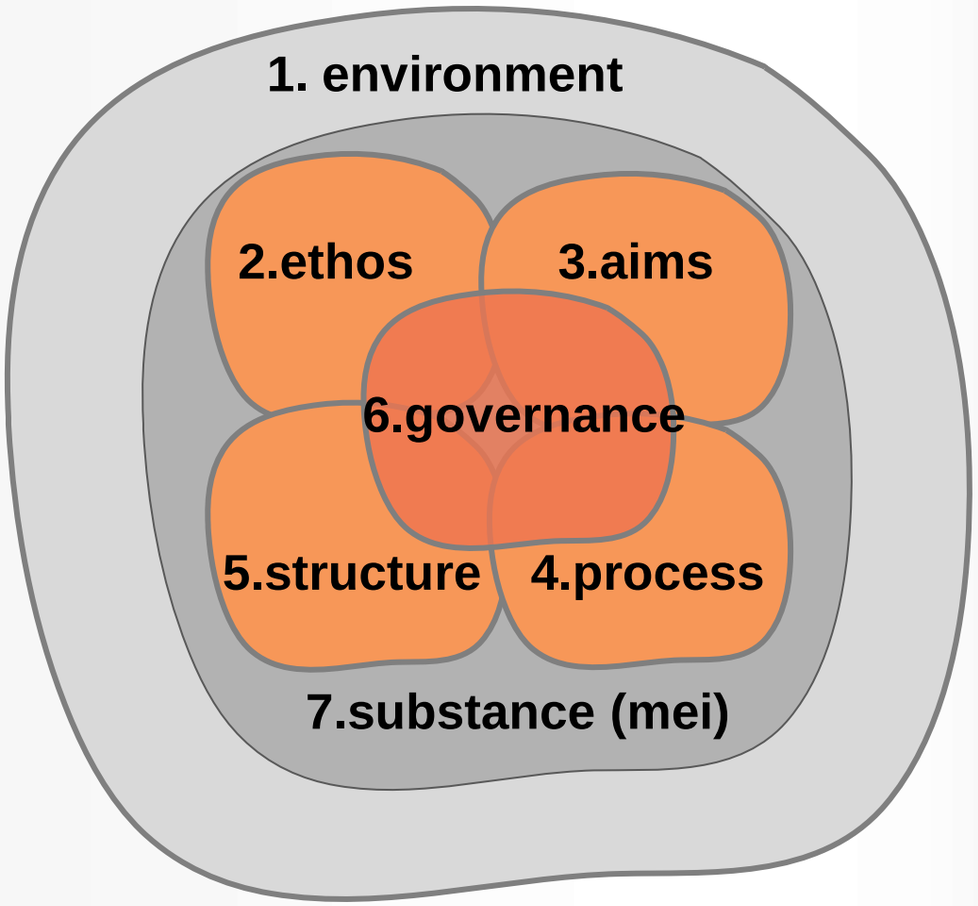
So far we have learned that there are two types of systems in the web of the biomatrix and how they are organised to form this web.

Now we need to learn about the forces that shape the internal organisation of the systems, namely the *SEVEN FORCES of System Organisation.*

These forces interact with each other to co-create the form of a system and its ongoing development.

In changing a system, these seven forces are used as a framework for guiding the redesign of the system.

Seven Forces of System Organisation



Biomatrix Theory

The Seven Forces of System Organisation co-produce the form and functioning of all systems, both activity and entity systems *(albeit in somewhat different ways).*

A change in any of the seven forces will change the system as a whole.

Incoherent change between the seven forces creates a chaotic and problem riddled system.

Seven Forces of System Organisation *(continued)*

1. ENVIRONMENT: a system is co-produced by its outer and inner environment

2. ETHOS: refers to the values *(i.e. what it desires)* and beliefs *(i.e. how it thinks that the world works)* of a system that determine the system's development

3. AIMS: refer to the outcomes that a system wants to achieve *(i.e. aims range from broad purpose and mission to objectives and specific goals)*

4. PROCESS: refers to the flow and transformation of substance with which the desired output of the system is achieved *(as for example transforming coal into electricity and transporting it)*

5. STRUCTURE: refers to the configuration of the acting and support substance with which the processing is done *(as for example the machines which do the generating of electricity and the people managing them)*

Biomatrix Theory

6. GOVERNANCE: describes the steering of the activities and development of the system towards its aims *(as for examples, the policies, laws, rules, criteria and guidelines that regulate the electricity generating),*

7.SUBSTANCE / MEI: consists of matter, energy and information *(i.e. the "things" or "stuff" of which the system is composed);* it ensures that the system has existence *(i.e. has substance); substance includes material "things" (like machines, buildings and people), energy "things" (like electricity) and information "things" like plans, software and rules).*

NOTE: Each force has its own organising principles. Not adhering to them creates problems.

A1: You need to know the seven forces, because they co-develop a system. Therefore, you need to consider them in a **system (re)design.**

One can also look at an existing system from the perspective of each of the seven forces and identify its problems as a **diagnostic procedure.**

Moreover, there are organising principles associated with each force *(which you can learn from the Biomatrix books and courses).*

Typically problems arise if a system violates one or more organising principles.

Q1: Why do we need to know these seven forces that organise a system?

Q2: Can you give us an EXAMPLE of such **PRINCIPLES** and the problems that arise from violating them?

A2: Yes, I will give you a few examples in the following *NOTES...*

... BUT, before we give you some examples, you need some more theory about a governance principle that we use in them.

Types of Governance

Biomatrix Theory

The governance of a system requires an appropriate balance between the following three types of governance:

(1) Form-creating governance

(2) Form-maintaining governance

(3) Form-destroying governance

ANALOGOUS to the trinity in Hinduism of

BRAHMA, the creator

VISHNU, the maintainer

SHIVA, the destroyer.

Types of Governance

(continued)

W/Holistic thinking distinguishes the following three types of governance:

(1) Form-creating governance

As the name implies, the purpose of this type of governance is to create change in the system. It is growth and development producing. *For example, the more you learn, the more information you will be provided with, so that you continue to develop. Or, the more you work, the more you get paid.* This form of governance is the proverbial "carrot".

Biomatrix Theory

(2) Form-maintaining governance

This governance ensures that the system stays within prescribed limits. *For example, you can drive anywhere, provided you adhere to the traffic rules.* This type of governance is the realm of laws that set the boundaries of acceptable behaviour in society. It acts analogous to the previously explained "riverbed".

(3) Form-destroying governance

The aim of this governance is to eliminate undesirable behaviour. *For example, if you steal, kill, or violate traffic rules, you will be sanctioned with imprisonment or fines.* This form of governance is the proverbial "stick".

EXAMPLES

NOTE: **Both, activity and entity systems are shaped by the seven forces of organisation, albeit with differences in emphasis and some different principles.**

ACTIVITY SYSTEM EXAMPLES

PRINCIPLE:

One of the principles associated with the organising FORCE OF GOVERNANCE is balancing form-creating, form-maintaining and form-destroying governance.

EXAMPLE: Finance System

In the global finance activity system the three types of governance are not balanced:

- **the form-creating regulation dominates *(through bonuses and maximising the ROI, etc.)*, while**
- **there is too little form-maintaining regulation *(such as taxation, fees for each trade, limiting excesses of trading, etc.)* and**
- **almost no form destroying governance *(such as sanctioning the unethical - if not criminal- behaviour of reckless speculators).***

EXAMPLE: Education System

An activity system like education would need to be driven by form creating governance in order to encourage the creativity and development of learners.

Instead, education is mostly driven by the standardisation of form-maintaining governance *(such as a rigid curriculum, standardised tests and a standardised examination system)*. Likewise, the evaluation of universities by international accreditation bodies implies creativity destroying standardisation of form maintaining governance.

ENTITY SYSTEM EXAMPLE

PRINCIPLE:

One of the principles associated with the organising FORCE OF STRUCTURE is the three-dimensional matrix organisation of an entity system. This structure is derived from the optimal interaction of the outward-, inward-and self-directed activity systems of an entity system. *(See Slide 318).*

EXAMPLE: **Business or Government Organisation**

If this principle is violated and the organisation is not structured as a three-dimensional matrix, but as a two-dimensional one or even as a traditional hierarchy, it will suffer problems such as lack of coordination, communication problems *(i.e. gaps in, overlaps of and informal communication),* internal competition, duplications and incoherence and bureaucracy, amongst others.

NOTE: **To become a viable system, its design must adhere to ALL organising principles of the *Seven Forces of Organisation*.**

This is amazing!

I understand now so clearly some problems that seemed so complex before.

They told us *(and we believed it)* that the finance system is too complex to understand except maybe by the select few bankers....

Maybe redesigning those systems is not all that complex after all?!?!

CONGRATULATIONS! You begin to understand the w/holistic truth of simplicity underlying complexity!

AHA.
So the emperor of the current system is naked after all. Let's wrap him in a *Seven Coloured Dream Coat!*

Something to ponder on!

A spaceship is a simple machine.

A marriage is a complex undertaking.

PART 4:
Understanding Complexity

4.1. Definition of Complexity

4.2. Types of Problems

4.3. Understanding a Mess

4.4. Some Terminology

4.1. Definition of Complexity

DEFINITION of complexity

Various dictionaries describe something as being COMPLEX, if it consists of many different and connected parts and refer to complexity as a state or quality that is being intricate, complicated, difficult to understand, elaborate.

The opposite of complexity is SIMPLICITY, which dictionaries describe as plain, presenting no difficulty, being uncomplicated, easy to understand, clear, intelligible, etc.

According to systems thinking, complexity arises or EMERGES from the interaction of various systems with each other. *For example, the quality of a marriage emerges from the interaction of the spouses. They co-produce the state or quality of the marriage.*

The other aspect of systemic complexity is related to a non-linear cause – effect relationship, whereby

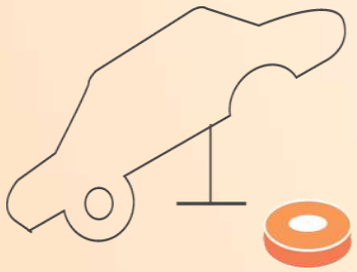
- **on the one hand, the link between cause and effect can be difficult to determine, due to feedback loops, *as illustrated by the famous chicken – egg analogy (i.e. what was first, the chicken or the egg?)***
- **on the other hand there is multiple causation, or the co-production of an effect as emergence, *as illustrated by a new idea emerging in a conversation – i.e. whose idea was it really?)***

"I think the next century will be the century of complexity."
(Stephen Hawking)

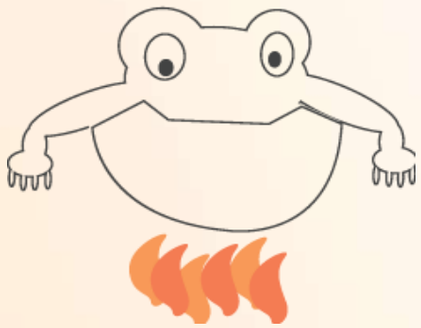
4.2. Types of Problems

types of problems

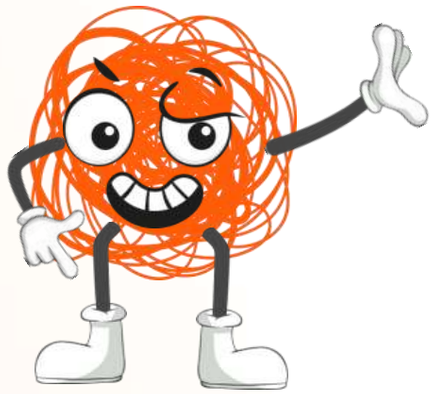
According to systems thinking one can distinguish between a Simple Problem, Complex Problem and a mess.



simple problem

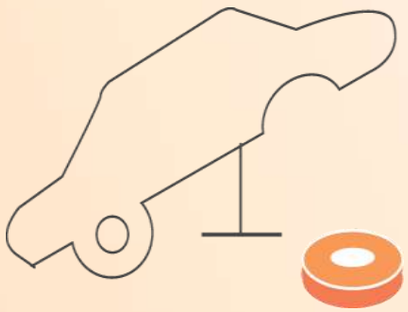


complex problem



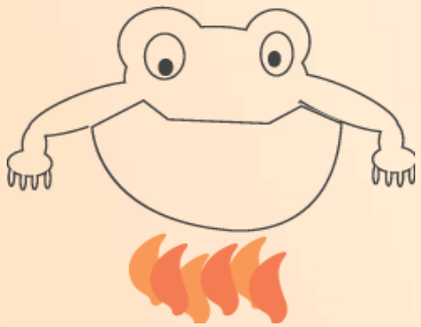
mess

types of problems (continued)



SIMPLE PROBLEM: **A simple problem represents some malfunctioning in an otherwise well functioning system.**

Such a problem is solved by identifying the cause of malfunctioning and fixing it. *Typical examples are fixing a car breakdown, or setting a broken arm in plaster.*

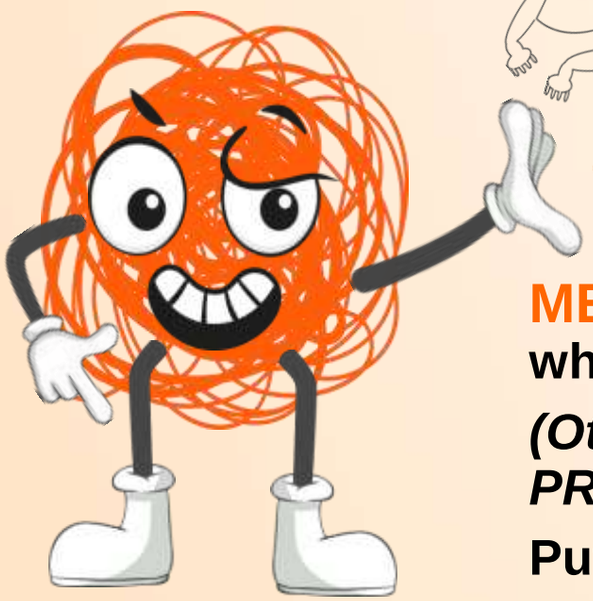


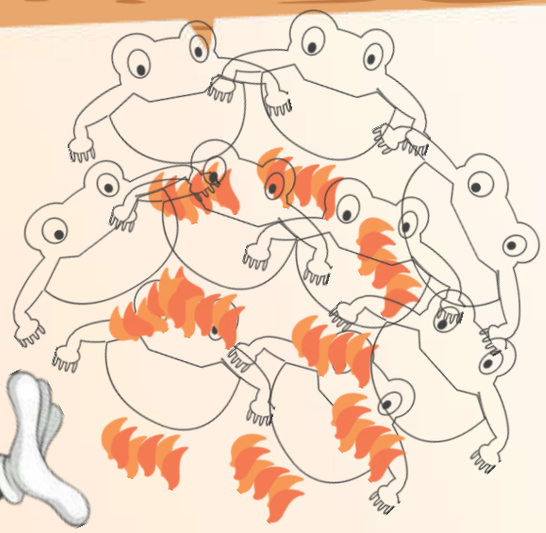
COMPLEX PROBLEM: **A complex problem is an emergence from the interaction of systems. *Typical examples are social problems, like an unhappy marriage or an unprofitable business.* The unhappiness, or unprofitability are co-produced by the interacting systems.**

The interacting systems are not necessarily aware that they co-produce the problem, nor do they intend to create a problem. *For example, a caring spouse may irritate the partner, or improving medical care in a society can give rise to its exploding population, or more iatrogenic disease (i.e. disease arising from medical treatment).*

(NOTE: We also refer to a complex as a "frog" – see NOTE on frogs below.)

types of problems (continued)





MESS: **Mess is a term coined by the famous systems thinker Ackoff, who defined it as being a system of interrelated complex problems.**

(Other researchers call such a system of interacting problems a PROBLEMATIQUE.)

Put differently, a mess is a problem riddled system *(be it a personal marriage, or a messy business system, or the education, finance, or democracy mess of a society)* that interacts with other problem-riddled systems in such a way, that they mutually impact on each other, reinforcing and worsening the problems in each system.

This gives rise to a system-like emergence that spans levels and dimensions. Examples of a personal mess are unhappiness and conflict, examples of societal messes are poverty, war and environmental deterioration.

NOTE: **The characteristics of a mess are described in more detail in the following section. How to dissolve a mess is described *in Part 6: W/Holistic Change Methodology.***

Q: You mentioned the example of a marriage problem as being complex.

Can you explain the difference between a **complex problem** and a **mess** in some more detail?

A: The difference is **not** one of NATURE *(i.e. both arise from the interaction of systems)*, **but** of DEGREE. For example, if you have one specific relationship problem *(such as the one mentioned above)*, you deal with a complex problem. If you have two problems, well ... with how many problems will you start calling your marriage a problem-riddled mess?

Also, if we begin analysing a single complex problem by identifying its co-factors, we could be in for a surprise and uncover a mess.

In short, there is little difference! In final analysis, it is frogs all the way!

NOTE on frogs

Problems are often referred to as FROGS...
for the following two reasons:

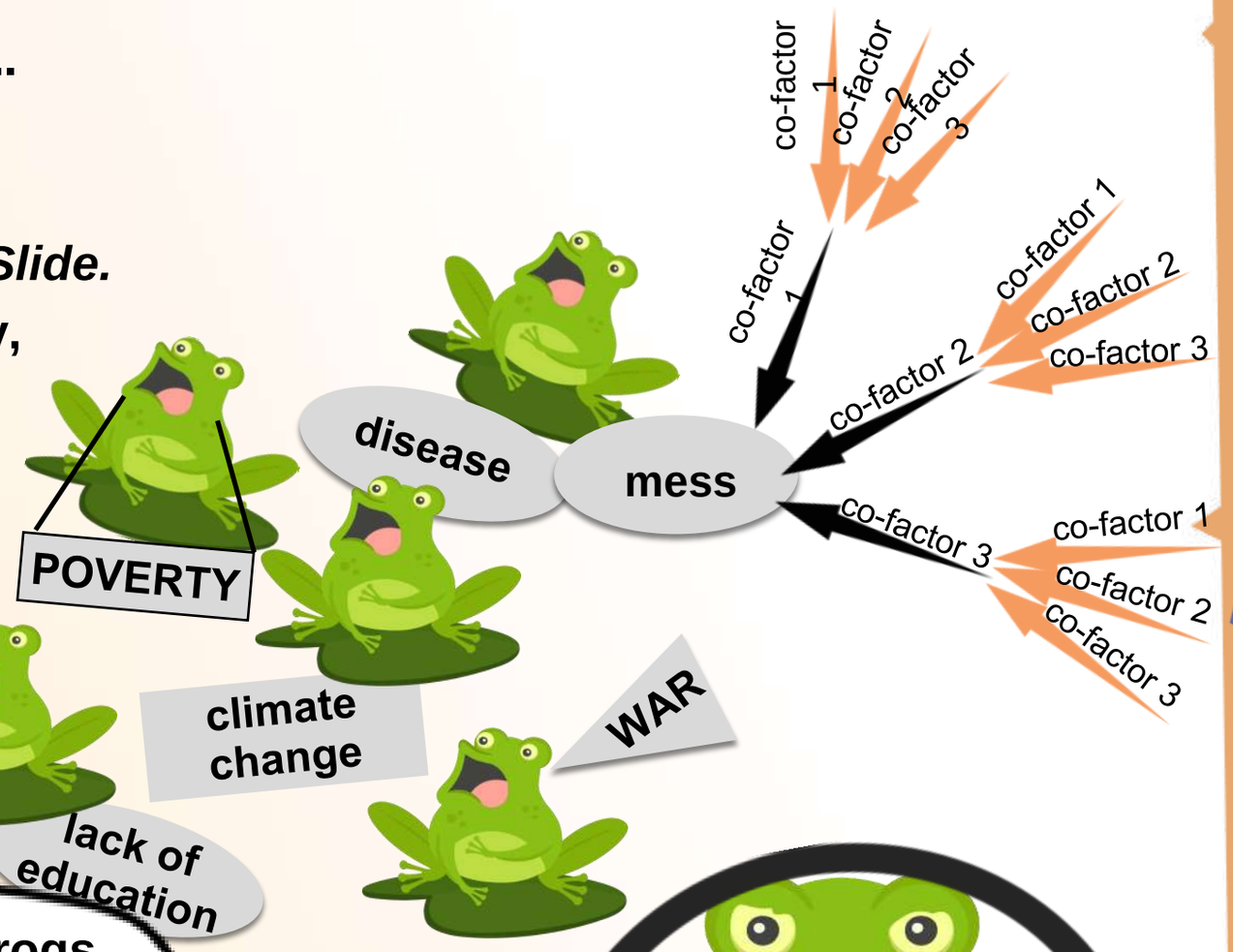
1. **because of the boiling frog analogy,**
   which is explained in the following Slide.
2. **because of the frogs / prince analogy,**
   which is explained later under problem (dis)solving.

Each major global problem is a frog…
...and each frog *(in final analysis)* is a mess

If we inspect any one of these frogs *(problems)*….we find that they consist of many sub-frogs or *(sub-problems)*…

This is because larger problems are co-caused, *(or co-produced)* by other problems….the frogs co-produce each other.

(See the later education example.)



NOTE on frogs *(continued)*

The Boiling Frog Analogy

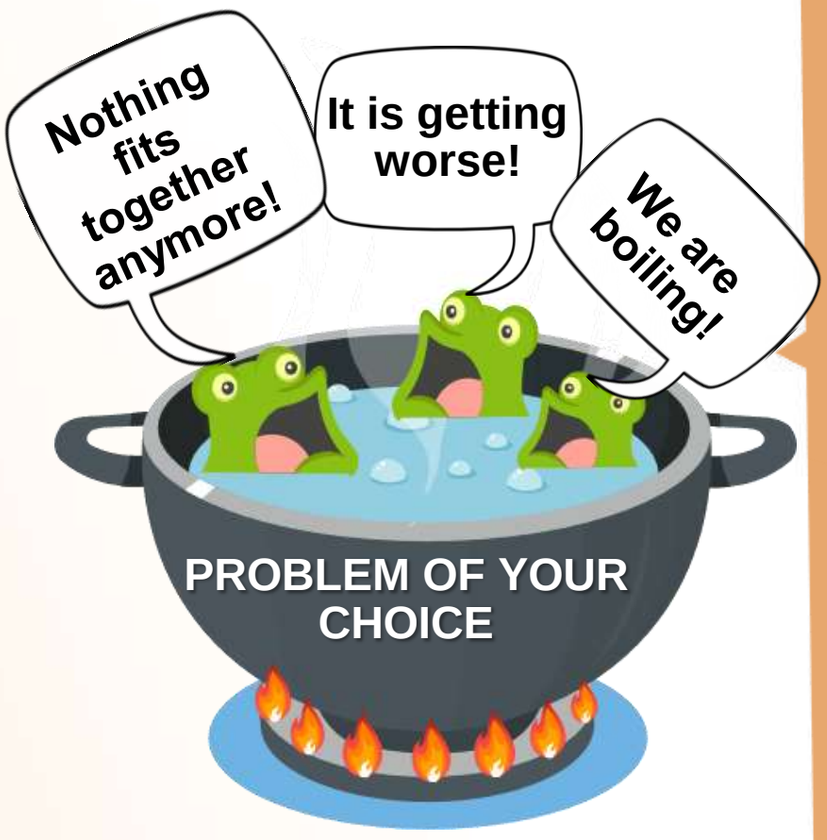
Apparently, if one throws a frog into hot water it will immediately jump out. But if it is put into cold water, it stays there, even if the water gets increasingly hot *(as long as the increase in the water temperature is gradual).*

The reason for this is that a frog has a nervous system that cannot detect small changes in temperature.
In fact, before it notices that it is getting hot, it is boiled to death. *(PLEASE, do NOT try this. It is only an analogy!)*

What does this mean?

It means that if we are in a deteriorating situation, we adjust to the gradual decline *(e.g. declining health, happiness, efficiency, success, or freedom).*

And when we notice that it is really getting serious, it is often too late to turn the situation around . The gradual decline results in an apparently sudden demise *(e.g. a life-threatening disease, divorce, being fired from work, or waking up in a totalitarian state).*



By analogy, a mess is a cesspool of frogs boiling to death.

In a societal or collective mess we all sit *(more or less)* happily or scared in a current situation, accept the problems and deny that they are getting worse. Welcome to the energy, finance, education and any other mess, including the hype of climate change, the panic about a pandemic and probably the worst threat of all: nuclear armament!

NOTE on co-factors

A complex problem *(i.e. a mess)* is co-produced through the impacts of other systems.

A co-production is also referred to as co-factor. It can be an activity, or a state or outcome of a system that impacts on another system and co-causes it to change.
At closer inspection one will detect that most co-factors are complex systems in themselves. You detect this by doing a mess analysis on each co-factor *(i.e. by identifying the co-factors of each co-factor, as suggested in the exercise).*

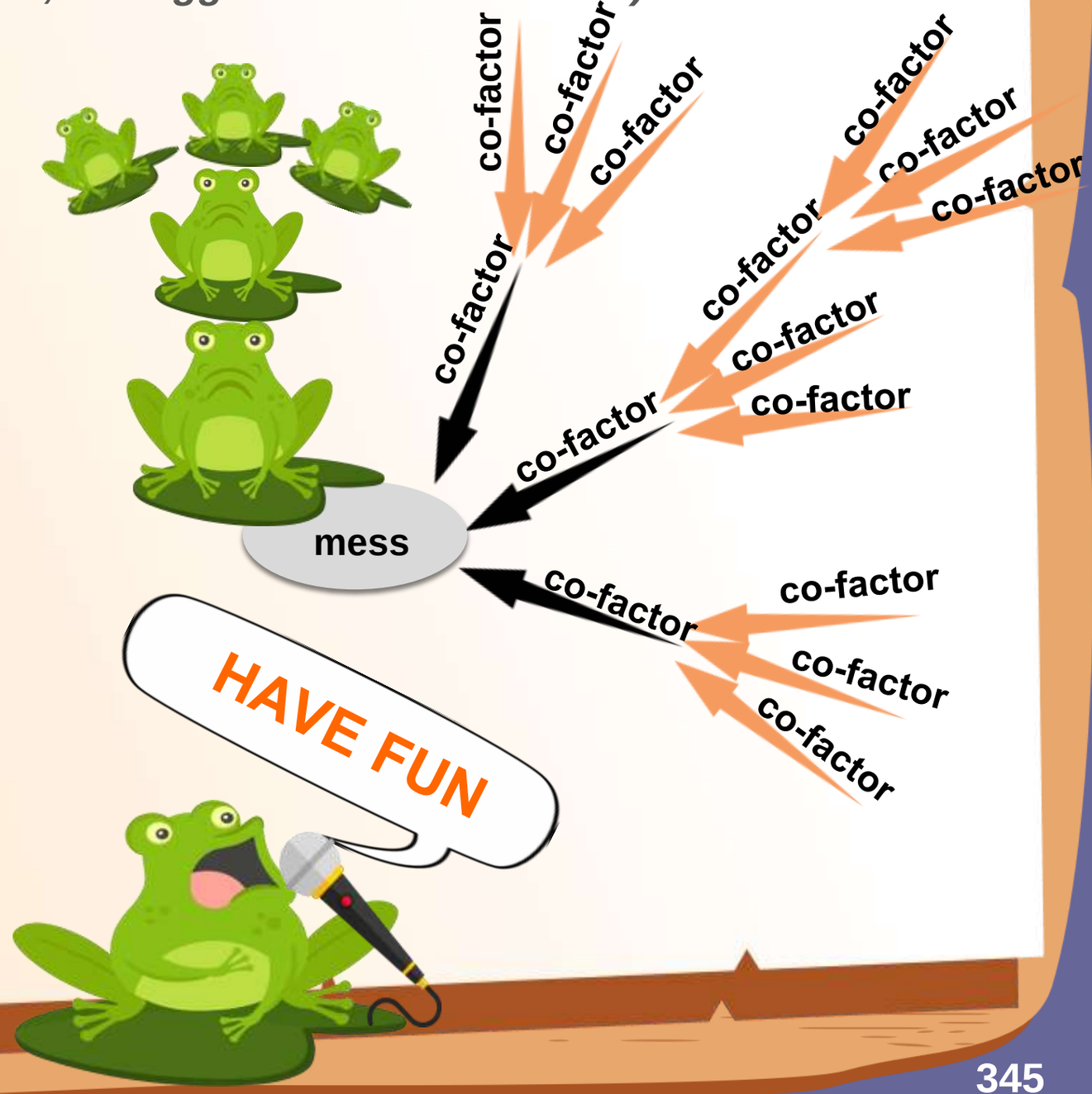
Suggested Exercise

Choose a personal problem and do a mess analysis by identifying its co-factors *(like in the education mess)*. You will be surprised how messy your problem really is.

And if you still do a second round of co-factors (*the frogs of the frogs*) ....

... and if you feel adventurous and do a third round *(the frogs of the frogs of the frogs)*...

...then you will be amazed at the complexity!



4.3. Understanding a *Mess*

Memo from Mr. Mess

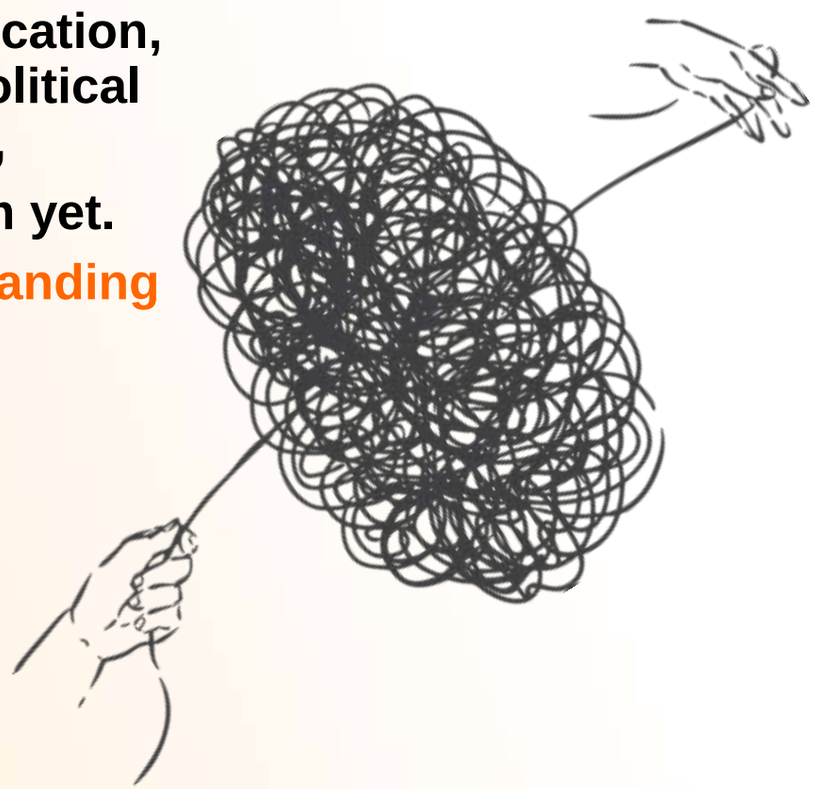
Hi, I am Mr Mess!

If you think that you really understand the world's problems and their solutions,

and if you believe that the current education, health care, energy, economic and political systems are able to solve them,

you are not ready for this curriculum yet.

You still have a too simplistic understanding of the world.



Q: WHY is it important to understand complex problems and messes??

A: If we do not understand the nature of **complexity** and complex problems (*or messes*), we will design and implement **too simplistic solutions.**

And then we are surprised that things don't get better, or even get worse than before.

In your reflections on what you learned from the experts during your journey *(in Chapter 1)*, you already realised that there are different *(and seemingly equally valid)* points of view on and according solutions of any issue.

Thereby you already showed a good understanding of complexity.

Now let us deepen this further by exploring the nature of a mess.

understanding a mess

"Every problem interacts with other problems and is therefore part of a set of interrelated problems, a system of problems... ... I choose to call such a system a mess." (*Russel L. Ackoff*)

A mess consists of many different types of problems *(as illustrated in the education mess below).*

These problems interact with each other, making the mess worse *(as for example, lack of funds for education implies a shortage of teachers, incompetent teaching and poorly qualified school leavers).*

The mess gets even greater and more complex, as soon as messy systems interact with each other. *Think for example, how the COVID mess interacts with an already messy education system, making both messes worse.*

Welcome to the realities of the world!

Trying to solve one or even more of the problems of a mess, tends to make the systems that participate in a mess even more messy.

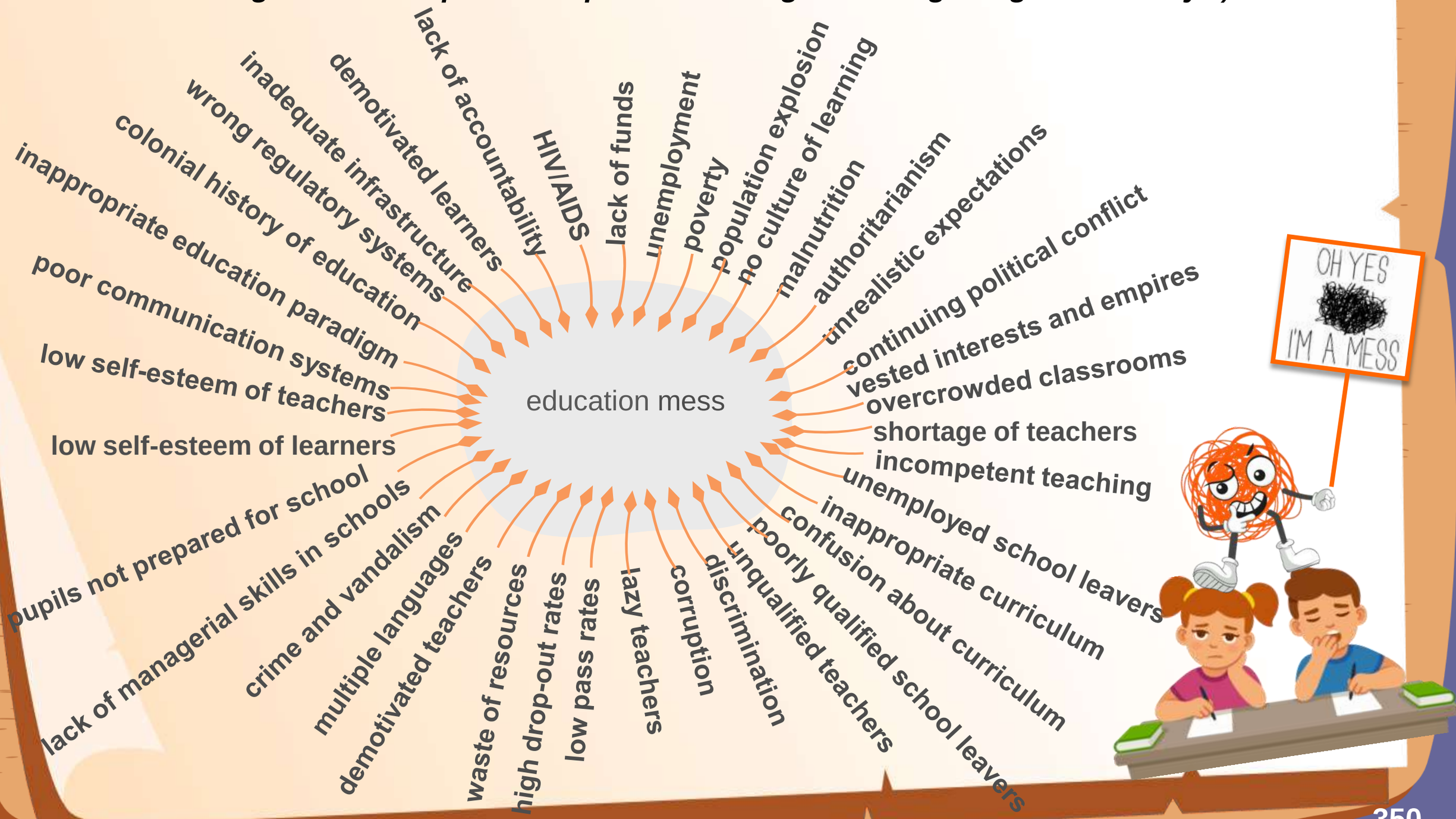
Instead, the mess needs to be dissolved by redesigning the interacting systems that co-produce the mess.

Sadly, our social systems are messes which also create messes in nature's systems!

Let's re-imagine and redesign them!

understanding a mess: *case study education*

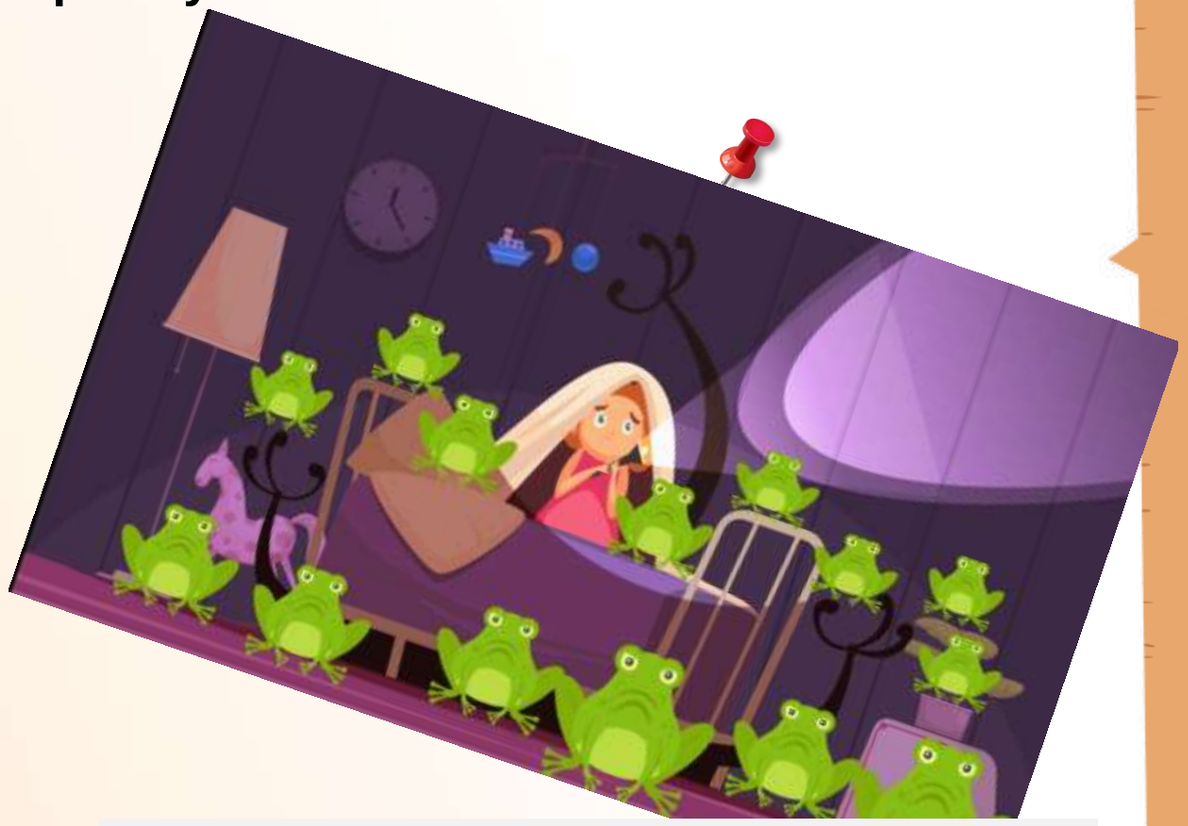
The Figure below illustrates some of the diverse problems *(or co-factors)* that characterise the education system of South Africa, as identified by a group of educationists. *(The group identified many more co-factors, of course. But for illustration purposes we only included enough to make a point and prevent the Figure from getting too "messy".)*



understanding a mess *(continued)*

Anyone watching the news regularly will be overwhelmed by complexity. And since most news is about problems, we are also overwhelmed by problems.

Any solution we could think of soon evaporates as we are confronted with yet another problem that is related to our solution and seems to make the solution impossible to implement it after all. We drown in a problem complexity.



P.S: Did you ever observe that any societal mess got less in the transition from one administration or government to another? Probably not!

It seems that messes survive so-called democracy!!!

PS: Many give up, lose hope and become lethargic. What to do instead?

Step 1: Don't be naive: wake up, look complexity in the eye and don't flinch!

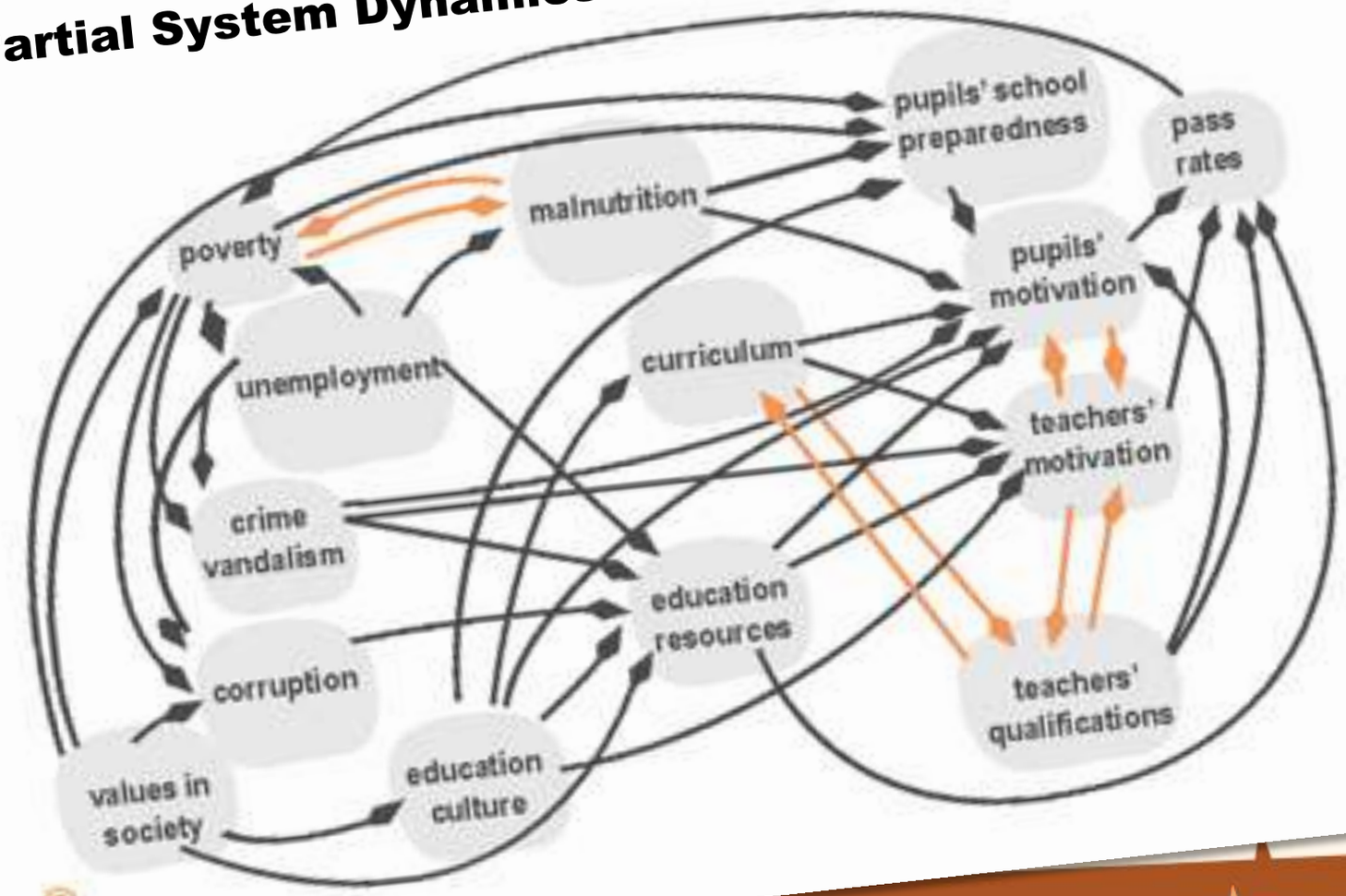
Step 2: Keep working through the curriculum!

understanding a mess: *system dynamics model*

We said that the problems impact on and reinforce each other and that therefore the mess gets worse. Let us go back to the education mess and explore this through a SYSTEM DYNAMICS MODEL. Such a model depicts which co-factor impacts on which other co-factor *(this is illustrated by the direction of the connecting arrow.)* Notice the orange arrows? They depict circular causation, or the famous chicken – egg situation. *(See later explanation.)*

Such a model depicts the current logic of the system – i.e. how the current system functions.

Partial System Dynamics Model of the Education mess



NOTE: **The depicted system dynamic model uses only a few co-factors of the education mess.**

NOTE: **System dynamic models are discussed in more detail in *Part 5: Understanding System Change.***

NOTE: chicken – egg problems

We said that complexity is an emergence of the interaction of systems. Another aspect of complexity is circular causation.

Look carefully at the orange arrows in the above system dynamics model. They represent CHICKEN–EGG situations, meaning: what was first, the chicken or the egg? This mutual causation is referred to as circular causation. ***For example, an unmotivated teacher causes pupils to be unmotivated also, which reinforces the teacher's lack of motivation. Another example is the famous cycle of violence of if you hit me, I hit you back, then you hit me back, then...***

Sometimes an original or final cause can be traced, ***as for example, who started the hitting?*** **But then there could be other co-factors that explain why this party started the hitting in the first place.**

More often than not, a chicken–egg situation is started and maintained by various co-factors which make the solving of such problems impossible. ***A typical example of poverty co-causing malnutrition and malnutrition co-causing poverty. Even if one dishes out food, it does not necessarily dissolve poverty, as other co-producers are also involved, such as lack of education and skills, or lack of job opportunities, or...).***

Another famous example is the population explosion. It has been shown that economic development slows down population growth. But in many countries, rapid population growth is ahead of economic development, whereby economic development cannot catch up with - let alone overtake - population growth. This increases both problems, lack of development and population increase.

A mess is full of chicken – egg problems that reinforce each other!

EXERCISE

1. Do a system dynamics model of your problem.

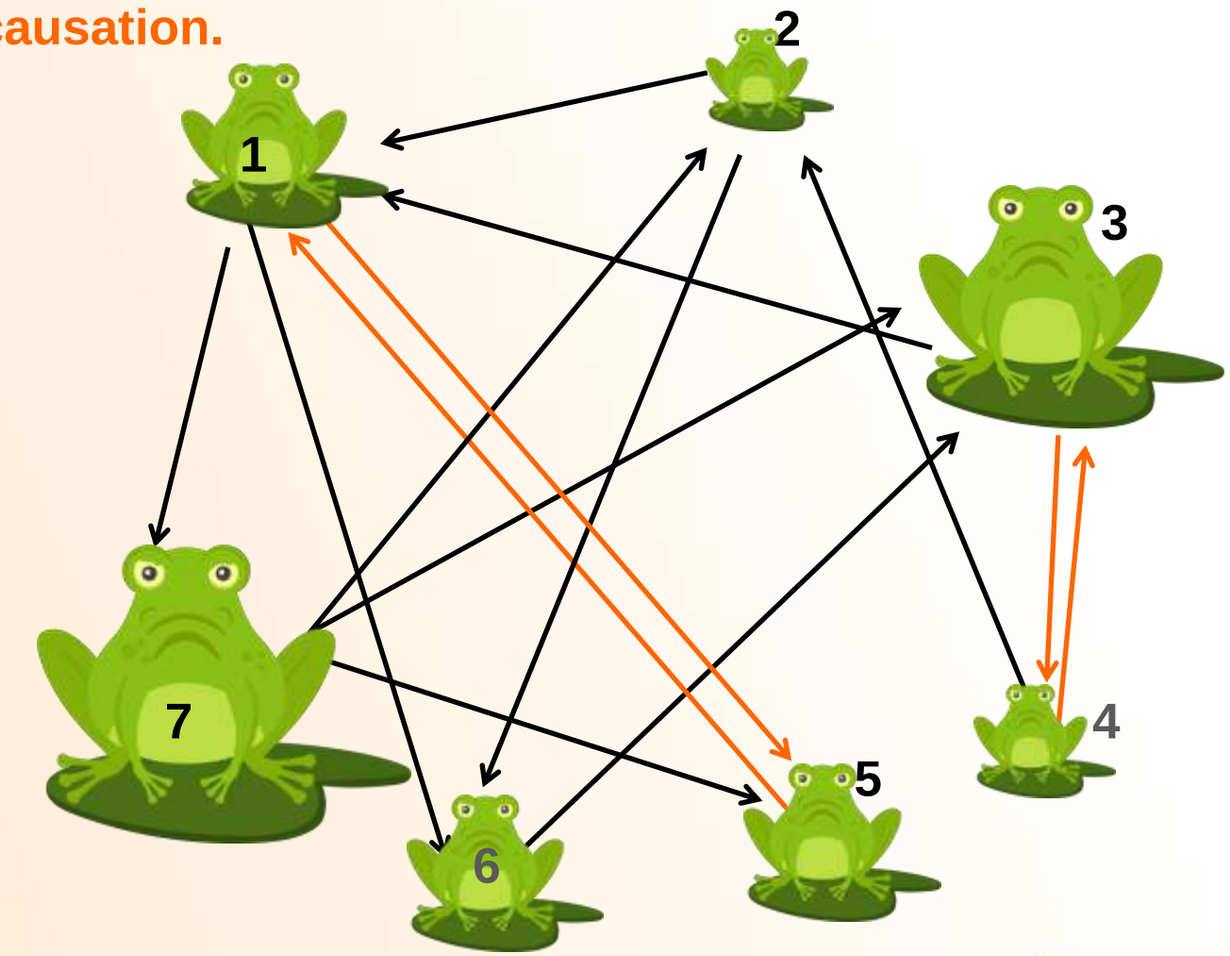
Select five to seven problem co-factors which you identified in the previous exercise and write them down in a circle.

Then starting with co-factor 1 and ask if it impacts on co-factor 2, 3, 4, etc.
If there is an impact, draw an arrow and describe the impact with a few key words.

Then go to co-factor 2 and ask if it impacts on co-factor 1, 3, 4, etc.

Continue with all other co-factors.

2. Identify at least one circular causation.



This is very depressing. One seems to go in circles when one tries to analyse a mess.

How can we dissolve the messes of the world?

This complexity gives me a headache! How can one redesign a system that changes shape all the time? How can one deal with chicken / egg situations? Where should we start?

WISE OWL ADVISE:
Don't entangle your EMOTIONS with the mess!!! You might sink into a black hole *(an anti-whole).* Rather keep a cool and analytic head and study this curriculum. Then roll up your sleeves and *(armed with w/holistic knowledge and a bottom-less cup of coffee)* get going with clearing up mess after mess, your own and our collective ones!

WELCOME TO THE REAL WORLD!

Indeed, complexity can be overwhelming until we learn how to deal with it.

A first step is to CLASSIFY things.

a mess spans levels and dimensions

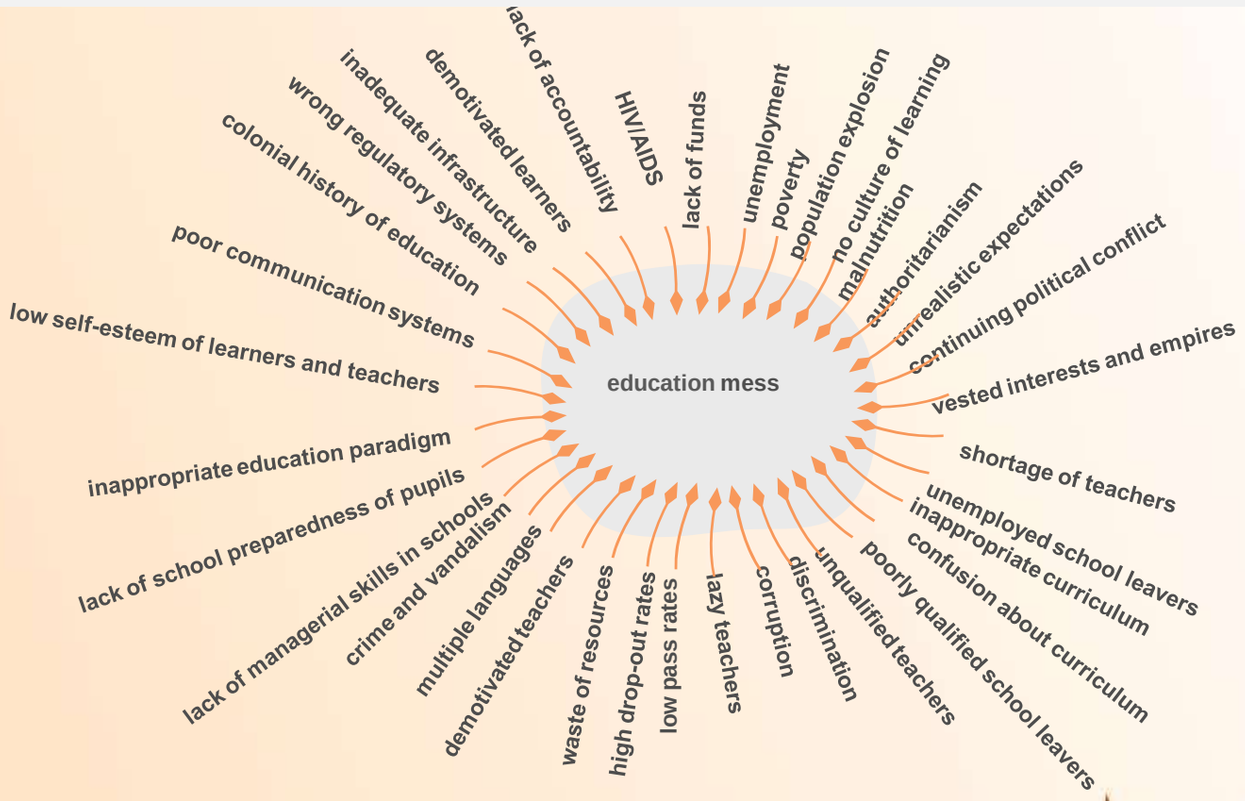
If you look at the Figure of the education mess and its circle of co-factors more closely, you will notice that the co-factors belong to different categories.

Some co-factors will have to do with the individual learner, others with society, the national education department, the school and the family. These represent co-factors at different LEVELS.

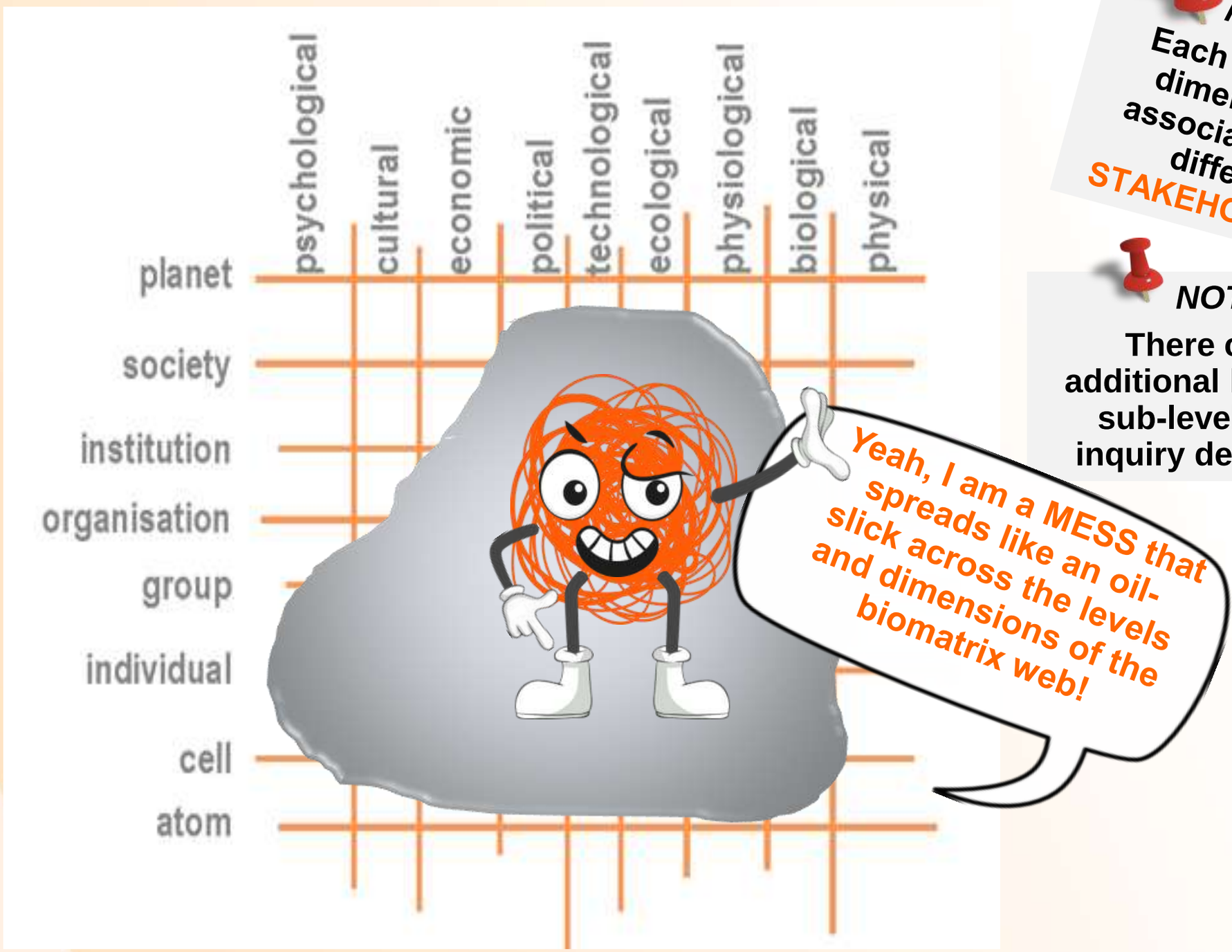
You will also notice that some co-factors have to do with culture, economics, politics, technology and physiology. These represent co-factors from different DIMENSIONS.

Thus, a mess spans levels and dimensions.

The levels and dimensions consist of generic categories. These categories are helpful to identify the different aspects of a mess. They make the mess more "orderly".



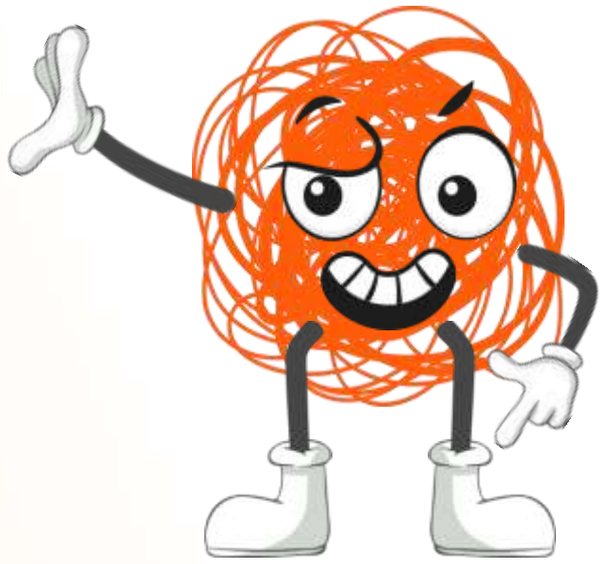
biomatrix spatial framework: a mess spreads



NOTE:
Each level and dimension is associated with different STAKEHOLDERS.

NOTE:
There can be additional levels and sub-levels, if the inquiry demands it.

Curriculum Vitae of Mr Mess



Yeah, you know already that I am a system of interrelated problems that co-produce each other. I am therefore not sure if I came from a chicken or an egg, or a whole battery thereof. Who cares?

Yes, I weave my way through levels and dimensions and I am at home in all of them.

If you look closely at me you will find numerous co-factors *(i.e. co-causes from different systems from different dimensions and levels).* Each is a problem *(a messy one)* in its own right. OK, so I am a mess of messes.

As one problem in my mess changes, the other messes also change. In fact, they all change continuously and often quite rapidly, because they continuously interrelate and impact on each other. That's why I have given up looking into a mirror!

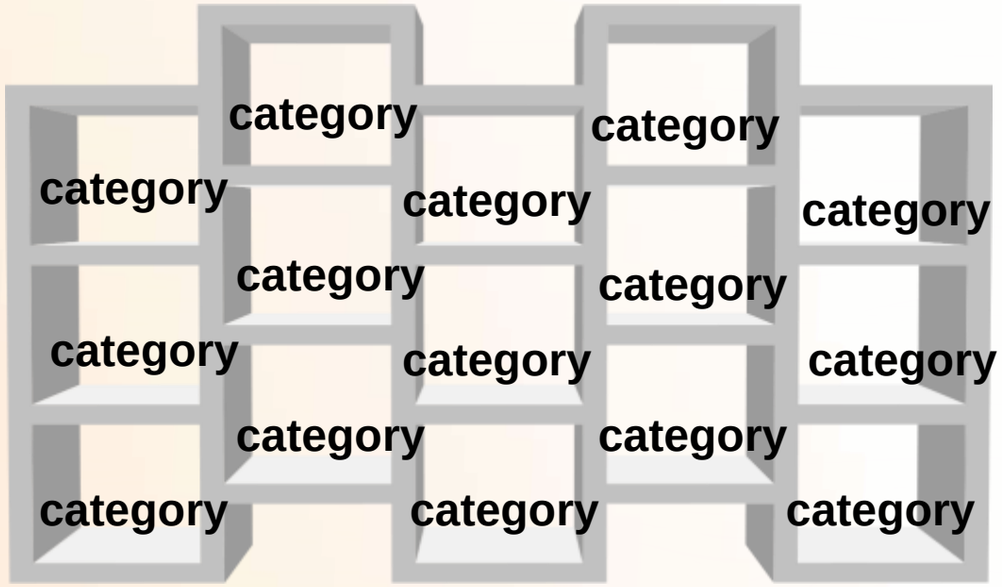
I am the ultimate shape shifter, depending on who looks at me, the picture looks different. Often, what looks like a problem to one, is a benefit to another. *(For example, think of a pandemic: what a disaster for the people and what a blessing for the pharmaceutical industry and their investors!)*

And in case you didn't know: YOU are also a part of me! You are not just the observer! And if you try to dissolve me, I will resist you through many hidden entanglements.

To conquer me, you will have to dissect me and work with my different parts *(which you will learn in Part 6).*

categorising a mess

Picture a heap of books on the floor *(i.e. a mess of books)* and a bookshelf with a name *(or category)* on each shelf. As soon as each book is picked up and put into its appropriate shelf, there is orderly information about the mess. One will also notice which shelves have no books in them. They represent a gap in the information about the mess and suggest that more research might be needed.



The categories of the *Biomatrix Framework (bookshelf)* represent CONTEXT.
The information provided by stakeholders *(books)* represent CONTENT.

The CONTEXT of each mess is the same, while the CONTENT of each is unique and changes over time and differs according to the viewer.

The CONTEXT represents the generic categories of levels and dimensions. One could also regard them as generic RESEARCH QUESTIONS, such as: What are the ecological, cultural, political, etc. co-factors at each of the different levels of the mess? The answers provide the CONTENT.

To understand any mess *(or issue, or system)* we need to have all its relevant categories populated by the stakeholders. Only then do we have sufficient collective knowledge about it and can start with redesigning it.

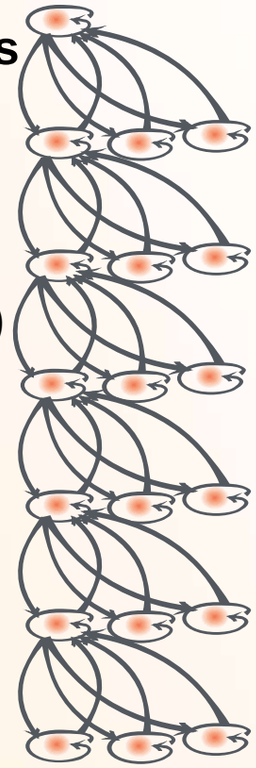
categories associated with LEVELS

The categories associated with LEVELS are derived from the different types of system in the containing systems hierarchy of life.

The generic levels of the naturosphere and psycho-sociosphere are listed below. The technosphere interfaces with the other spheres at all levels.

The NATUROSPHERE *(i.e. the systems of nature)* consists of the following main levels:

- **planet**
- **society *(human, animal, plant, rock, virus, bacteria, etc. societies)***
- **individual**
- **cell**
- **molecule**
- **atom**
- **particle**

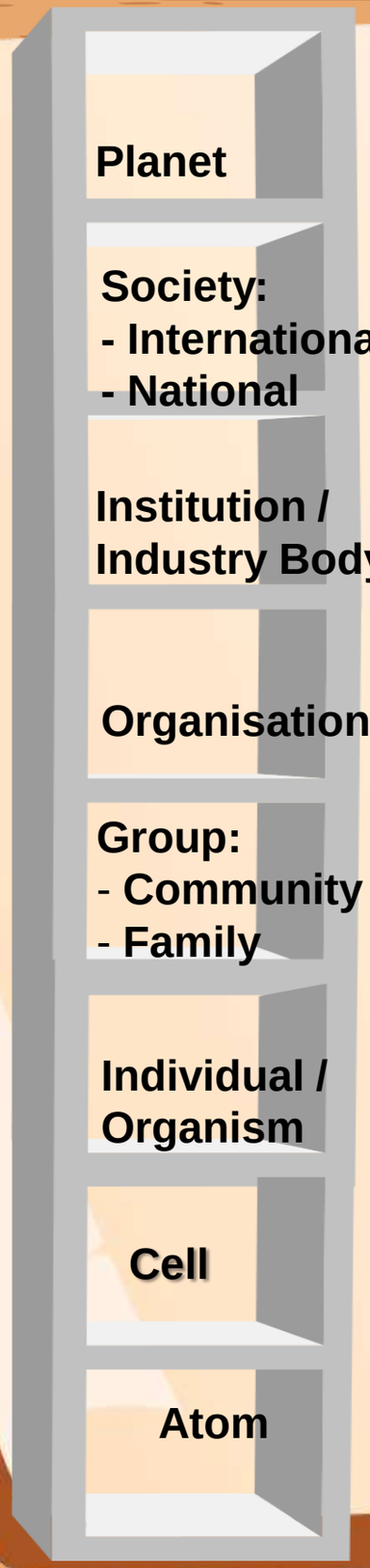


The SOCIO-SPHERE *(i.e. the human social systems)* consists of the following main levels:

- **international**
- **national**
- **institutional**
- **organisational**
- **group**
- **family**
- **individual personal**

NOTE: **Of course, one can add more levels or sub-levels in both the naturo- and psycho-sociosphere, if the nature of the inquiry requires it *(e.g. such as a galactic level, a physiological level and different social groupings, for example).***

EXERCISE



Explore the levels of your problem

1. **Determine at which level your problem is located *(e.g. is it a personal problem; or a problem at another level, like your physiology, family, organisation, society, or the planet?).* The level at which your problem is located is your reference level.**
2. **Classify your co-factors according to the level they belong to.**

   NOTE: **If one of your co-factors represents more than one level, reformulate it into two co-factors, one for each level**
3. **Find additional co-factors at the outer and inner levels of your reference level *(maybe you can find one for each level?)***

NOTE: **There can be additional (sub)levels, depending on the nature of your issue.**

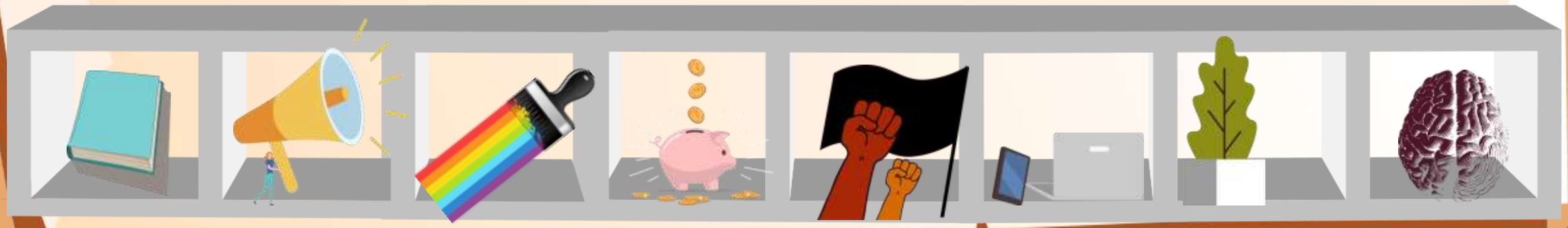
categories associated with DIMENSIONS

Systems have sub-systems that are connected with and impacted on by other systems from the different dimensions of the sub-webs of the biomatrix *(i.e. the naturospere, psycho-sociosphere and technosphere).* Thus systems are multi-dimensional.

The generic dimensions are the following:

- **psychological** (***cognition, emotion, spirit, senses, etc.***)
- **cultural** (***education, science, religion, art, media)***
- **economic** ***(production, consumption, trade, finance, etc.)***
- **political** ***(relations, governance, law, military, etc.)***
- **technological**
- **ecological**
- **physiological**
- **biological**
- **physical**

NOTE: **The categories are generic for all systems, but the actual content *(i.e. the various co-factors)* is system specific. The content will even be different for the same system at different points in time and according to different viewers.**



EXERCISE

Explore the dimensions of your problem

1. **Classify your previously identified co-factors according to the dimension each represents.**

   Note: If one of your co-factors represents more than one dimension, reformulate it into two co-factors, one for each dimension.

2. **Find more co-factors *(maybe you can find one for each dimension?)***

psychological	cultural	economic	political	technological	ecological	physiological	biological	physical
e.g. cognitive emotional spiritual sensual	e.g. science, education, media, language, art, ethics, religion	e.g. production, finance, exchange	e.g. rules, laws, power relations	e.g. matter-energy-information processing; different categories of artefacts	e.g. physical environ-ment	e.g. functions of an organism	e.g. cellular functions	e.g. atomic and sub-atomic functioning

Let me do a little check on your understanding of a mess, by asking you some questions for a change:

Question 1. How could you visualise a mess like the education mess, within the web of the biomatrix?

Question 2: How do you relate a mess to entity and activity systems in general?

... yes, indeed, the education mess affects many systems in different ways, co-producing their malfunctioning.

Answer 1: I visualise a messy system like a tar spot spreading across a fishing net. It makes different strings and knots dirty!

Bingo! We will later learn that we have to tease a mess apart according to its participating activity and entity systems, if we want to dissolve it.

Answer 2: I think that a mess involves different activity and entity systems.

I am impressed! You are a bright bunch of kids! Let's ask you some more, before we learn some more about how systems can be changed.

Question 3: How do you relate a mess like education to the sub-webs of the biomatrix?

Question 4: How do you relate a mess to the containing systems hierarchy?

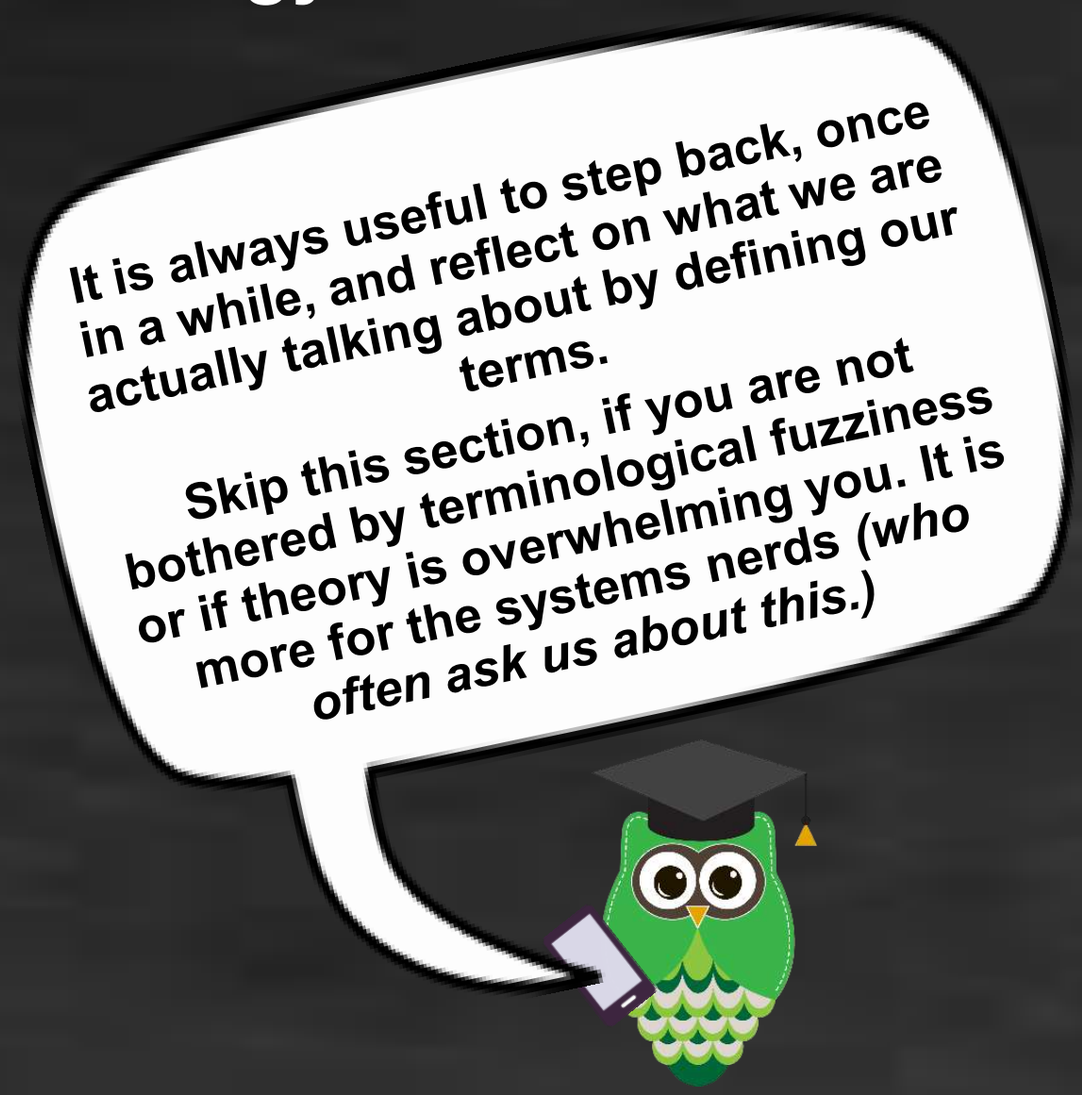
... yes, indeed, the mess is multi-dimensional!

Answer 3: I think that the education mess spreads across the three sub-webs, which means that it has psychological, cultural, economic, political, ecological, biological and physical aspects.

... yes, indeed, the mess is multi-[illegible]

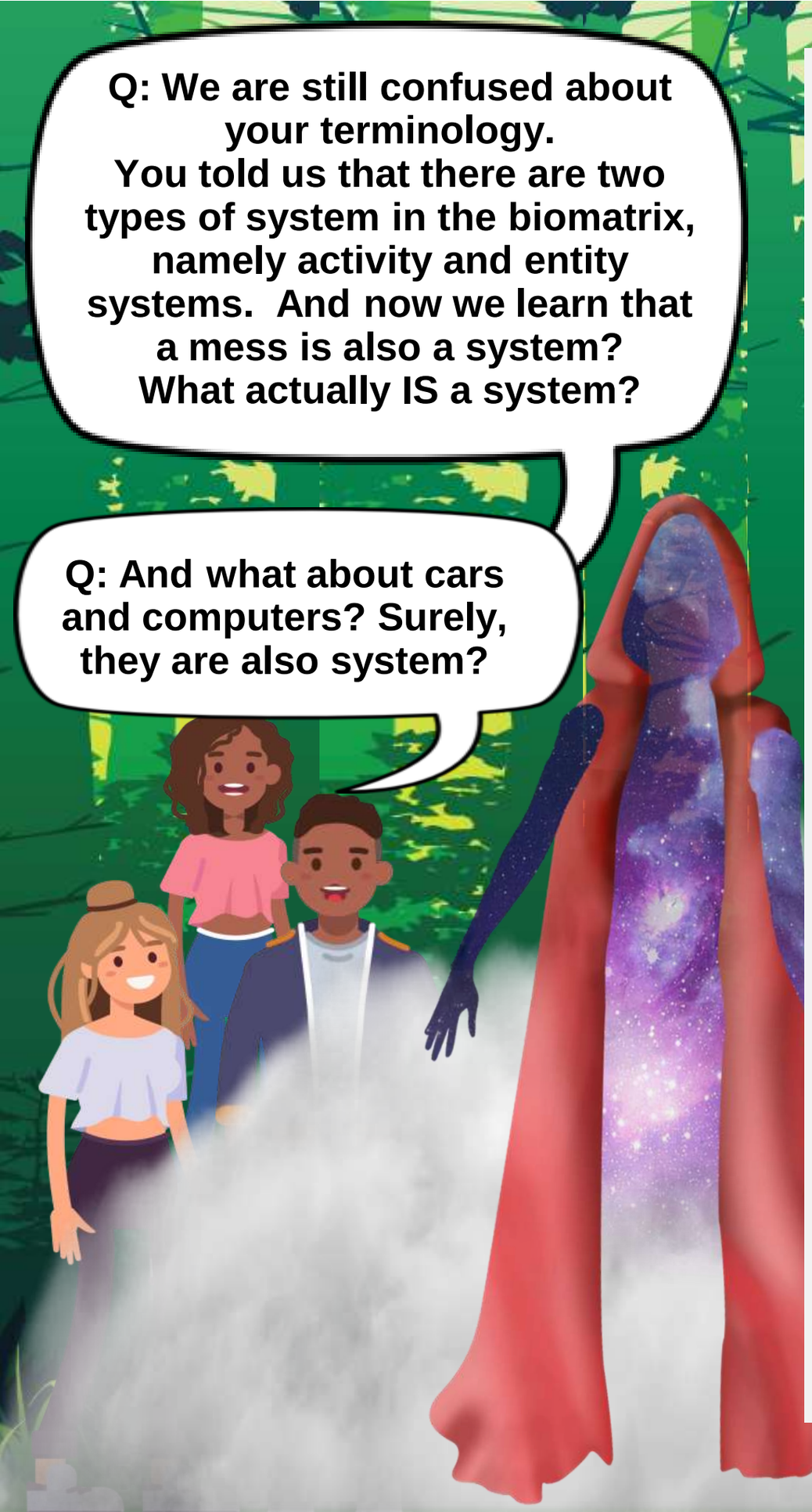
Answer 4: AHA! A mess spreads across different levels in the containing systems hierarchy *(like education department, school, classroom, individual and the brain / mind)!*

4.4. Some Terminology



Q: We are still confused about your terminology.
You told us that there are two types of system in the biomatrix, namely activity and entity systems. And now we learn that a mess is also a system?
What actually IS a system?

Q: And what about cars and computers? Surely, they are also system?



A: Welcome to the quagmire of the terminology associated with systems thinking. Different systems thinkers *(we too!)* have different definitions *(and they don't always agree).* The long discussions on this you can find in the scientific articles, PhDs and Books of the *Biomatrix Group*.

A short version according to *Biomatrix The*ory is that the biomatrix *(i.e. the web of life)* consists of activity and entity systems, which are carefully defined, according to a set of criteria. These systems are w/holistic, in the sense of organising themselves to form coherent wholes according to seemingly inherent organising principles.

Technological systems *(like the car or computer)* do not fully meet those criteria and are therefore regarded as incomplete entity or activity systems, even if they are designed as a coherently functioning whole (like a car or computer, or a web of technological processes, like a network). However, technological developments *(i.e. Artificial Intelligence)* will change this in future.

As these systems continuously impact on, interact with and co-produce each other, one can see the emergence orderly outcomes *(e.g. the famous ecological balance, homeostasis of the body and periods of peace and stability in society),* as well as apparent random and disorderly outcomes *(e.g. messes).* These interaction are analysed as systems *(i.e. through system dynamics models),* although they are not wholes per se but more or less stable and orderly patterns of interaction of systems.

Q1: Can you explain the distinction between wholes and systems some more?

A1: Ultimately, an answer depends on definitions. **All wholes are systems.** For example, a person *(and an organisation, industry, society and the planet)* is a whole. And it is also a system, meaning that it has the characteristics and behaviour of a system, as well as being organised into a coherent whole, according to w/holistic organising principles.

But not all systems are wholes. For example, a complex problem like poverty or climate change is also called by some researchers a system *(we prefer to call it messy system, or mess)*, because it has some characteristics and behaviour of a system.

Q2: On our journey we met some systems and complexity thinkers.

Are they w/holistic thinkers?

A2: Yes, their thinking is based on some w/holistic concepts, but it may still lack others. *(See the following NOTES, if you are REALLY interested. Otherwise skip it.)*

There are different systems and related thinking approaches. *(See the following NOTE)*

NOTE: w/holistic thinking *versus* systems thinking

Systems thinking and its derivatives of complexity-, ecological- and design thinking are related thinking approaches. They are based on shared and overlapping theoretical concepts and models, as well as apparently contradictory approaches with some differences in emphasis and application, namely the

- **CYBERNETIC APPROACH which emphasises the inherent dynamics of an existing system and which has evolved into complexity theory *(This approach is based on system dynamics modelling, as explained previously; it proposes to change a system by identifying the variables with which a desired change can be effected; it works essentially within the current logic of the system)***
- **IDEAL DESIGN APPROACH which emphasises the intentional design of a system. (This approach is based on transforming the logic according to which the current system functions, whereby different researchers use different organising concepts to guide the design process)**

Both approaches subscribe to Aristotle's idea that "the whole is greater than the sum of its parts" and while they share some core concepts, they differ in others. Also, they do not distinguish between different types of systems and their difference in organisation. They are part of an overarching w/holistic paradigm, but each is incomplete per se. Thus, paradoxically, they are w/holistic in a partial way!

***NOTE:* The two approaches represent different ways of changing a system.**
(See Part 5.2. on Reforming versus Transforming Systems.)

NOTE: w/holistic thinking *versus* systems thinking (continued)

Also, most of these approaches are derived from and associated with a specific scientific discipline *(e.g. psychology, management, engineering, biology, physics and ecology).* Typically they reflect the terminology and methodologies of their discipline of origin and are therefore too specialised and fragmented to deal with trans-disciplinary problems in a w/holistic manner.

By comparison, *BIOMATRIX THEORY* integrated the two approaches and developed them further, whereby the interdisciplinary Biomatrix research group worked the key concepts of different systems-, complexity – and related approaches into a coherent and internally consistent theory, due to an overarching conceptual framework, which is the unique contribution of the group. *Biomatrix Theory* can therefore be regarded as a META-SYSTEMS THEORY.

One of its unique conceptual contributions is the distinction between different types of systems within the biomatrix and their organisation as coherent wholes and differentiating them from incomplete systems *(in terms of their w/holistic organisation)* and emergent systems that are not a whole *(e.g. messes)*. It also distinguishes between a web and field-perspective of systems. This makes *Biomatrix Theory* also a THEORY OF W/HOLISM.

PART 5:
Understanding System Change

5.1. Problem Solving versus Dissolving

5.2. Reforming versus Transforming Systems

5.3. Context versus Content of Change: *Biomatrix Frameworks*

why do we need to understand system change?

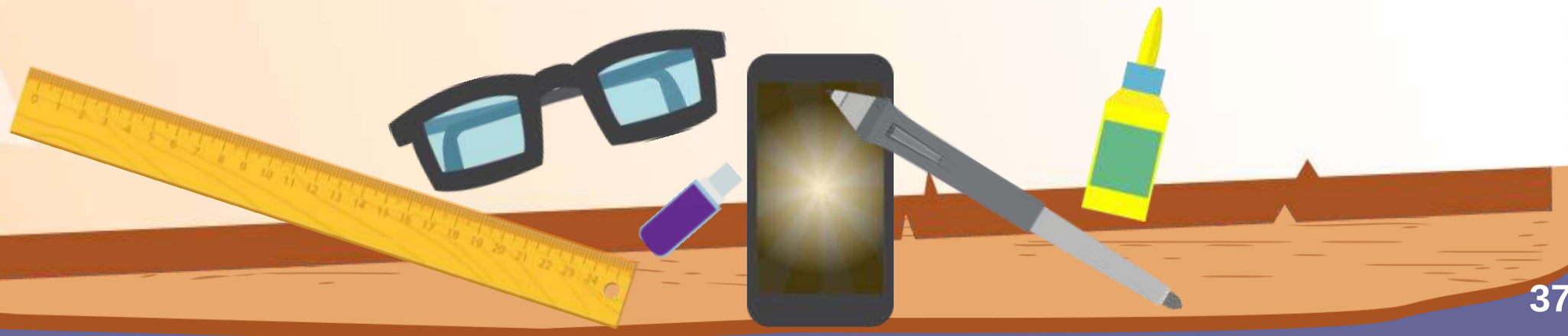
Practitioners are only interested in a theory as far as it can be applied in changing things.

For example, what is the use of knowing about the law of gravity if we don't know how to apply it to build a bridge or fly to the moon? And who cared about the theory of electricity before Edison and Tesla harnessed it so that we can light up our houses and plug in our appliances?

While scientists will *(or should be)* interested in a w/holistic theory *(such as Biomatrix Theory)* per se in order to check and expand their own assumptions and theories, the managers and governors of society's systems will only be interested if the theory can be applied in praxis to

- **make sense of the world in a public discourse *(e.g. through w/holistic frameworks and generic principles)***
- **(dis)solve complex problems *(e.g. through developing strategy designs for the systems that co-produce a complex problem, so that they deliver new outcomes and the problem dissolves)***
- **transform the current problem-riddled and outdated legacy systems of the industrial age *(e.g. though ideal system redesign)* into w/holistic and information age relevant ones.**

The *Biomatrix Change Methodology* facilitates this.



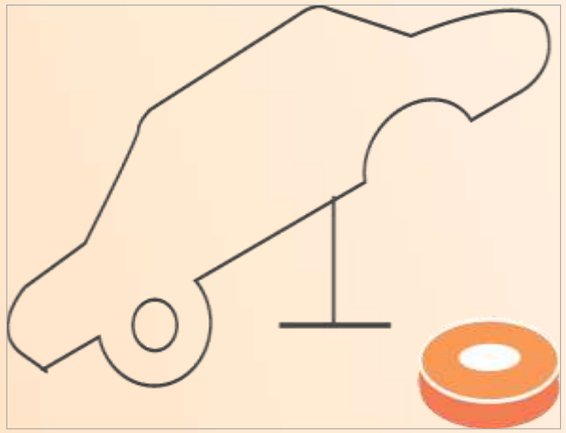
5.1. Problem Solving *versus* Problem Dissolving

Q: We know about problem solving. But what is problem dissolving?

A: Any problem solver and change manager needs to know that

- there are problems that can be solved and others that need to be dissolved
- problem solving and dissolving involve different approaches
- complex societal problems typically need a combination of both approaches

NOTE: problem solving



problem solving

PROBLEM SOLVING involves

- **analysing the system to identify its malfunctioning. This is usually done through root-cause analysis *(besides a few other, related methods)* and**
- **then "fixing" the malfunctioning part.**

For example, if the car breaks down, the faulty part is identified and then repaired or replaced.

The problem solving approach is typically used in technical systems that were designed to function in a specific way. By fixing the malfunctioning, the system works as it did before the problem occurred.

It can also be a useful approach in natural systems, because they have evolved a relatively fixed form and functioning. For example, many medical procedures *(e.g. setting bones, removing tumours and killing bacteria, parasites and viruses) are problem solving approaches.*

Problem Solving restores the system to the way it functioned before the problem arose.

NOTE: Problem Dissolving

problem dissolving

prince

boiling frog

NOTE: (See also the frogs / prince brainstorming method in *Part 6, Step 3*.)

PROBLEM DISSOLVING involves

- **identifying the stakeholder systems that co-produce the complex problem *(or mess),***
- **analyse their problem producing behaviour**
- **redesign their behaviour and**
- **getting them to change it accordingly..**

As the co-producing systems begin to change the way they interact, they co-produce different outcomes which dissolve the problem. *By analogy, to the degree that health promoting change is introduced into a system, its disease dissolves.*

This approach is typically used in systems that have a large degree of free will, and can deliberately change the way they function and interact with each other, such as the systems of the psycho-sociosphere. For example, a marriage, organisation, education or finance system is not the result of laws of nature but are the deliberate creation of people. They can also redesign them, based on new ideas and a different logic that will produce more desirable outcomes!

Problem dissolving transforms systems

As the co-producing systems change their functioning and interaction, based on a new logic, the system begins to function according to this new logic (e.g. *if the different part of the health-care system function on the basis of creating health, the current disease care system will be transformed into a health care system.*

5.2. Reforming versus Transforming Systems

To create a more desirable future for a system, one could REFORM it *(by improving it)*, or TRANSFORM it *(by redesigning it).*

Accordingly, systems thinking consists of two fundamentally different approaches to changing systems, namely

- ***System Dynamics Modelling* for *REFORMING* a system**
- ***Ideal System (Re)design* for *TRANSFORMING* a system.**

Each approach serves a different purpose and is appropriate for changing different types of systems or the same system at different points in time.

Learn about it, so that you do not use the wrong approach!

reforming versus transforming a system

To REFORM a system implies making improvements to the existing system without changing it fundamentally, *analogous to renovating a house; or making an existing production line more efficient.*

A reform could even imply transforming one part of the system *(e.g. one function),* while the others remain the same or change marginally. Or it could involve changing one aspect of the system, *such as changing an aim, or improving the processing, structure or regulation of the system.*

To TRANSFORM a system involves redesigning the existing system as a whole and giving it a fundamentally new form, *analogous to a larva becoming a butterfly; or for example, breaking down the house and rebuilding it in a different way; or creating a new production line for new products.*

A transformation always involves a fundamental change in ethos which results in a new way of being organised and a different logic of system functioning.

System Reform

System Transformation

system dynamics modelling vs. system design

The body of knowledge associated with systems-, complexity- and related theories evolved two different ways of looking at changing a system, namely system dynamics modelling and ideal system (re)design. They lead to a system reformation and transformation respectively:

- **SYSTEM DYNAMICS MODELLING *(as previously mentioned)* describes the current functioning of the system. It allows the system analyst to "walk" through a system and identify how its different aspects interact. Thereby problematic relations can be identified and changing them can be explored. An intervention derived from this approach leads to a *REFORMATION* of the system, without changing the overall logic *(or design)* of it. This is therefore a PROBLEM SOLVING approach.**
- **IDEAL SYSTEM (RE)DESIGN involves creating an ideal design of the system, based on w/holistic organising principles. In the course of implementing the design the system gets reorganised and begins to function in a new way and its complex problems dissolve. The system gets *TRANSFORMED.* This is a PROBLEM DISSOLVING approach.**

REFORM: System Dynamics Approach

The system dynamics modelling approach shows how the system currently functions. It models the current logic of the system by showing its different elements and their interaction.

It is a useful way of understanding the current situation of a system *(e.g. be it a marriage, organisation, energy system or planetary system).* One can "walk" through the system and explain how each element impacts on the other elements and how they – in turn – respond to the impact.

Thereby one can detect and identify problems in the interaction of systems and sub-systems, making it a useful diagnostic tool.

In the case of systems with relatively fixed, law-like and predetermined functioning *(e.g. like the homeostatic functioning of an organism),* one can use system dynamics models to identify malfunctioning and design strategies *(or solutions)* for fixing the problem and returning the system to its previous functioning *(i.e. before it malfunctioned).*

It is also a useful method to generate alternative outcomes from the interaction of a range of variables and their impact on each other *(e.g. like in climate change scenarios).*

Mathematical modelling makes the analysis of large-scale problems with a large number of variables possible. This is used in complexity theory which has made major contributions in this field.

REFORM: System Dynamics Approach *(continued)*

If one tries to solve complex societal problems through system dynamics modelling, one will fail *(and even create more problems with it).*

CASE STUDY: **We were approached by a student who used systems dynamics modelling for his thesis with the aim of solving the complex health care problems of his country.**

After a year of research and stakeholder workshops he had a thorough understanding of the complex health care related problems, but no idea of how to solve them *(besides a list of incoherent "nice to have" solutions).* He was stuck and was referred to us for advice.

We suggested that he continues with a system redesign approach *(such as the Biomatrix approach)* and use the previous research as phase one *(i.e. problem analysis and brainstorming).*

Unfortunately he lacked the resources to do so and chose our second suggestion, namely to change the title of his thesis from *"Solving the complex health-care problems of the country through systems dynamics modelling"* to *"Understanding the complex health care problems of the country through systems dynamics modelling."*

Q: Is it important to do a system dynamics model of a mess?

A: Yes, it is useful to do a system dynamics model, because it allows one to "walk" through the mess and explore what impacts on what. Thereby causal relations are detected and an understanding is generated of how complexity arises.

It is a useful diagnostic tool, which shows the logic according to which the current system functions. *(But remember, one cannot derive ideas for a transformed system from this method.)*

It is also a useful tool for change management, as it allows stakeholders to understand the consequences of their own behaviour and makes them aware of how they co-produce the mess. This can motivate them to change.

It also can help to dissolve conflict, as the mutual impacts of the various parties on each other become obvious and with it the realisation that not one, but all are to blame for the mess in different ways.

Q: You only selected a few co-factors in the system dynamics model of the education mess.
If you would show all of them, would that not become very “messy”?

A: Yes, we selected only a few co-factors to illustrate the nature of a system dynamics model. If we were to draw all interactions between all co-factors, the model would become hugely complex and messy.

For this reason, some systems thinkers *(e.g. Peter Senge)* suggest that one should identify and work with “higher order” variables only, to avoid detail complexity, as he calls it. In praxis, this involves grouping related co-factors together and finding their common cause. This is especially useful to show the logic of how a current social systems function.

Nevertheless, many complexity theory models use mathematics to - aided by computers – work with a large number of variables *(or co-factors)* in order to predict future outcomes of a system *(e.g. climate change, or economic developments)*, or to test the effect of different interventions.

NOTE: For practical purposes you can equate the terms variable and co-factor!

Q: On our journey we met scientists who work with such models and others who critique their poor predictive power *(e.g. of economic and pandemic models)* and their wide range of possible outcomes *(e.g. of climate models).*

A: Statistical and mathematical models are useful to explore the dynamic and possible outcomes of a system or issue, based on a chosen set of variables.

At the same time, there will always be potential variables that have not been considered in the model, making its application limited and its predicted outcomes questionable. *(And yes, a good modeller can manipulate outcomes deliberately!)*

In fact, it is not the outcome of a model that is of the greatest relevance in a scientific debate, but the ASSUMPTIONS underlying it *(such as the selection of variables, their measurement, the pattern of their interaction and the structure of the model itself, amongst others).*

Let me remind you: what the critics you refer to were mostly objecting to, is that PUBLIC POLICY is often based on the outcomes of models that have not been subjected to sufficient scientific debate and which exclude criteria that other scientists regard as important.

TRANSFORMATION: Ideal System DESIGN Approach

The ideal system design approach is concerned with TRANSFORMING systems.

This involves (re)designing the system according to a new, higher order logic, *analogous to replacing the logic of disease producing behaviour with the logic of health creation*.

This approach is used in the case of systems that have a large degree of free will, such as psychological, cultural, economic and political systems. *REMEMBER:* These social systems have evolved their functioning by choice. There is no law of nature determining how a person's marriage or society's education, energy and finance system should work.

If a social system is problem riddled *(as many of them have become)*, it can be redesigned according to a new logic of functioning.

This requires a collective stakeholder effort, whereby the stakeholders of the system TOGETHER redesign the system based on a new ETHOS and if each stakeholder subsequently implements its share of strategies, the stakeholders collectively co-produce the transformation of the system.

Inspired by the new ethos, the transformed system will function according to a new logic. By comparison, if the ethos of the system remains the same, so will the system. If it changes at all, the change will merely be a more of the same type of change, or it will merely be "cosmetic".

TRANSFORMATION: Ideal System DESIGN Approach *(continued)*

Why do we speak of IDEAL design?

Because ideals cannot be achieved, but can be approximated FOREVER

Therefore, they continue to inspire the ongoing development of the system.

As the circumstances of the system change, the ideal must be approached by a different route. Thus the same end can give rise to different means of achieving it.

This ensures that the system continues to develop into a desirable direction.

NOTE: The *Biomatrix Change Methodology (see Part 6)* has been developed for (re)designing systems in the psycho-sociosphere.

In principle, ideal design is also the foundation of creating new technological systems and is used for changing biological systems *(e.g. through genetic engineering)* and physical systems *(e.g. new materials development).*

A1: A complex problem or mess, like poverty affects many systems and is co-produced by many systems.

A mess analysis will identify the various systems that are involved. By doing an *Ideal Strategy Design* for a mess *(see later discussion in Part 6, Step 5),* the involved systems will be able to determine how they need to change on the basis of this design.

Some of the changes will involve a reform in order to solve a specific problem they contribute to the mess, while other systems will require a more fundamental transformation.

Q1: Does the dissolving of a mess like POVERTY involve reform or transformation?

A2: Should a system like education, electricity, or finance be transformed or reformed, depends on how problem riddled it is.

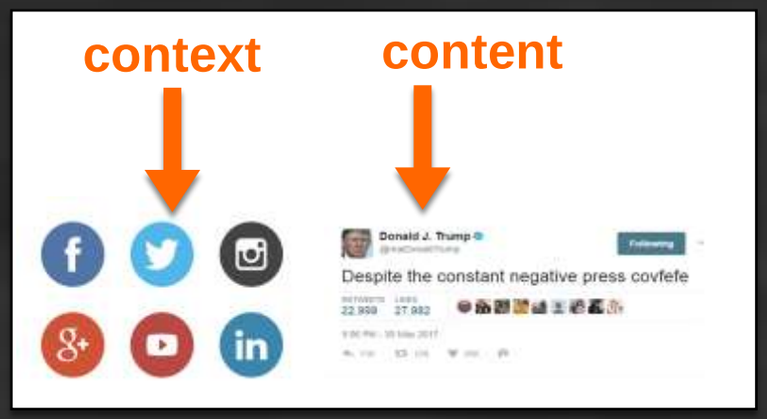
If the system produces reasonably desirable outcomes for its stakeholders, is stable and orderly, but has a problem here and there, it can probably be reformed.

But if the system is problem riddled, whereby each stakeholder has a problem with it and it seems to get worse after attempts to solve them, it definitely requires a transformation.

Q2: And a system like education, does it need to be reformed or transformed?

5.3. CONTEXT versus CONTENT of Change:
Biomatrix Frameworks

As a w/holistic thinker you have to understand the distinction between CONTEXT and CONTENT!
You will hear about this repeatedly throughout this curriculum.



As w/holistic thinkers we need to distinguish between CONTEXT and CONTENT.

Every bit of information about something derives its meaning from a context, or a frame.

According to *Framing Theory*, a news item, for example, can be manipulated to be interpreted in a specific way by placing it in an according field of meaning.

While framing is inevitable *(i.e. one cannot present information in an a-contextual manner)*, it can also be deliberately used for propaganda and manipulation.

In transforming our systems, we need to know about and be aware of hidden agendas and avoid them *(and if possible identify them if they are present in others)*.

We need GENERIC and NEUTRAL FRAMES to lay open the "larger" truth of things and show the different perspectives from which something can be viewed.

While reductionist science operates in an a-contextual manner *(i.e. ceteris paribus)*, w/holistic thinking has to deal with things in interaction with their changing environment. Frameworks allow us to be systematic in exploring this interaction.

Another way of describing the purpose of a framework is that it represents a set of GENERIC QUESTIONS with which to explore the system or issue.

The framework gives rise to the questions as CONTEXT, while the stakeholders provide the answers as CONTENT *(i.e. specific descriptions of the system or issue).*

Thus, the frameworks can guide a public debate, the diagnosis of the problems and brainstorming of solutions for a specific system or issue.

Because the *Biomatrix Frameworks* are comprehensive and w/holistic, the content they elicit is will be comprehensive and w/holistic also.

ABOUT QUESTIONS AND ANSWERS

As the famous American philosopher *Gertrude Stein* lay on her death-bed, her disciples wanted to get her ultimate and final piece of wisdom and asked her: *"Gertrude, Gertrude, what's the answer?"*

And with her last breath Gertrude answered: *"What's the question?"*

Q: Are we to deduce from all this that truth is relative?

A: Well, truth is truth *(as opposed to lie)!* Or is it?

The **"truth" about something** can be context specific *(e.g. what is food for the one, can be poison for another).* And different people can have different partial perspectives about the same thing. Putting those perspectives together provides a larger truth of the investigated phenomenon. *(See the famous elephant analogy in which each blindfolded person perceives a different "thing", depending on where they touch the elephant.)*

Then there is **personal truth** and **collective truth** of a phenomenon. To establish a collective truth is the purpose of science!

(See also Notes on truth in the Post Script: Slides 699-702)

biomatrix frameworks as context

In summary: A framework provides a CONTEXT for viewing a system, issue, or mess from different perspectives. It represents a set of generic categories within which their different aspects can be described as CONTENT, thereby giving rise to a larger truth of it.

***The Biomatrix Frameworks* are derived from *Biomatrix Theory*. Their generic categories represent the CONTEXT for generating the system specific CONTENT.**

They guide stakeholders to identify different aspects of a system *(or issue, or mess)* in order to

- **understand and thereby reduce its complexity**
- **make sense of it in a larger context**
- **view its development over time**
- **identify its parts**
- **(re)design how it is organised and**
- **gain a more w/holistic view of it.**

NOTE: The *Biomatrix Frameworks* can also be used to guide stakeholder participation in online *Biomatrix Jamming*.

Different Biomatrix Frameworks

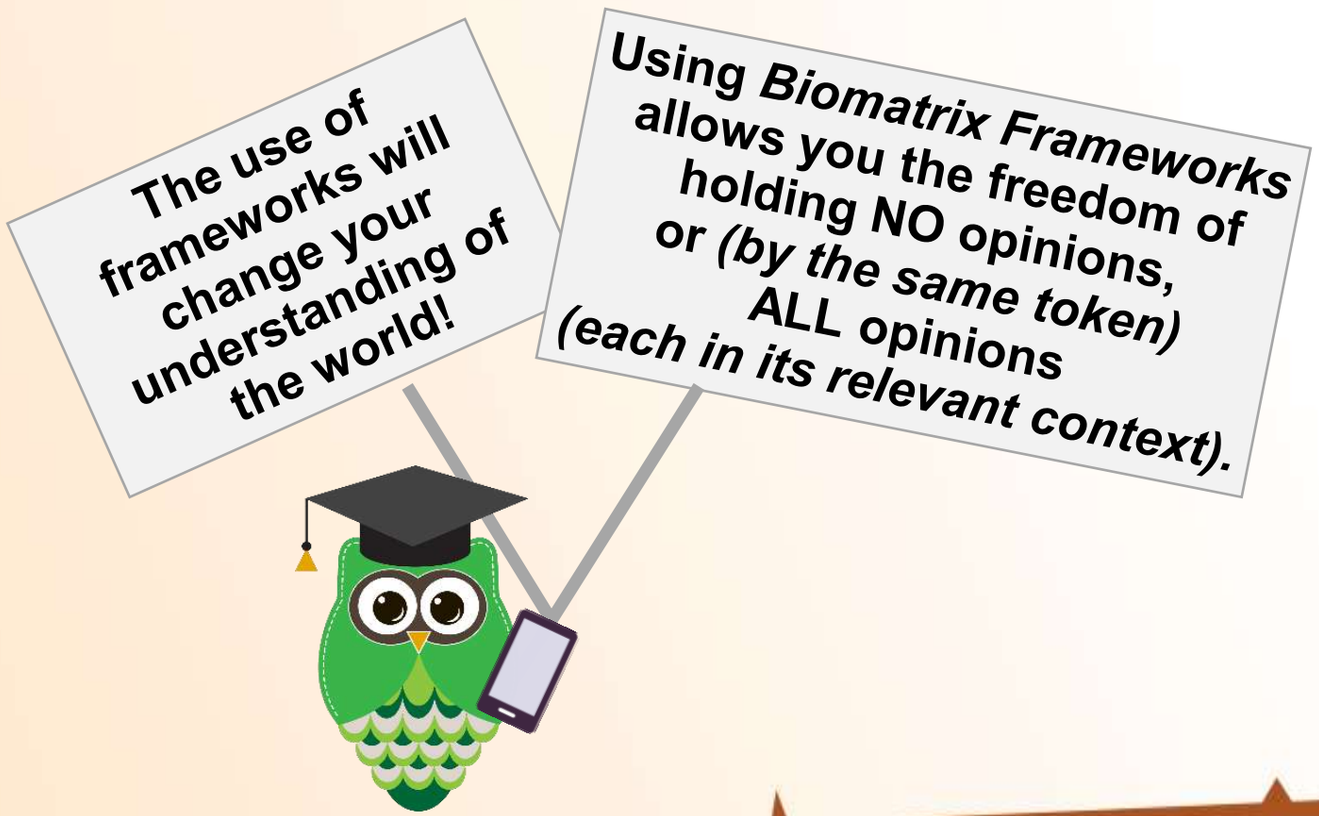
There are different frameworks *(see the following Notice Boards for their graphic representation)* which serve a different purpose each:

- ***Co-factor Framework*** **is useful in identifying the co-factors of a problem (see above illustration of the education mess) and even the co-factors of each co-factor, without initially categorising them.**
- ***Stakeholder Framework*** **is widely used for stakeholder *analysis (i.e. for identifying the stakeholders of an issue and their co-production of a problem; or their concerns about, interest in, or expectation of their system).***
- ***Biomatrix Spatial Framework*** **of multiple levels and dimensions is useful for understanding complex issues. *For example, it would be suitable for a more thorough exploration of the education mess, or poverty, or the HIV/AIDS pandemic, or.....***
- ***Biomatrix Temporal Framework*** **invites the recording of important events along a timeline. It is especially useful for exploring a conflict or war situation. It facilitates making sense of the ongoing development of an issue over time *(instead of remaining ignorant and confused through the disconnected and thereby a-contextual media reporting about it).* It is also a useful tool for mediating in conflict situations.**

Different Biomatrix Frameworks *(continued)*

- ***Biomatrix Organisational Framework*** **of the seven forces of system organisation is used for (re)designing activity and entity systems. It can also be used for creating a design for dissolving a mess *(or complex problem or issue).***
- ***Biomatrix System Frameworks*** **describe the generic structure of the two types of system within the biomatrix, namely that of an activity system as a supply / value chain and an entity system as a three-dimensional matrix.**

NOTE: **Each framework is discussed in more detail on a following *Slide*.**



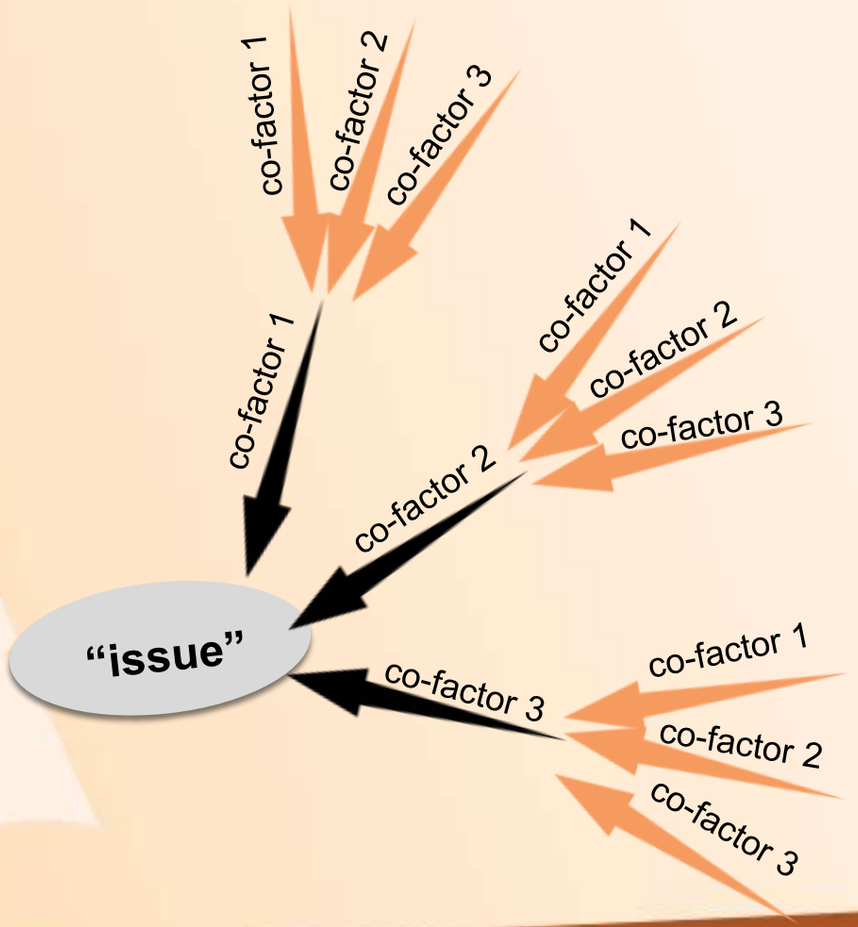
co-factor framework

The *co-factor framework* allows you to identify the co-factors of an issue.

It is a useful framework for a quick and broad exploration of an issue, such as a personal or organisational problem. If used for describing a larger societal issue *(such as the education mess we illustrated above),* it can give an impression of its complexity.

It is however insufficient for a thorough analysis of a societal issue *(like the education system)*, which needs to be looked at within the multi-dimensional and multi-level framework. *(See following Slide).*

The co-factor framework also lends itself to explore the complexity of an issue even further by identifying the co-factors of each co-factor.

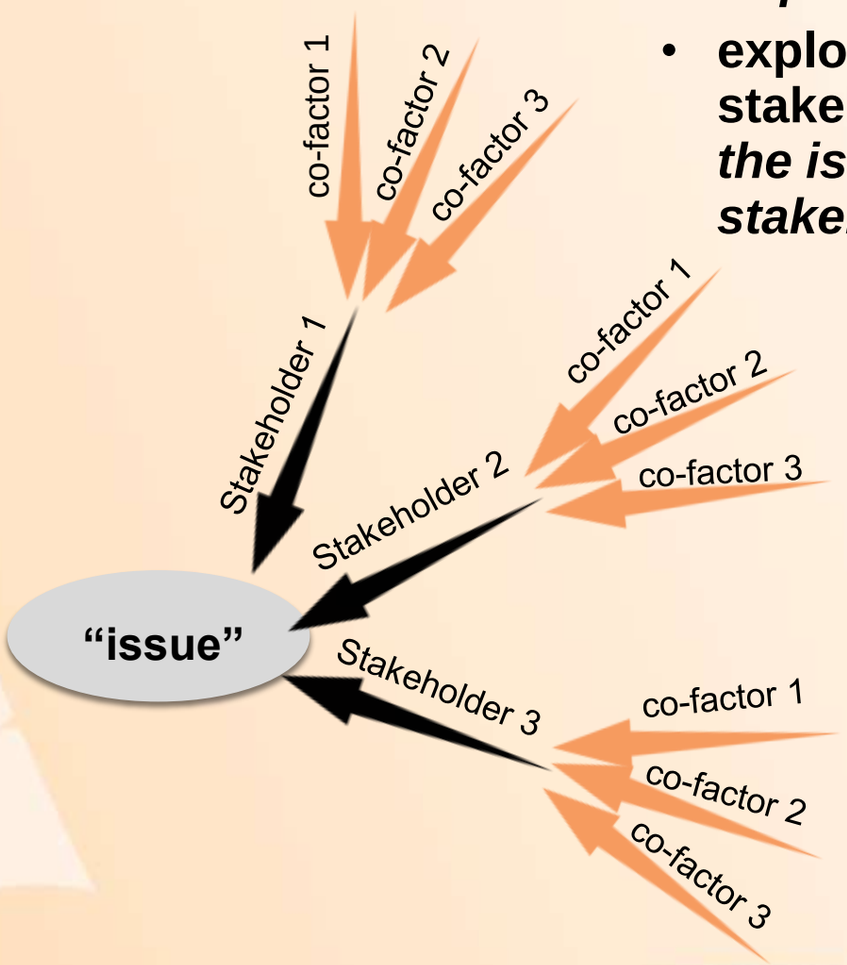


stakeholder framework

The stakeholder framework is the same as the co-factor framework, only that the immediate co-factors *(which are actually an activity systems of the self or another system)* are replaced by the entity system from which the activity originates*. (Those entity systems are referred to as stakeholders.)*

The framework guides the

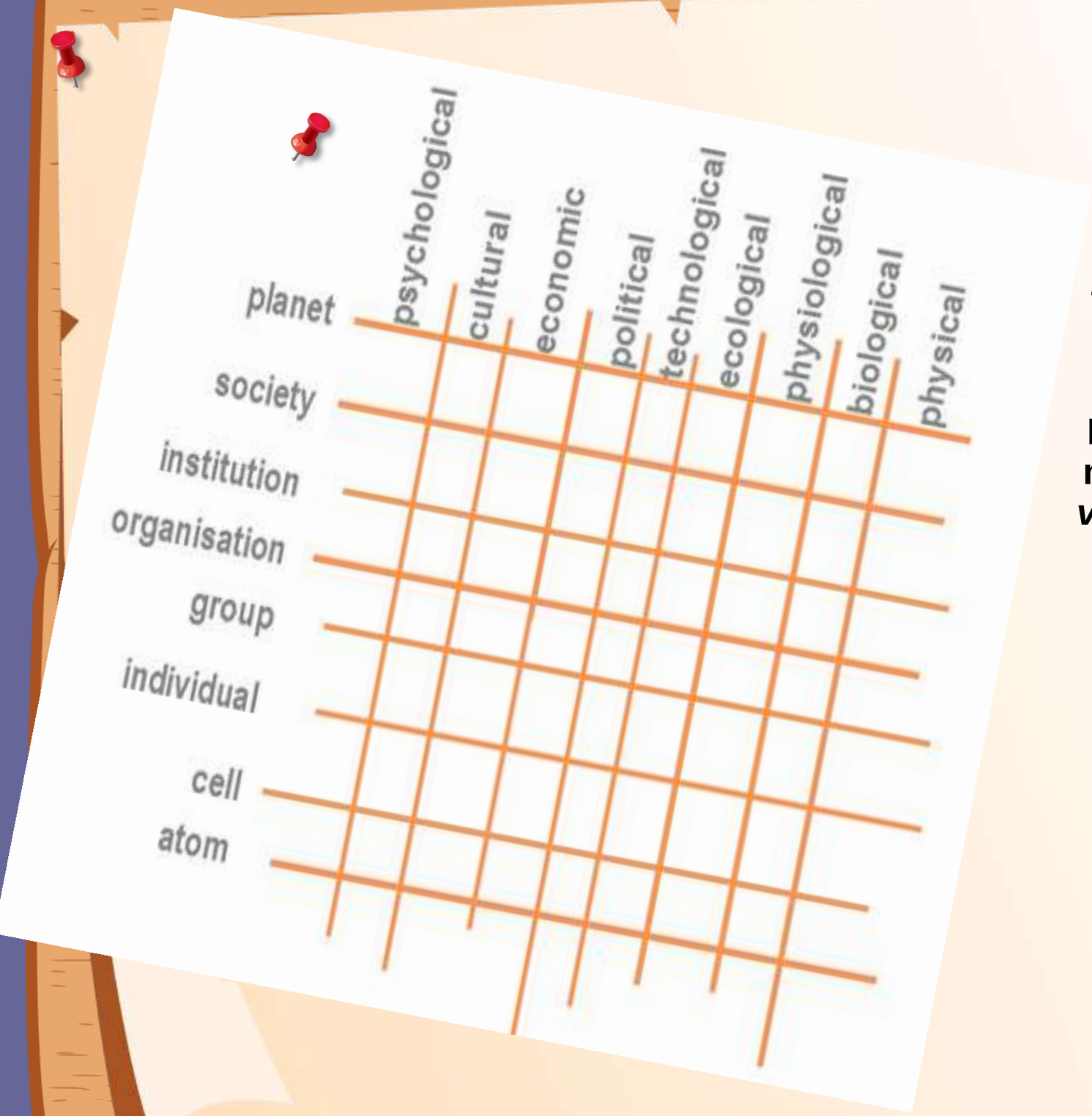
- **identification of the stakeholders of an issue *(or system, or problem)* and**
- **exploration of co-factors associated with each stakeholder *(such as how the stakeholder co-produces the issue, or what concerns, interests, or expectations the stakeholder has about the issue).***



EXERCISE

Do a stakeholder analysis now, using your chosen case study or any other issue that takes your fancy!

biomatrix spatial framework



As explained above, the *biomatrix spatial framework* identifies the multi-dimensional and multi-level co-factors associated with an issue *(or a complex problem, or a mess, or a system).*

It is useful for exploring large societal messes, *(such as poverty, pandemics, violence in society, or climate change)*, or to analyse the current situation of an industry *(such as education, or energy).*

It allows the analyst to place the different arguments raised about the issue into their relevant "boxes" according to level and dimension.

biomatrix spatial framework: EXERCISE

EXERCISE

Choose any complex issue or problem and see how many co-factors you can identify and insert in the boxes of the framework.

Or watch a discussion on TV and classify all the arguments mentioned during the discussion according to level and dimension. You will be amazed to discover how "one sided" and limited most discussions are!

(You can also view a case study on a peace discussion on www.biomatrixweb.com Click on video and select the talk to the World Future Society, Part 3).

biomatrix temporal framework

This framework identifies the factual events of a conflict or war in chronological order, as well as the influencing multi-dimensional co-factors *(i.e. the economic, cultural political, technological, or ecological interests of different stakeholders)*

(1) Framework for a conflict within a system *(e.g. a country)*

timeline ↓

Date	Influencing multi-dimensional co- factors	External support to opposition	Opposition	Population	Current government	Military	External support of government	Influencing multi-dimensional co-factors

(2) Framework for a conflict between systems *(e.g. countries)*

timeline ↓

Date	Influencing multi-dimensional co- factors	External support to party 1	Military1	Govern-ment1	Country 1 (Population)	Country 2 (Population)	Goven-ment 2	Military2	External support to party2	Influencing multi-dimensional co- factors

***NOTE:* Adjust the headings and number of categories in the frameworks as needed.**

EXERCISE

Choose any current or recent conflict within a country and identify the parties involved and the multi-dimensional co-factors that are involved in the conflict.

And / or choose a conflict between countries, such as Palestine / Israel, or Ukraine / Crimea.

In either case, identify key events and multi-dimensional co-factors that caused and shaped the conflict from start to the present.

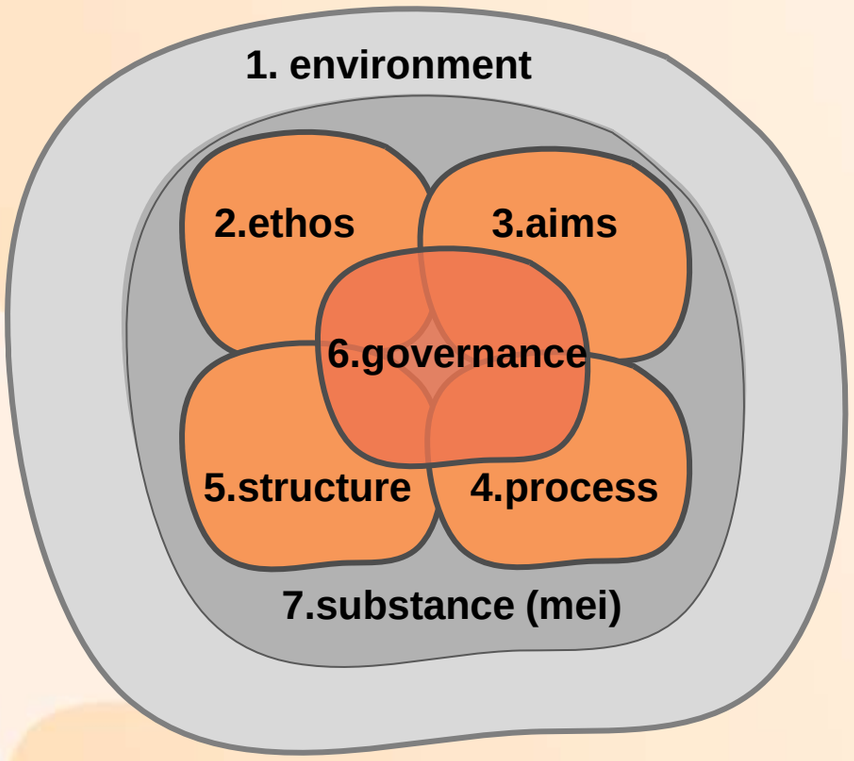
In the case of a team exercise, each team member should research a different stakeholder and present the according perspective. Then integrate the different perspectives within the framework. If there are conflicting perspectives within the same "box", put both in and explore this further.

NOTE: **You will find that you have to adjust the categories of the framework to suit your case. You also may have to add categories as you go along, because new parties enter the conflict.**

biomatrix organisational framework

The *Biomatrix Organisational Framework* identifies the co-factors of a system that are related to each of the SEVEN FORCES OF SYSTEM ORGANISATION and their organising principles. It guides the redesign of a system and is applied for both, the (re)design of an activity and entity system *(albeit in different ways). (See the later section on Steps in System (Re)Design and Transformation for some more explanations).*

However, to apply this framework effectively, you require deeper knowledge of each force and its associated organising principles and how to apply it to an activity and entity system. This involves considerably more study than can be offered in this curriculum.



NOTE:
To learn more about this framework, you can work through the theory on www.biomatrixweb.com *(click the theory section),* or enrol in the relevant system design course of the *Biomatrix School*.

biomatrix system frameworks

As mentioned before, the biomatrix *(or web of life)* consists of two types of systems namely string-like ACTIVITY SYSTEMS and knot-like ENTITY SYSTEMS.

Each type of system has a different structure, which forms the framework for analysing and designing it:

ACTIVITY SYSTEM FRAMEWORK:

Activity Systems are structured as a value / supply chain

ENTITY SYSTEM FRAMEWORK:

Entity Systems are structured as a three-dimensional organisational matrix

NOTE: The three-dimensional matrix structure of an ENTITY SYSTEM *(which is required for the redesign of an organisation),* is not the subject of this curriculum and is therefore not discussed here.

However, if you are interested, you can read about it on our webpage *(in the theory section)* or in the *Biomatrix Book.*

PART 6:
W/Holistic Change METHODOLOGY
Steps in Complex Problem (Dis)Solving and System (Re)Design

INTRODUCTION:

Application of the steps

Q: Do we use those nine steps of the change methodology for dissolving complex problems and messes, as well as for transforming a system?

A: Those steps are specifically designed to change systems in the psycho-sociosphere, especially collective systems at the organisational, institutional and societal level. They can be used for dissolving a mess, as well as for transforming an activity system and an entity system *(although we do not discuss the application to entity systems in this curriculum).*

The principles underlying those steps are equally valid for changing systems at all levels. *(See the following NOTE)*

NOTE: application of the steps

While the nine steps described below are useful for any change intervention they need to be adapted according to the nature and magnitude of the problem and system to be changed.

For example if one deals with a specific personal or organisation issue or problem, steps 1, 2 and 3 will suffice, whereby one will typically use the co-factor and / or stakeholder framework.

After completing the brainstorming, one can move to step 5 and do an *Ideal Organisational Design* (consisting of the seven forces of system organisation) or an *Ideal Strategy Design*, consisting of the ethos *(i.e. values, beliefs and guiding rules),* overarching aim *(i.e. what should be achieved as an ideal)* and set of strategies *(i.e. courses of action)* for achieving the aim.

It is also useful to do an impact assessment *(i.e. determine the impacts of the design on stakeholders)* and if necessary, discuss it with them, or if planetary systems are concerned, select strategies with the least negative impact.

If the personal or organisational issue or problem involves other people, it is useful to get their inputs to steps 2 and 3 and get their agreement to the design, by either involving them in the design, or asking them to comment on the design and its impacts *(i.e. as step 7: design iteration).*

And of course, you need to do an implementation plan to see if and how the design can be implemented *(i.e. step 8.)*

As you will see, it is not all that complicated. Some say it is just common sense. So why don't we always do it like this?

And please note that the difference between problem solving and dissolving hinges around step 3, doing brainstorming in a transformative *(i.e. frogs / prince)* way!

A: We have found it useful to follow this order.

There is however an ideal design school which skips a detailed problem analysis and starts with a design on a “blank slate”. While this can be useful in some situations, it is our experience that many participants can’t do this and question any new idea in the light of current problems, while others can’t see beyond existing solutions. Hence we prefer to do a problem analysis and the brainstorming before the design.

It is also typical that there is iteration between the steps, such as doing a step in overview before returning to a previous step for more detail. *(See also later discussions in the according sections.)*

Q: Do we have to follow the nine steps in this prescribed order?

Like all creative processes, the design process is not linear (*even if the steps are presented as such*), but it is ITERATIVE!

Q: From your explanation of dealing with a personal problem, the application of those steps seems indeed to be quite simple. So why do we need to study any more?

A: For your personal problems and even those you encounter in your immediate work environment, you don't need to know much more than the basics of each step.

However, if you are responsible for or need to facilitate change in larger societal systems, such as dissolving a public mess *(e.g. in your town, province, country, or a transnational organisation),* or if you have to effect major change in and even transform the system you work in *(be it a business or government function, or an organisation or government department),* or if you are involved with public policy design, you need more detailed knowledge of each step.

Therefore, let us proceed with discussing each step in more detail in the context of dissolving a public mess and redesigning a public function *(i.e. activity system)!*

The more familiar you are with the change methodology and with change management, the more influence you can have as an INDIVIDUAL. You will even be able to initiate change in systems without having an official position within them, or a mandate to change it!

STEP 1: Determine the *Design Framework*

1.1. Framework for dissolving a mess

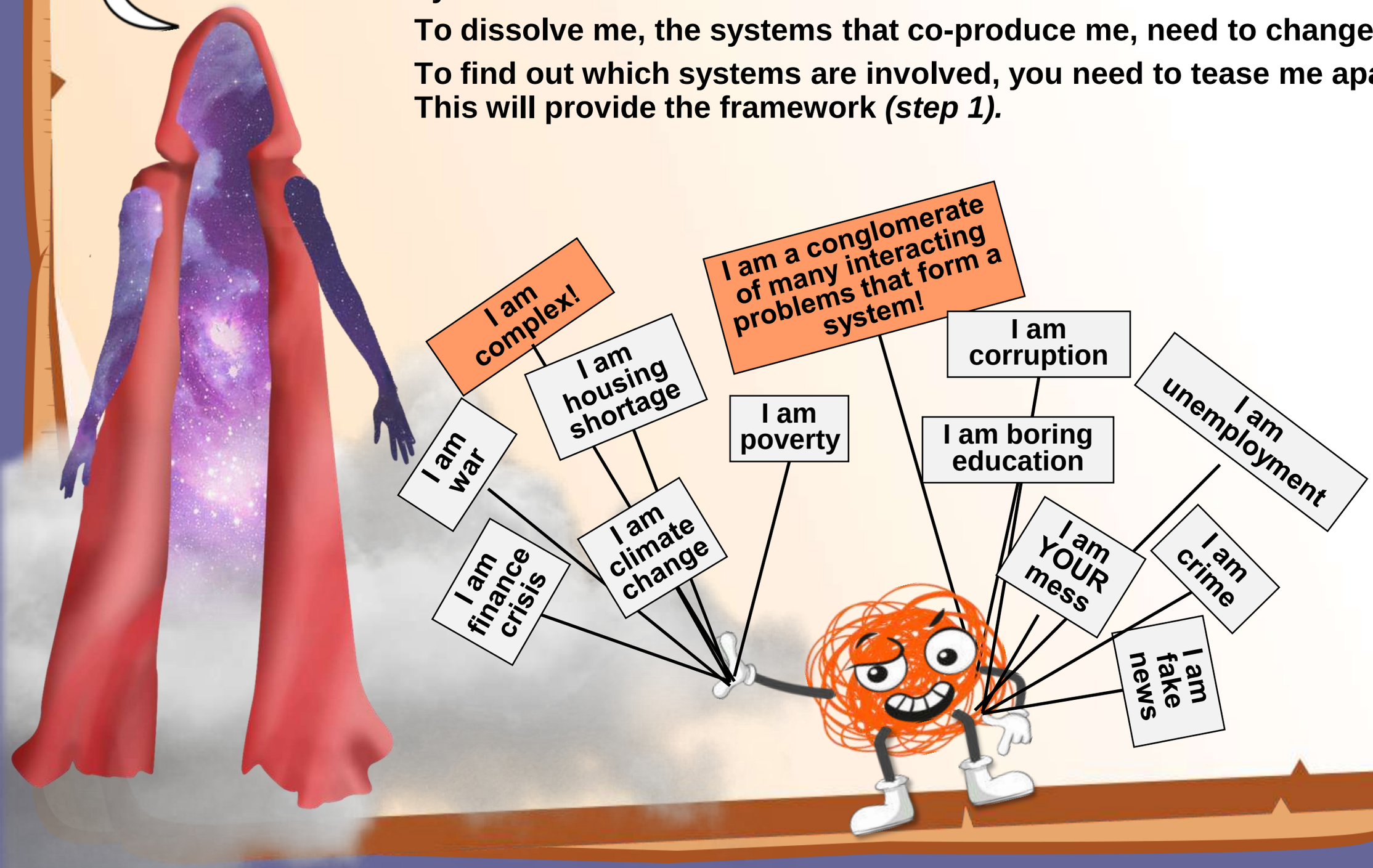
another memo from Mr. Mess

A mess cannot be solved, only dissolved!

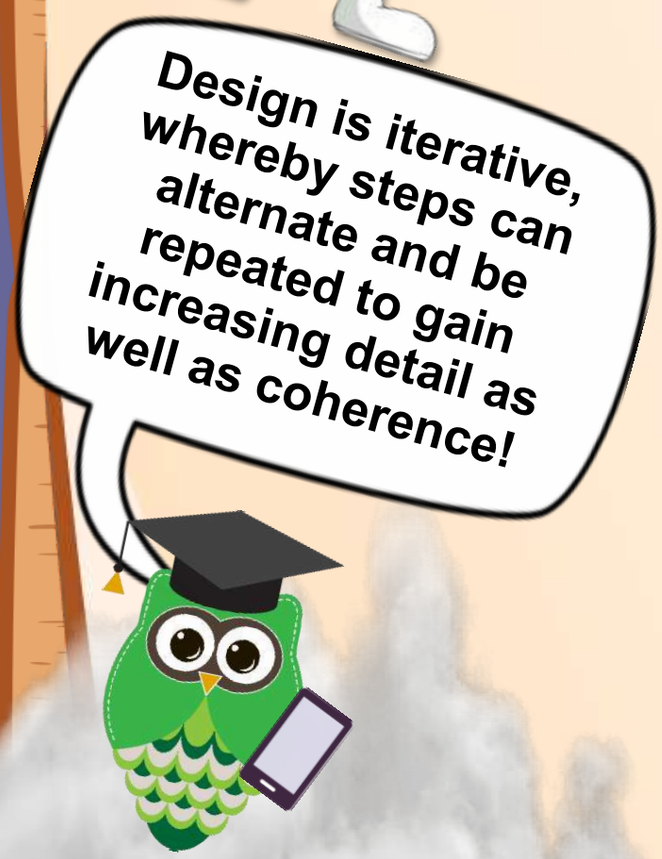
Remember, I, Mr. Mess, am a conglomerate of different problems that are co-produced by many independent systems. The larger I am, the more systems are involved. More specifically, I am co-produced by the actions *(i.e. activity systems)* of many entity systems.

To dissolve me, the systems that co-produce me, need to change.

To find out which systems are involved, you need to tease me apart. This will provide the framework *(step 1).*



DISSOLVING a mess: change in the co-producing systems



To dissolve a complex problem *(or mess),* requires changes to several *(if not many)* independent stakeholder systems from different dimensions and levels that co-produce it.

For some of the systems the required changes could imply reforming a part of the system *(such as amending one of its strategies, or adding a new strategy),* while other systems may need more fundamental change *(such as creating an additional activity system, or transforming an existing activity system, or even changing the whole entity system).*

For example, to dissolve a mess like poverty, some of the current cultural, economic, political, technological and ecological systems will have to be reformed and others transformed.

The ideal design for dissolving a mess is an overarching IDEAL STRATEGY DESIGN. It acts as an overarching governance framework for all mess co-producing systems. It should consist of a universally applicable ethos and broad aims and strategies which will guide the co-producing systems in designing their own change. The *Ideal Strategy Design* will also have some regulatory criteria and mechanisms with which the co-producing systems will have to comply.

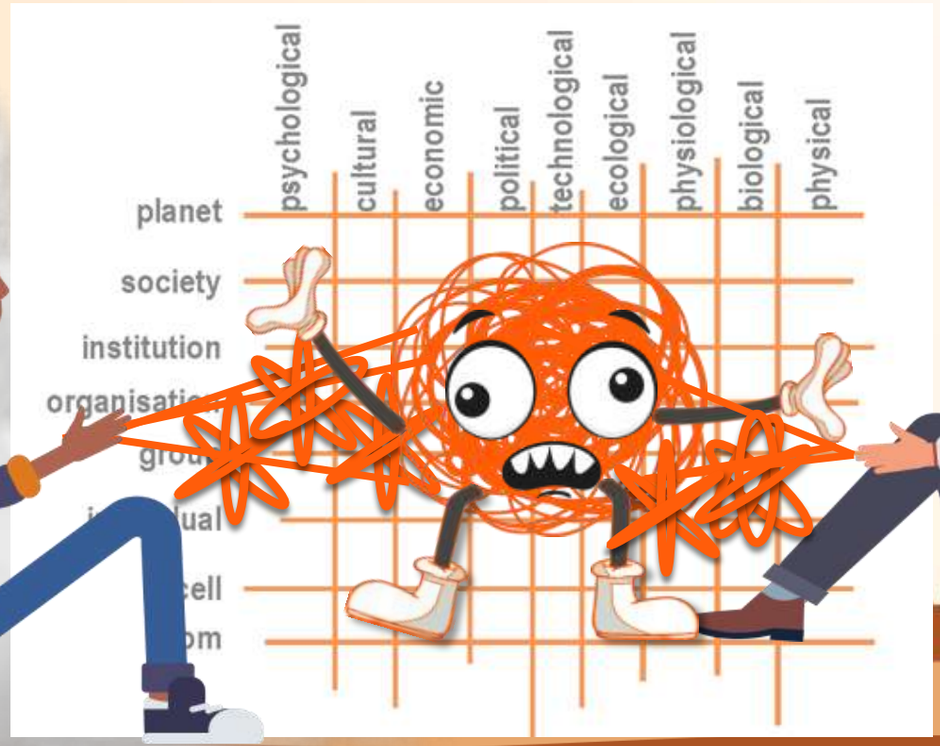
Once such an overarching *Ideal Strategy Design* exists, each of the mess co-producing systems will design its own changes, inspired by it, using the steps of the change methodology. As each system begins to implement its changes *(step 9),* the mess begins to dissolve.

DISSOLVING a mess: teasing the mess apart

To determine the design framework for dissolving a mess, one first needs to tease it apart by

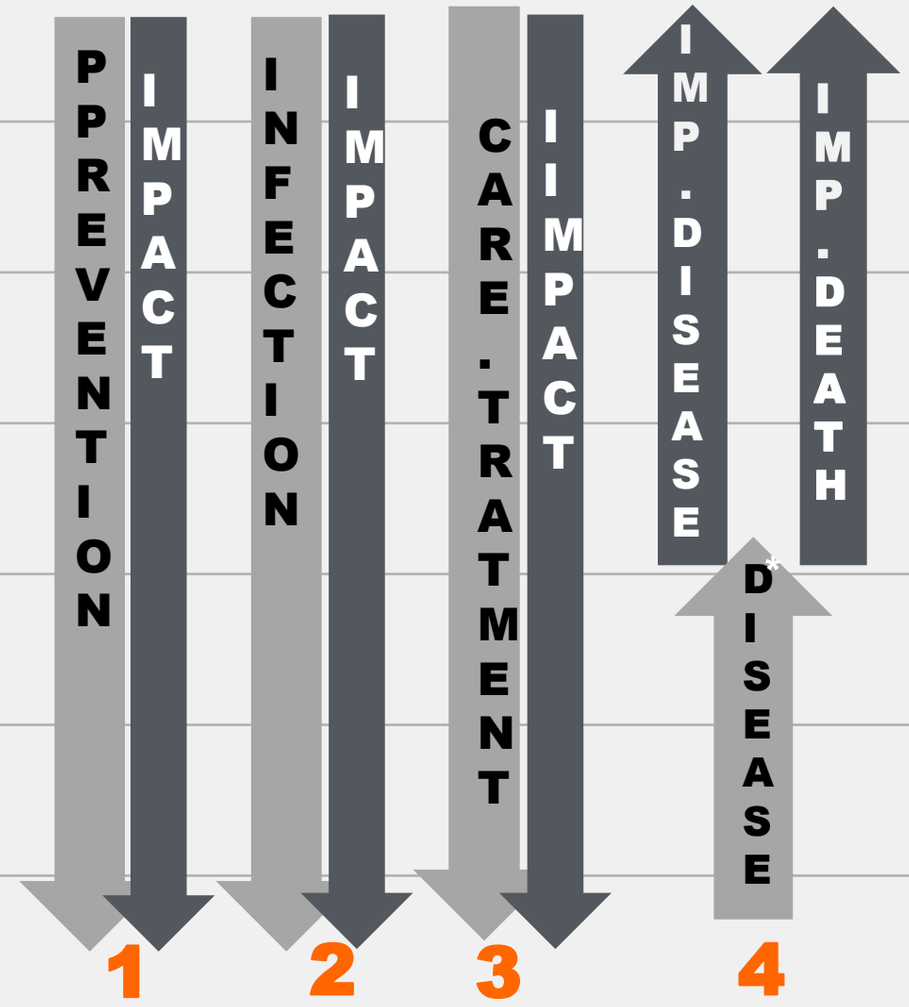
- **either asking experts to identify the co-producing activity systems (*the HIV/AIDS framework depicted below was created in this manner),* or**
- **in the case of a more amorphous mess like poverty, one can start by identifying the different aspects *(e.g. sub-issues and problems)* of the mess at the different levels and in the different dimensions of the biomatrix and infer the co-producing activity systems from them (*the later depicted framework for the poverty mess was derived in this way)***

The only way to mess with Mr Mess is to tease him apart, thread by activity system thread and knot by entity system knot.



design framework: HIV/AIDS case study

LEVELS	
Planetary	
Societal / Institutional	
Organisational	
Interpersonal	
Individual	
Cellular	
Molecular	



NOTE: **The direction of the arrows across the systems hierarchy is derived from the level at which the aim of the activity system is directed.**

design framework: HIV/AIDS case study *(continued)*

The activity systems illustrated in the Figure above and listed below, were identified as the framework for dealing with the HIV/AIDS mess during a workshop with a NGO advising Southern African governments on HIV/AIDS strategy. The same framework is suitable for exploring strategy development in any other pandemic, including that of the the C-virus.

There are of course further sub-systems under each activity system at and between the different levels associated with different entity systems *(e.g. the planet, society, organisations, persons, cells, atoms).* Some of the sub-systems differ according to the type of disease.

The main activity systems *(and some of their sub-systems)* as shown in the Figure are:

(1) preventing infection *(sub-systems include protection, hygiene measures, distancing, testing, vaccination, strengthening the immune system),* as well as IMPACTS of the preventive measures on other systems

(2) getting infected *(e.g. sub-systems concerned with the disease entering the body and spreading through society),* as well as IMPACTS of the infection on other systems

(3) managing care and treatment of the disease *(e.g. sub-systems concerned with early treatment, treatment of light and heavy infections), as well as* IMPACTS of the measures on other systems

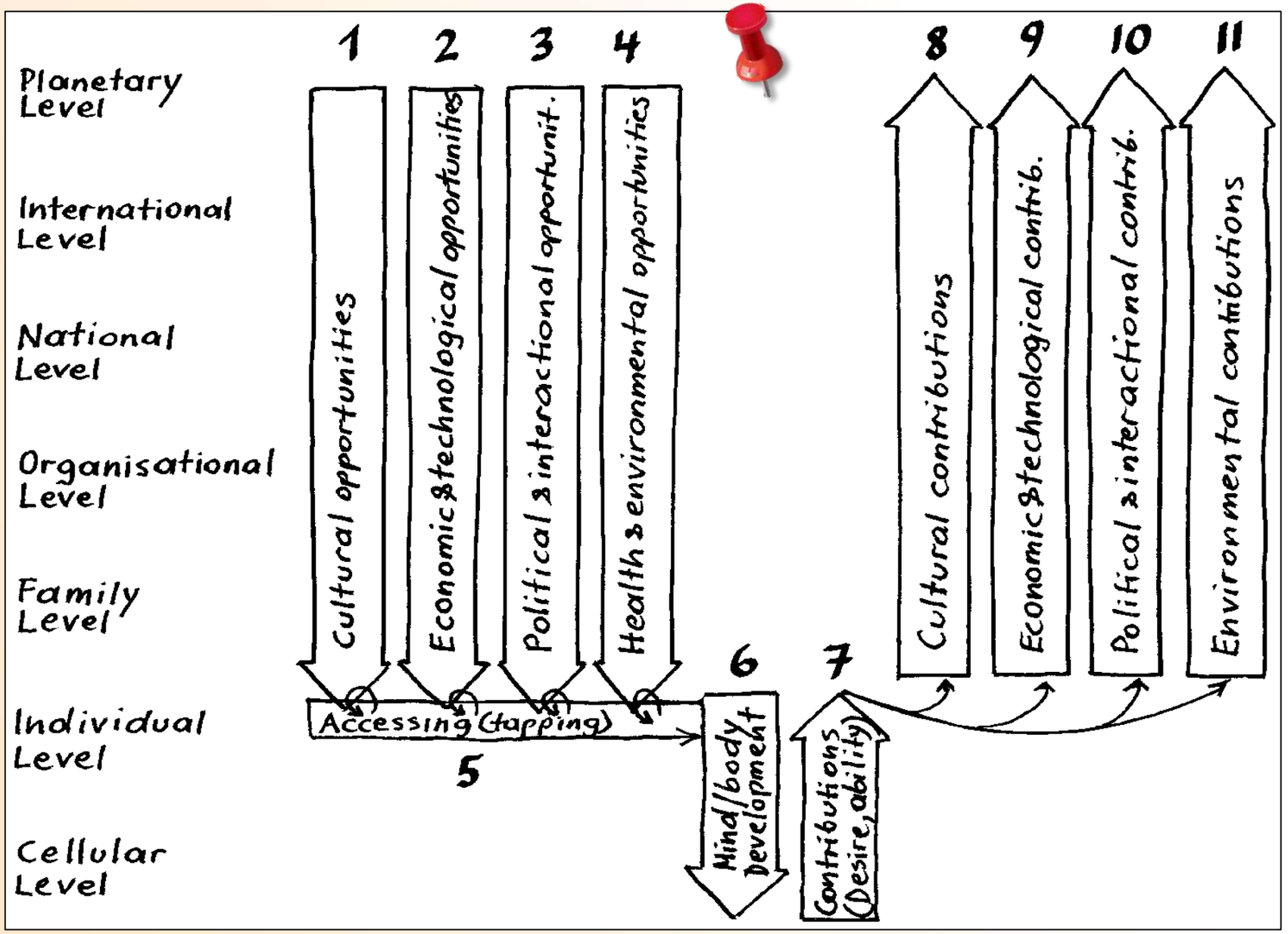
(4) course of the disease within the infected person, as well as the

- **IMPACT of the disease on other systems**
- **IMPACT of death on other systems**

***NOTE:* In a mess analysis one needs to identify the problems WITHIN and also BETWEEN the different sub-systems.**

design framework: poverty case study

The poverty mess is an emergence from the current functioning of all of those systems and their interaction. To dissolve it requires a change in their functioning.



design framework: poverty case study *(continued)*

To actually dissolve poverty, one needs to make a broad IDEAL STRATEGY DESIGN. *(See also according discussion in STEP 5.)*

This means that the current poverty co-producing strategies within the different activity systems are redesigned into strategies that serve the aim of co-producing the ideal of prosperity.

This could imply that new strategies are added to existing systems, while other systems need to be changed fundamentally *(e.g. it is doubtful that the worldwide poverty can be eradicated, until the current finance system is transformed).*

As the actors responsible for each strategy implement them, the poverty mess will dissolve.

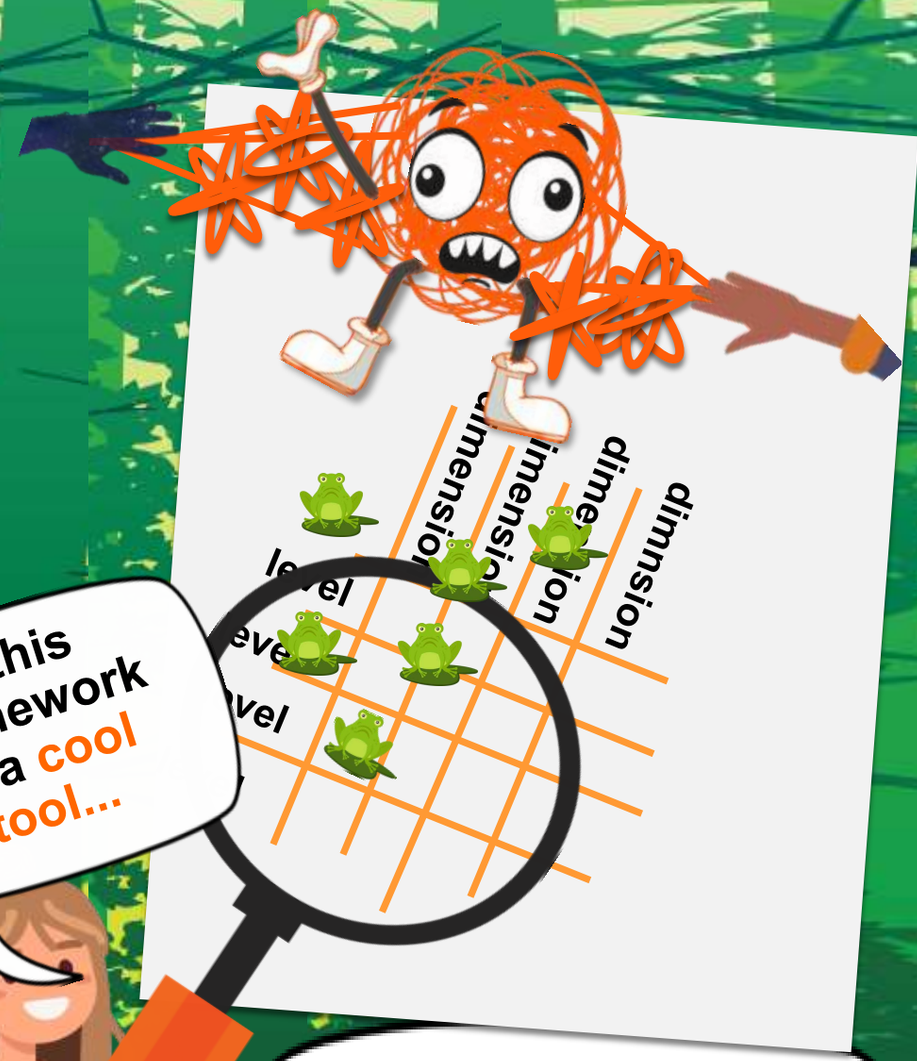
NOTE: The Figure shows only overarching activity systems, within which sub-systems exist *(such as education, science, media, religion and arts within the cultural system, or production, finance and distribution in the economic category).*

A: In a workshop with a government department concerned with poverty alleviation, we used the ***Biomatrix Spatial Framework*** as a TOOL to identify the most important issues and problems associated with poverty.

From this we deduced the co-producing activity systems *(as depicted in the previous Figure)*. This was done by teams, whereby each team worked with a different dimension *(e.g. the economic team looked for economic systems, etc.)*.

Of course, the teams also identified further sub-systems, making the final framework much more detailed than depicted above.

Thereafter, each team contributed to the overarching *Ideal Strategy Design* from the perspective of their dimension.



Q: Which framework did you use to identify the co-producing systems of poverty and how did you do this?

NOTE: If your mess is a war or conflict, you would use the temporal framework to identify the conflicting entity systems and their conflict co-producing activity systems.

Q: This poverty issue is a huge challenge. Should one tackle this on a national or international level? And who should do so?

C: I cannot see that any national government or international body could succeed in this!

A: The famous saying *"think globally, act locally"* is useful here, as long as we interpret *"locally"* as *"system specific".*

By this we mean, that if any societal system *(be it education, health-care, transport or electricity)* is redesigned, poverty eradication should be considered from its functional perspective and strategies for co-producing prosperity included in its design and then implemented.

Ideally, this system specific planning is informed by an overarching national design *(e.g. a national development design),* which – in turn – is informed by an international design that is concerned with transforming the current role of INTERNATIONAL RELATIONS in co-producing poverty into one of co-producing prosperity for all nations.

As a matter of interest, the *World Economic Forum* apparently intends to do a *Great Reset* of the World's economy *(and maybe of many other systems in the biomatrix?).*
If its aim were to eradicate global poverty, it would probably succeed. Alas, this is probably not in the self-interest of its participating corporations and their financiers!

Q: What about the repeated finance crises which seem to happen every few years. Isn't that also a mess? And what would its co-producing systems be?

Q: And many say that we need to return to the gold standard to solve this problem. Do you agree?

A: Indeed, our finance system is hugely messy and needs to be transformed.

However, returning to a gold-backed currency is only a single solution *(and remember, a mess is not solved by a single solution, but by more or less fundamental changes to its co-producing activity systems).*

Besides there were finance crises in the past, although currencies were still linked to gold.

While gold will certainly be one of the solutions that should be considered in one way or another, we also need to consider that we live in the information age. This offers new opportunities that were not available in the past (such as digitalisation and encryption).

And most importantly, we need to identify the sub-activity systems of the finance system and analyse and redesign each. *(See the NOTE on the main financial sub-systems)*

NOTE: Sub-systems of the finance system

1. **Exchange** *(i.e. establishing the monetary value of goods and services and facilitating their exchange)*
2. **Saving** *(i.e. accumulating monetary value for the future)*
3. **Investing** *(i.e. using accumulated monetary value to finance production in the physical economy in order to produce more value)*
4. **Trading** of investments *(i.e. to facilitate a choice between different investment options in the physical economy)*
5. **Speculation** *(i.e. trading with expectations of monetary losses and gains – largely unrelated to the performance of the physical economy)*
6. **Money creation** *(i.e. how money is created)*

And there may be some more sub-systems!

EXERCISE: mess framework

EXERCISE

Choose your favourite mess and identify the main activity systems that co-produce it.

Draw the activity systems within the containing systems hierarchy *(similar to the poverty and HIV / AIDS case studies shown above).*

REFLECTION

What did I learn?

A: When we speak of a complex problem *(or mess)*, it is typically co-produced by one or more activities of various entity systems *(such as a person, organisation, society, or the planet).* To dissolve the mess, those activities need to change, not necessarily the entity system as a whole.
However, there are exceptions. Sometimes it is the whole entity system that is problem-riddled and co-produces many different messes. Such a system needs to be transformed as a whole, based on a new ethos. *(See also the NOTE on this and the following Slide.)*

Q: Up to now you talked about identifying activity systems. What about the ENTITY SYSTEMS? Are they not important in dissolving a mess?

NOTE: Psychologists tell us that we should not judge persons *(i.e. as an entity system)* as being "good" or "bad" *(by whatever criteria),* but by what they DO *(i.e. by their activity systems)*

Yet, some persons have "bad" ethos and aims, making them "bad" as a person *(i.e. as an entity system).* Through an ethos transformation they can become a different (i.e. *"good")* person who begins to act differently in many *(if not all)* areas of life. The person becomes a "new human" as ideological and religious transformations have demonstrated throughout the ages, *analogous to Saulus becoming Paulus.*

The same is true for other entity systems, like a family, organisation, institution, or society.

NOTE on entity systems

An entity system consists of many different activity systems. However, not all of them contribute to a specific mess. ***For example, if you have an education problem, the teaching activity system of your teacher co-produces your problem, not the teacher's eating, dressing, socialising or parenting activity systems. Or, it is not everything in an education system that co-produces poverty. Some of its sub-systems do co-produce poverty, others don't.*** **Thus, it is always a specific activity system of an entity system that needs to be looked at, when dealing with a mess.**

A function-specific part of an entity system ***(e.g. a person)*** **is also referred to as "role"** ***(e.g. a teacher, learner, parent, patient, runner, or eater*****). It is typically an entity system in a specific role that has an interest** ***(or stake)*** **in another system or in a specific issue. Thus, a stakeholder is an entity system in a specific role or function. It is a functional concept.**

NOTE: **Although we suggest that you start dissecting the mess by identifying its co-producing activity systems, one can, of course, also begin with identifying the co-producing entity systems by**

- **firstly, identify the stakeholders at the different levels and in the different dimensions of the mess**
- **secondly, ask which of their activities / behaviours co-produce the mess and**
- **thirdly, consider those activity system as part of larger value / supply chain.**

Q: Do we understand this correctly:

All stakeholders together do the overarching *Ideal Strategy Design* for dissolving the mess they co-produce?

Then each stakeholder designs in more detail their own strategies within this overarching design?

And as soon as each stakeholder implements its own strategies, the whole mess dissolves?

A: Yes, I could not have summarised it better!

Another way of explaining this is:

An overarching *Ideal Strategy Design* for dissolving a mess *(or a design for transforming a system)* is CO-PRODUCED by its stakeholders.

This shared design is then CASCADED back to each stakeholder for a more detailed stakeholder design which is then implemented by the stakeholder.

Thus dissolving a mess involves first a bottom-up and then top-down participation in dissolving a mess *(or transforming a system).*

Design involves ITERATION!

Q: Does this mean going through the nine steps first for the overarching design and then again for each system specifically?

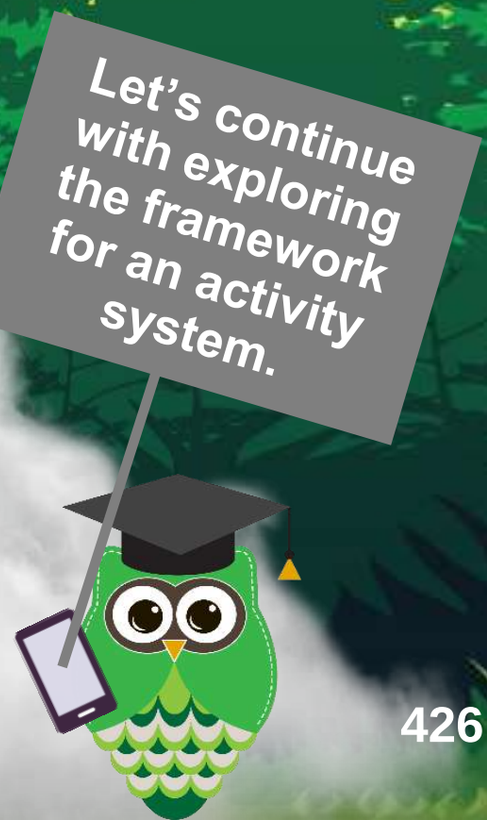
A: In principle, yes.

In praxis, there can be a more detailed application of a specific step in either the overarching mess or system, or in the sub-mess or sub-system. And sometimes one can leave out a step.

Once you are familiar with the methodology, you can "trim" it according to the nature of the mess or system you are dealing with.

Sometimes a thumbnail sketch application can be all that is needed and sometimes great detail is required.

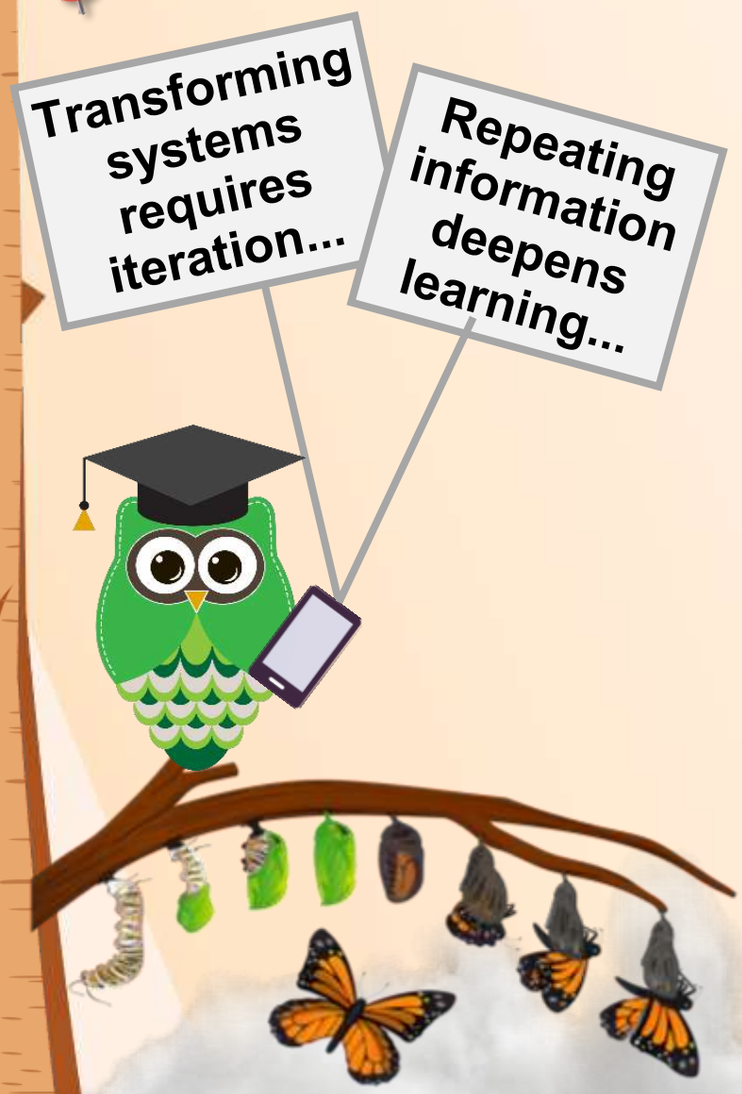
(You may also find it useful to look at Slides 408, 409 and 420 again.)



STEP 1: Determine the *Design Framework*

1.2. Framework for Transforming an Activity System

transforming a system



A transformation is the fundamental change of a specific system and its sub-systems, based on a new ethos, which guides the redesign and transformation process.

STEP ONE of the change process deals with *IDENTIFYING THE FRAMEWORK* that describes the system.

In the case of an activity system *(which is organised as a value / supply chain),* this step involves identifying the sub-systems *(and their sub-systems)* that make up the chain.

The subsequent steps of the design methodology are executed within this framework.

To transform an activity system should involve participation by the stakeholders representing the sub-systems. It also requires the consideration of the stakeholders which are impacted on by the system and each of its sub-systems.

To determine the framework, you have to

- *FIRSTLY* identify the main sub-systems *(as best you can)* and
- *SECONDLY* observe the position and direction of the system within the systems hierarchy.

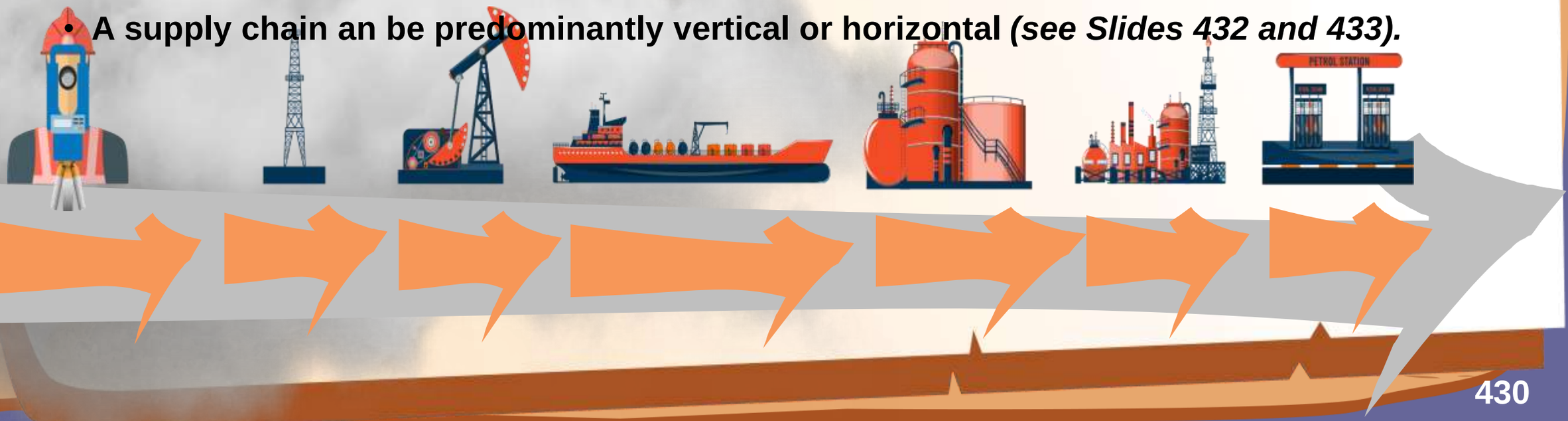
(See the following NOTES.)

Remember, the direction of an activity system is determined by its purpose, namely where the system is located which it serves.

DESIGN FRAMEWORK: identify sub-activity systems

Remember:

- **A string-like activity system *(or function, or industry)* consists of sub-system. *For example, the energy supply chain consists of sub-systems like prospecting, drilling, pumping, transporting, storing, refining oil and gas and then distributing the refined product (which again involves the sub-systems of transport and storage, etc.)***
- **A sub-system is determined by the substance *(or mei)* that flows into the system as input, is processed by the system and leaves the system as output *(which represents the value that has been created).***
- **Each sub-system can be broken down into sub-sub-systems *(whereby the detail of the analysis depends on the purpose of the inquiry).***
- **The sub-systems link up to form a value / supply chain, whereby the term value chain refers to the value that is generated in each link and supply chain describes the mei *(or substance)* that flows through the chain. *(See the detailed electricity supply chain in Slide 440.)* The sub-systems are typically identified by stakeholders.**
- **Sub-systems can be sequential or parallel *(remember Slide 304).***
- **A supply chain an be predominantly vertical or horizontal *(see Slides 432 and 433).***



Q1: How do we determine the sub-systems of an activity system?

A: As we explained before, a sub-system is an organised processing phase of the system. Some generic sub-systems are:

- transforming input substance into a different output substance *(i.e. substance changing processing)*, or
- storing a substance for later use *(i.e. time related processing)*, or
- transporting a substance to another system or location *(i.e. space related processing).*

Or you can ask some stakeholders of the system. They know!

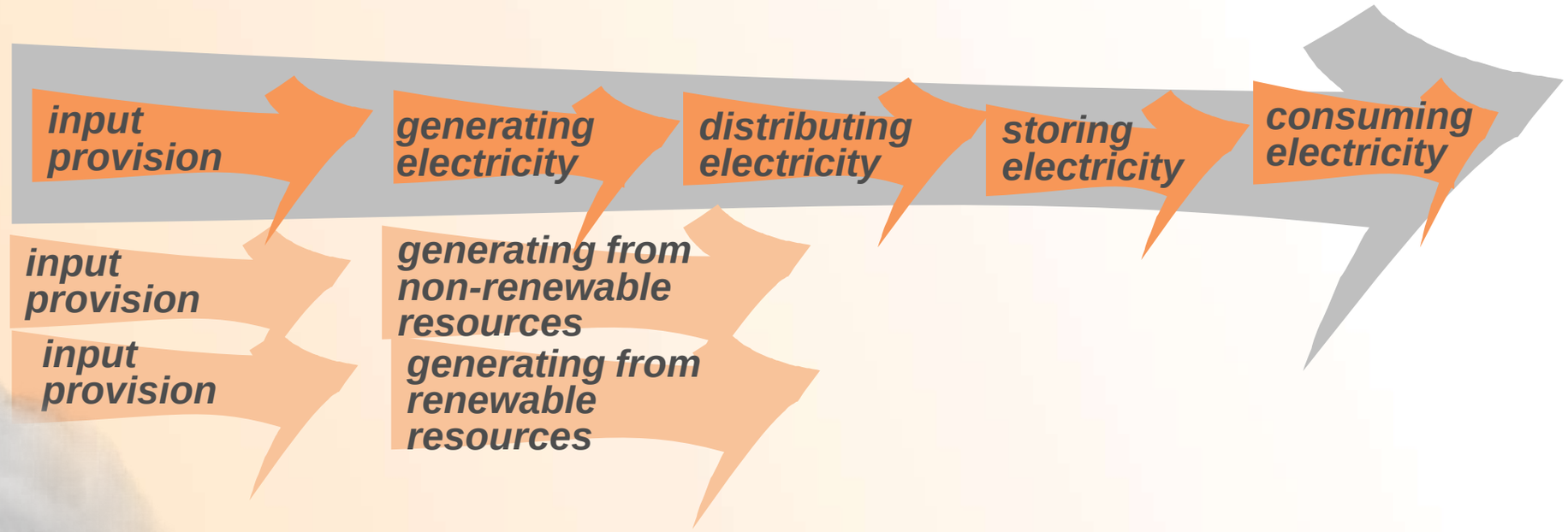
Time for a few case study frameworks...

HORIZONTAL SUPPLY CHAIN: electricity case study

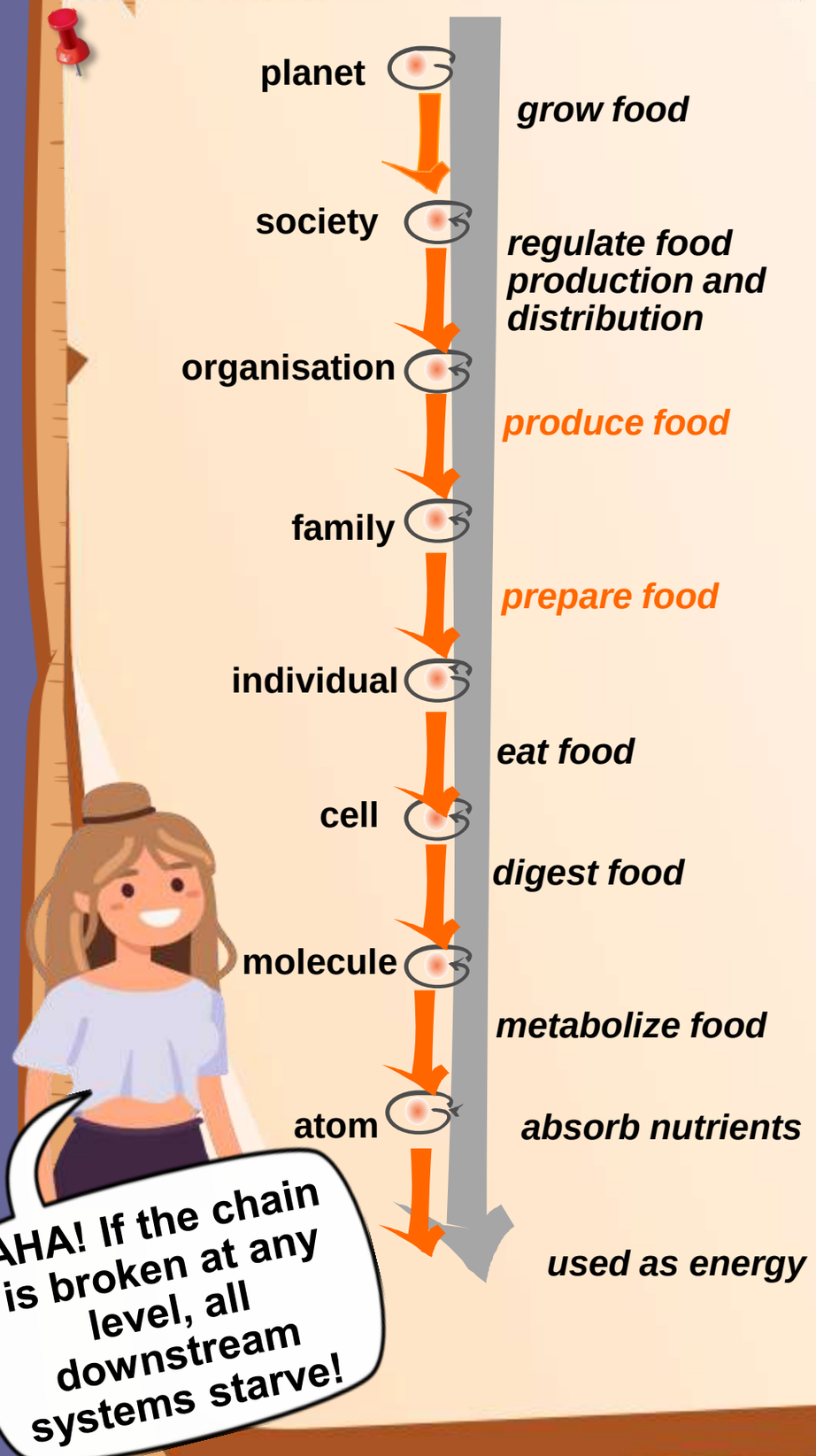
The electricity activity system *(illustrated by the light grey arrow)* is predominantly a HORIZONTAL supply / value chain, as its overarching purpose is to provide other industries with the energy that they need for their own processing.

The main sub-systems of the electricity activity system are illustrated by the orange arrows. They are sequential which implies that the output of the one sub-system becomes an input to the following (i.e. "downstream") system.

Sub-systems can also be parallel *(illustrated by the light orange arrows).* This implies that the output of two sub-systems become the input to the same following sub-system. For example, the electricity generated by renewable and non-renewable electricity generators are fed into the same distributor.



VERTICAL SUPPLY CHAIN: nutrition case study



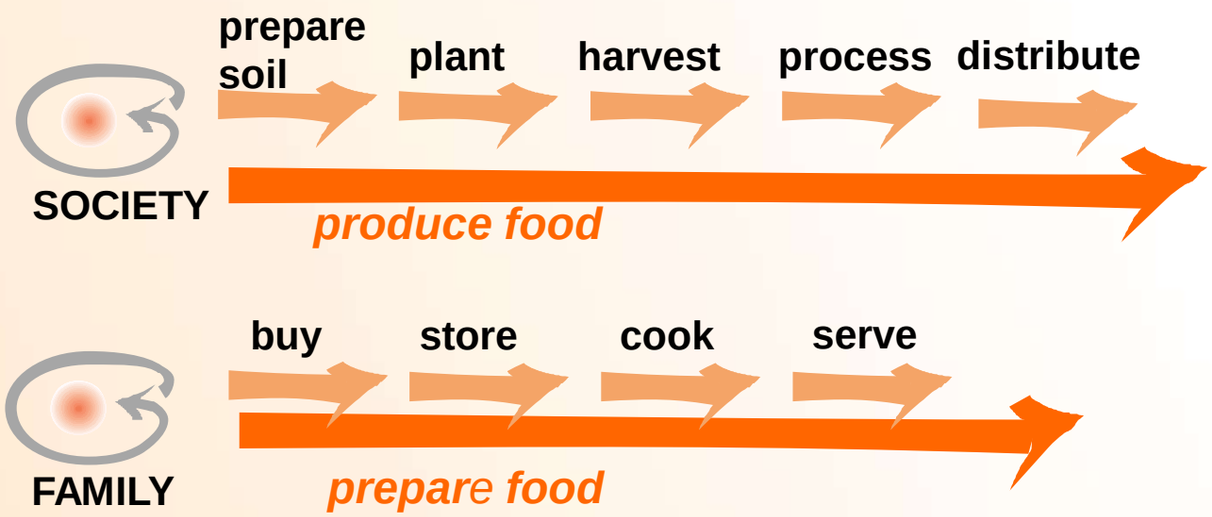
LEFT FIGURE: **The grey vertical arrow shows the nutrition activity system as a vertical value / supply chain running from beyond the planetary level *(i.e. the sun)* to the sub-atomic level.**

The orange arrows are the sub-systems which run between the levels *(ranging from growing food to absorbing the nutrients).*

BELOW FIGURES: **The darker orange horizontal arrows represent two sub-systems, namely *the production* and *preparation* of food.**

The lighter orange arrows represent their sub-systems (i.e. they are sub-sub-systems of the nutrition supply chain).

They are predominantly systems at the organisational and family level and are a horizontal section of the otherwise vertical supply chain.



A: YES, indeed!! At closer inspection, all systems are WEBS WITHIN WEBS! (See also the *NOTE*.)

Q: It seems to me that if one looks closer at an activity system, it actually becomes a web of sub-systems!

NOTE

If one looks at a supply chain in overview, it can APPEAR to be predominantly vertical *(like the nutrition or HIV/AIDS example)* or predominantly horizontal *(like the electricity industry supply chain example).*

Nevertheless, if one goes into more detail one discovers that all activity systems have some horizontal and vertical sub-systems *(as exemplified in the nutrition supply chain).*

Also, most sub-systems of a supply chain interact with systems at different levels through getting inputs from them *(e.g. light from the sun and resources from the planet)* and they produce outputs that also affect them *(like the pollutants that are absorbed by the planet).*

This is why we need to consider levels and dimensions in identifying and discussing issues *(i.e. problems and solutions).*

... just when things seemed simple, they get complex again...

Q: Is it all that important to distinguish between horizontal and vertical supply chains?

A: YES, it is important to reflect on this, because it helps us to identify the ultimate purpose, namely the system that is being served in the end.

For example, if we realise that the consumers of the electricity supply chain is every system of an economy, we realise its strategic importance for an economy. *(It also explains, why some societies nationalise it and resist privatisation of infrastructure in general.)*

If we understand that the education supply chain doesn't end in the classroom, but in the brain of the pupils, we begin to ask, if the current education system is optimal in terms of brain / mind functioning.

If we know that the nutrition chain serves the physiology, the nutritional value and toxicity in each sub-system of the chain are an important consideration.

Q: You said that we need to identify sub-systems and their sub-sub-systems, etc.

How detailed must our framework be and why?

A: The short answer is that this depends on the specific situation.

Sometimes it is sufficient to look at a system in broad categories and in overview.

Sometimes one needs to look at the system in great detail *(such as planning the transformation of a system).*

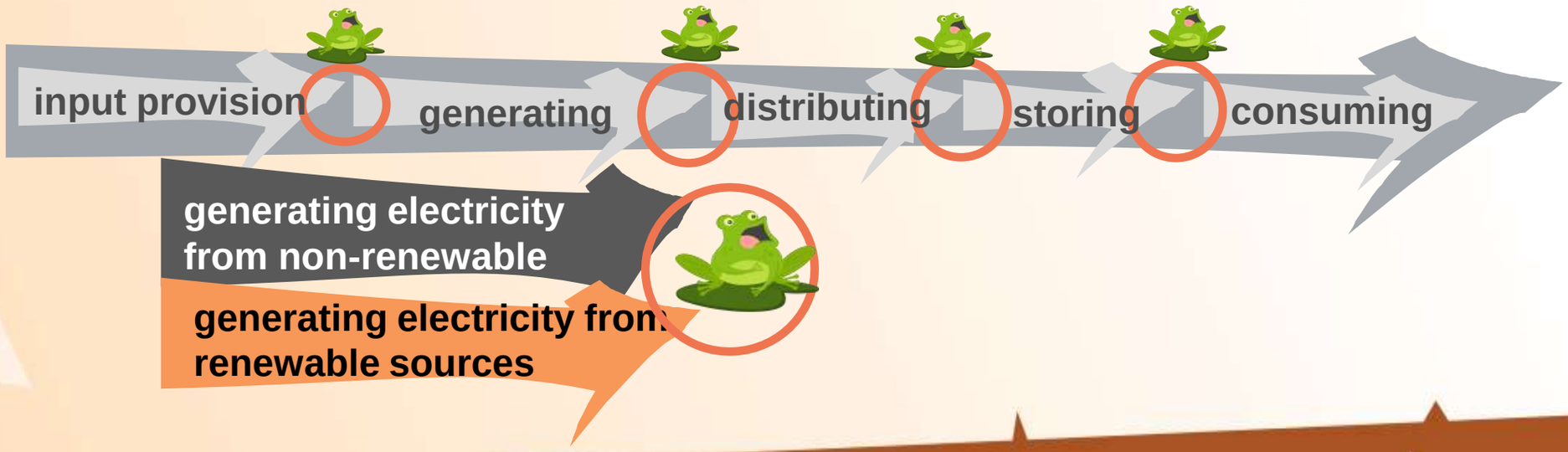
(See NOTES below).

NOTE: framework - broad view

A more broad framework consisting of the main sub-activity systems is especially useful for exploring and understanding the issues *(and especially the problems, symbolised by the frogs)* that arise between sub-activity systems *(illustrated by the orange circles in the Figure below).* These are the problems that the system as a whole has. They are not located within a sub-system.

For example, some of the core problems with establishing a more renewable electricity supply is the volatility of renewable energy generating *(e.g. the wind does not always blow and the sun does not always shine).* Besides unreliability of supply, it also creates sparks and instability in the distribution network and full utilisation would require more storage capacity than is available.

In the reductionist worldview the problems that emerge in the interaction between *(typically autonomously acting)* systems and sub-systems are often ignored, although these are the more serious and difficult ones to deal with.



NOTE: framework - broad view *(continued)*

Some of the typical complex problems that arise within and between activity and sub-activity systems are FRAGMENTATION and SUB-OPTIMISATION.

Fragmentation arises because the different actors associated with a specific sub-activity system *(as for example the different organisations within an industry or sub-industry)* make their decisions in isolation from and without consideration of the actors of the other links in the chain.

Sub-optimisation arises from maximising their own benefits. Thereby the interests of other stakeholder systems get sub-optimised.

Other typical complex problems are associated with by-products and their absorption and who should be responsible for the cost.

An example of a broad application of the framework for strategy development is the following case study of the road building industry. Stakeholder representatives of each sub-system of the industry participated in a workshop with the aim of finding ways of *"building more roads with less money".* They identified the problems between the different sub-systems and brainstormed strategies to dissolve them. One of those strategies concerned risk sharing between the building industry and the public road authorities in order to reduce the costly overdesign of roads due to excessive risk criteria. Together with a few more strategies the aim could indeed be achieved.

NOTE: broad view of electricity industry

Another example of a broad application of the framework to demonstrate the arising of complex problems between sub-systems is the following sketch of the German Energiewende *(i.e. German energy transformation policy).*

Until this policy decision, the established non-renewable energy providers *(e.g. coal and nuclear)* dominated. By continuously generating electricity, they prevented the electricity from renewable providers *(who generate only erratically when the sun is shining and the wind is blowing)* to enter the transmission lines.

Therefore the government decided to support the renewable industries by granting them priority access to the transmission lines.

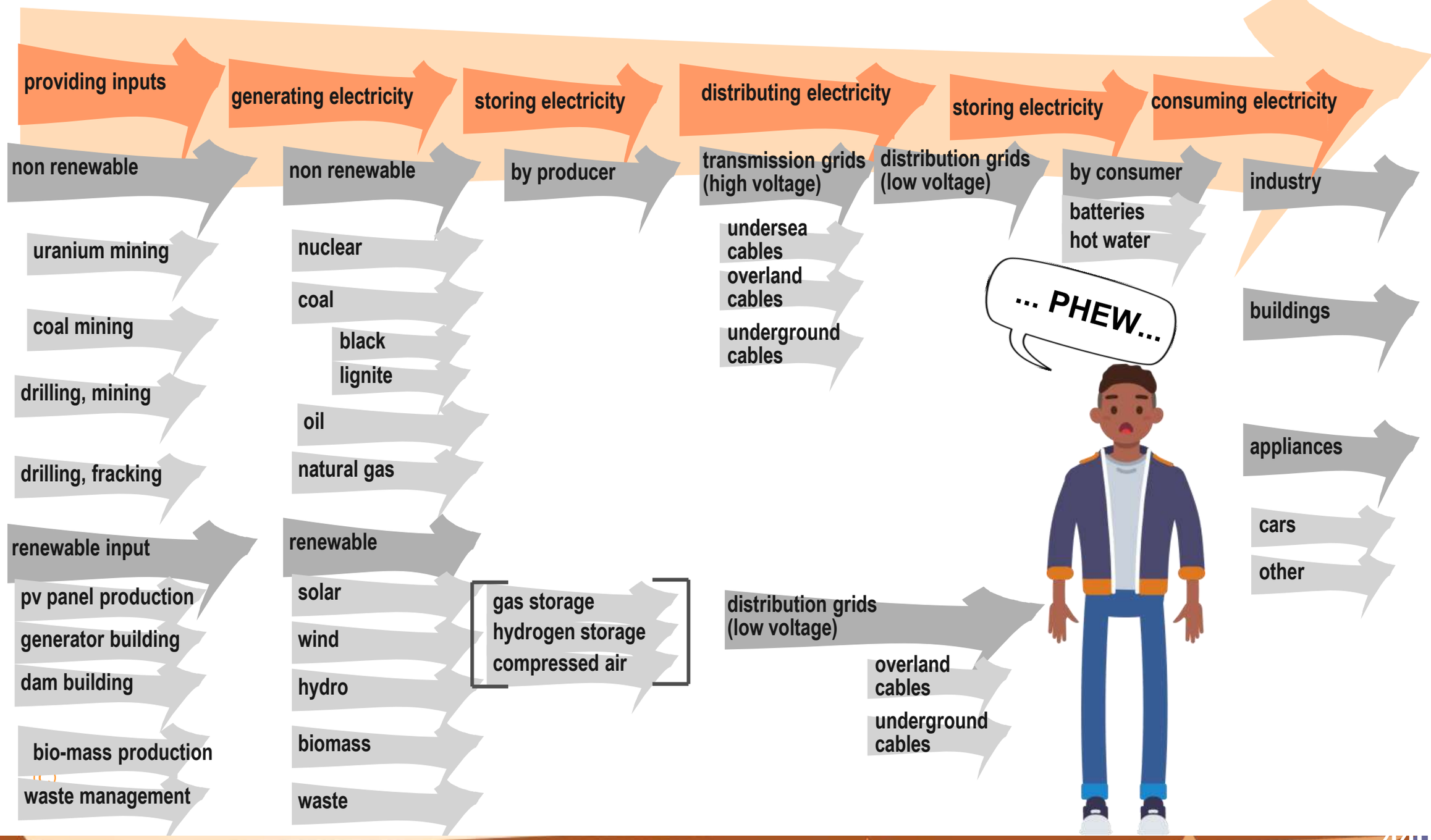
This led to reduced profits of the coal industry which could not sell all its generated electricity. They successfully lobbied to reverse this privilege of the renewable industries *(a classic case of optimising own interests and sub-optimising that of the others).* This led to the virtual collapse of the solar industry (which was bought by the Chinese) and laid dormant many wind generators, thereby seriously retarding the Energiewende.

Another problematic aspect of the Energiewende is related to the aims and ethos of the system: To favour renewable energy use, some atomic power stations were switched off. This led to serious shortages which are filled by buying electricity generated by nuclear power plants of neighbouring countries! (AHEM: Is this green or phoney?)

To (dis)solve such complex problems requires a redesign of the whole energy supply chain in such a way that all stakeholders benefit fairly and that each sub-industry is prepared to change accordingly. For example, the redesign could suggest that any new coal power stations transform their business model from being a continuous energy provider to being a COMPLEMENTARY one *(i.e. to generate when electricity from sun and wind is not available).* Although complementary electricity generating is currently done by biogas plants, these create other complex problems *(e.g. with food production).*

NOTE: framework- detailed view

To (re)design the electricity value / supply chain of a country or region, one needs to extend the framework into considerable detail by determining its sub (and sub-sub, etc.) systems, as exemplified by the Figure below. *(NOTE: This Figure shows only the processing inputs. For a thorough analysis, one will also have to consider the input provision of the processing structures, such as building power stations, refineries and solar and wind-farms, etc.)*



NOTE: framework - detailed view *(continued)*

A: A detailed design framework is needed for the redesign and transformation of large societal systems *(such as an education, health-care, or electricity system).*

It prompts the identification of the problems within, as well as between the sub- *(and sub-sub-etc.)* systems *(as prescribed by step 2 of the methodology)* and also guides the subsequent steps in the change methodology *(as will be described in more detail in the according sections).*

A detailed framework facilitates the cascading of information and iteration between different steps in the methodology.

More specifically, it facilitates the cascading of the design from the overarching system into its sub-systems and their sub-systems. At the same time, relevant information from a sub-system *(such as a major technological breakthrough in it)* is cascaded upwards into the overarching system causing it to change also. This new overarching design is again cascaded back through all sub-systems, etc., until a coherent design emerges.

The framework also facilitates iteration between the steps of the methodology, whereby information gained during a later step may prompt the revisiting of a previous step. For example, if implementation planning reveals that there are not enough resources to implement a design, one may have to go back to the design phase and amend the design.

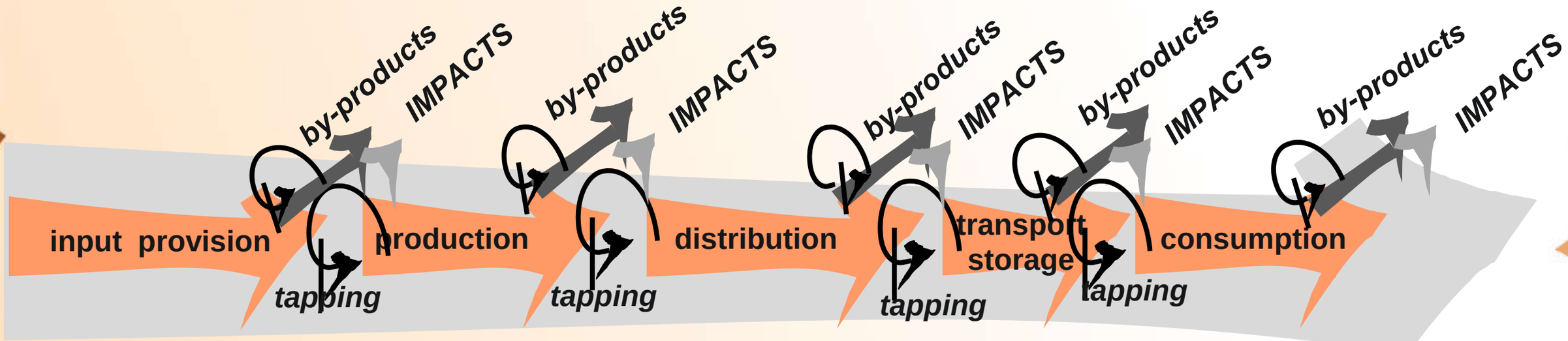
Thus, redesigning and transforming a system is not a linear process, but an iterative one between steps in the methodology and across the levels in the system.

Remember the theory (*Part 3*), which described how systems are organised?

We explained that processing produces products and by-products, that these outputs need to be tapped and that they impact on other systems. *(See the following Figure as a visual reminder of this.)*

Those concepts need to be incorporated into our framework of the system and its sub-systems. Even if some of them actually represent organisational sub-systems *(like the tapping sub-system)*, it is easier to deal with them as categories that will be explored within each link of the value / supply chain.

FRAMEWORK: tapping of products and by-products



The Figure illustrates processing, namely the continuity of substance (or mei) flow and its tapping:

- **the output of a "downstream" system is tapped *(illustrated by the black rounded tapping arrow)* as input and processed into an intended output**
- **the by-products created during processing are tapped by other systems *(e.g. nature and other impacted on stakeholder systems)* and become input to other supply chains *(illustrated by the black sub-system arrows)***
- **both, products and by-products impact on other stakeholder systems *(the impacts are symbolised by the grey arrow tips)***

And yes, there is more theory!

We mentioned the seven forces of organisation:
(1) ethos, (2) aims, (3) process, (4) structure, (5) governance, (6) substance (2) and (7) environment.

If super-imposed on the activity system framework, we get the following additional categories that need to be incorporated into a detailed framework of inquiry *(see the Figure on the following notice board):*

(1) **Ethos** *(depicted by the orange dot)*

(2) **Aims** *(depicted by the orange arrow head)*

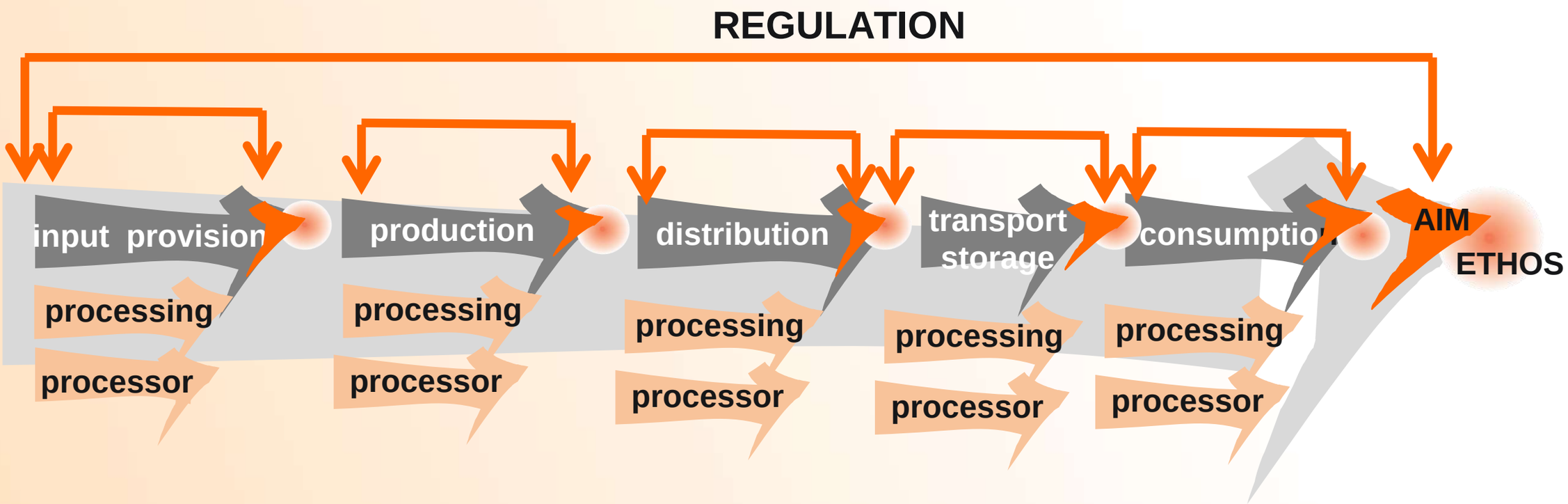
(3, 6) **Processing** of substance, whereby input is processed into output as products and by-products *(depicted as an organisational sub-system by the light orange arrow)*. The continuity of processing as product and by-product through tapping is illustrated in the previous Figure.

(4, 6) **Processor,** which refers to the structures that do the processing *(depicted as an organisational sub-system by the orange arrow)*

(5) **Regulation** of the system and each of its sub-systems so that their aims are achieved *(depicted as an organisational sub-system in form of orange brackets)*

(7) The **enviromental** category is explored by the tapping and impacts of products and by-products and their impacts on other systems *(as illustrated in the previous Figure)*. Environmental influences also need to be considered within the above categories.

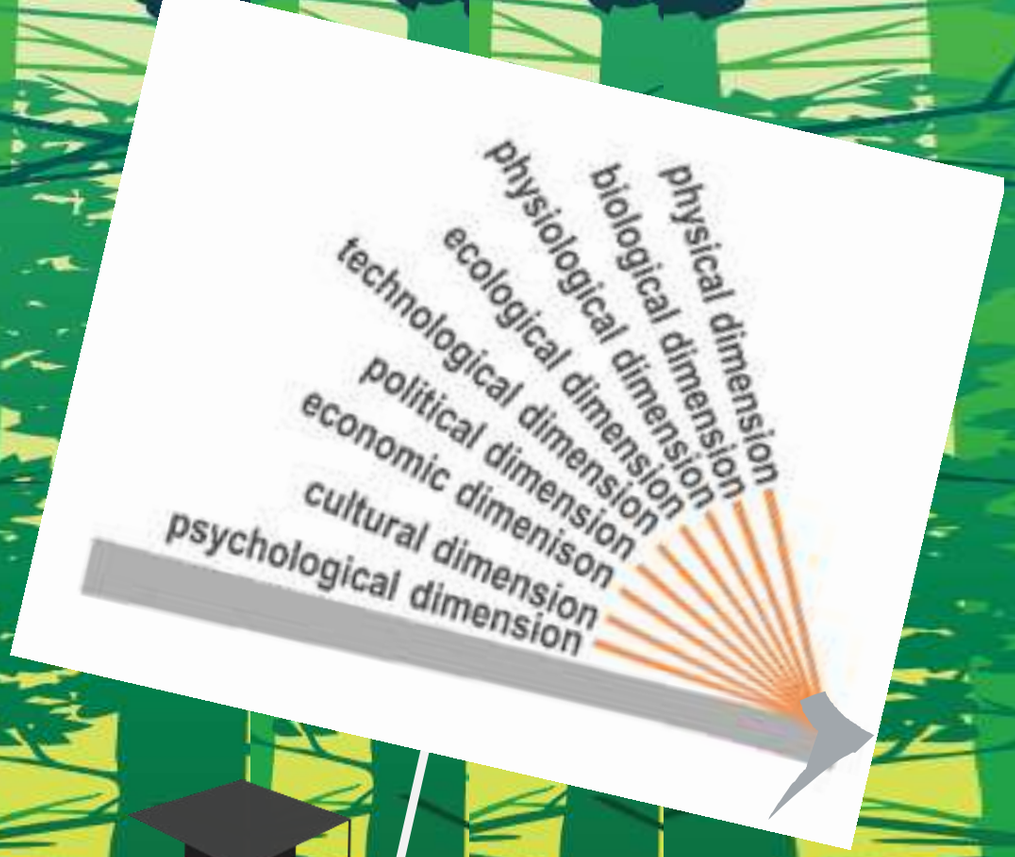
FRAMEWORK: regulation



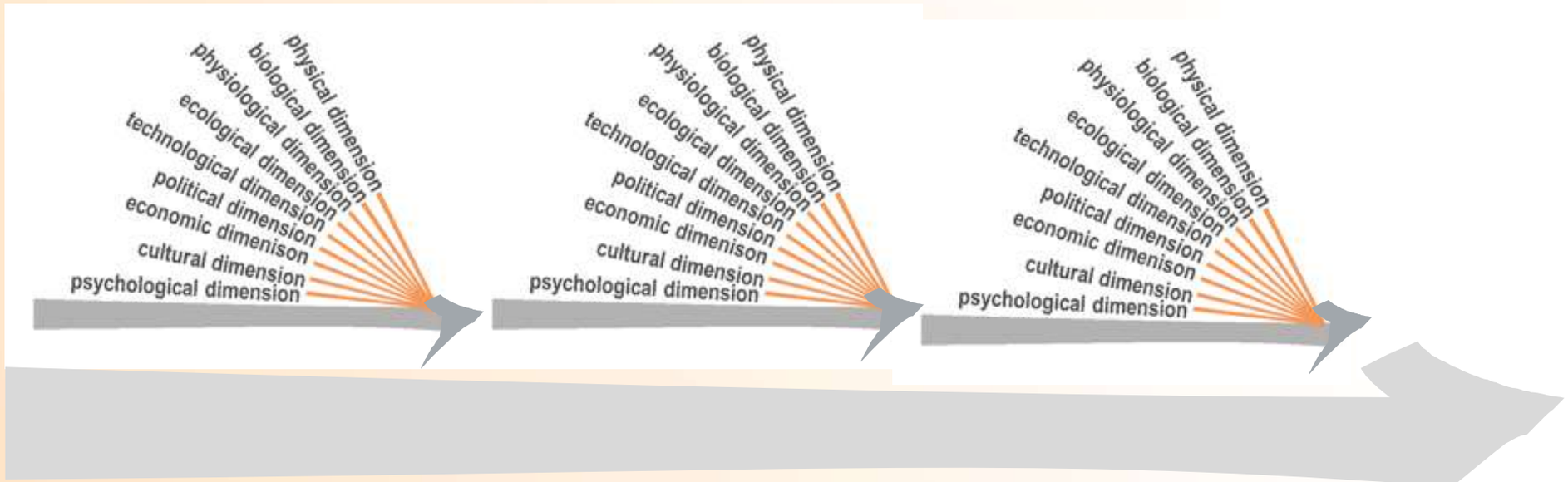
NOTE: **One also needs to consider the impacts of the processor and regulatory systems on other systems, including the discarding or discontinuity of their substance *(such as the decommissioning of power stations, discarding of electronic gadgets, or the unemployment of retrenched workers)***

And there are still some more categories that you can use, namely the different dimensions.

You could for example explore the system and its sub-systems from a multi-dimensional perspective. *(See the following Figure.)*



FRAMEWORK: multi-dimensionality



One can also explore each sub-system
(as well as the whole activity system)
from a multi-dimensional perspective.

Q: PHEW! This is overwhelming!

Are such detail and so much theory really necessary?

A: Remember, I said that the level of detail depends on the purpose of the inquiry. If you really want to do a thorough analysis of a system in order to transform it, you need to consider all categories, albeit not all categories during all steps of the methodology. *(We learn more about this, as we discuss each step.)*

Remember, I also said that a framework translates into a set of generic questions. This implies that the participating stakeholders do not need to know any theory. They only need to answer the questions proposed by the framework.

The design team, however, needs to understand the theory in order to ask the relevant questions.

Remember Gertrude Stein:

If you don't have a question, you don't get an answer!

If you have a wrong *(or irrelevant)* question, you get a wrong *(or irrelevant)* answer!

Q1: We are somewhat confused about frameworks, categories and questions.

The way you talked about them seems that they are the same.

A1: No, they are not the same *(check their meaning in the dictionary – which we inserted below in brackets).* They do, however give rise to each other, *analogous to the proverbial two sides of a coin.*

A framework *(i.e. the basic structure underlying a system),* consists of categories *(i.e. divisions of things that have a shared characteristic).* The categories, which make up the framework, can be expressed as a question *(i.e. a sentence worded so as to elicit information).*

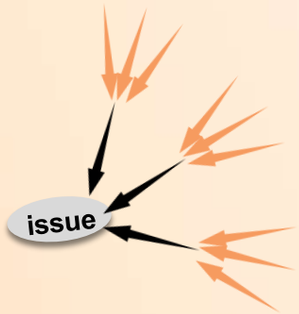
Q2: Can you give some examples about how a framework translates into questions?

... and when we should ask them?

A2: Concerning some examples of questions and when to ask them, see the following NOTES.

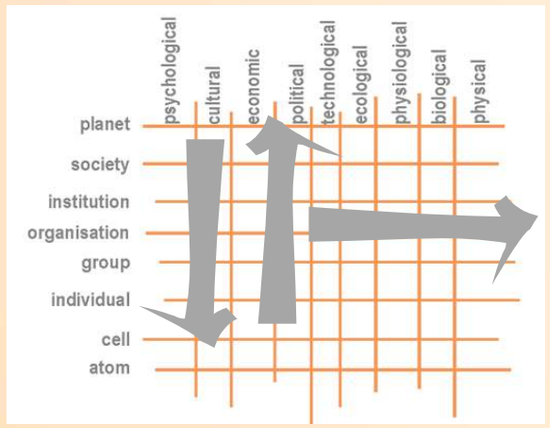
(Those Notes also serve as a summary for step 1 and an introduction to some of the following steps.)

NOTE: framework categories as questions

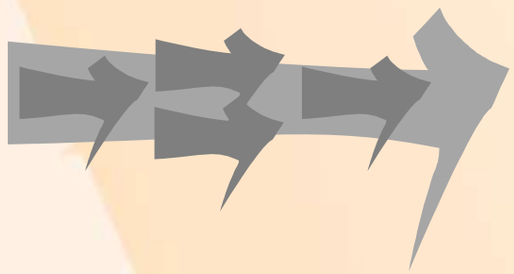


In *STEP 1* of the methodology we ask the question "which framework should we use?"

If I deal with a PERSONAL ISSUE *(or mess),* we can ask "what are the co-factors or who are the stakeholders of the issue" and use the according framework.

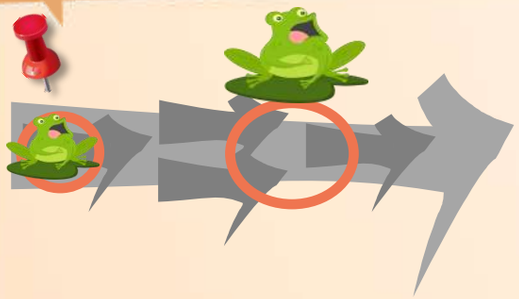


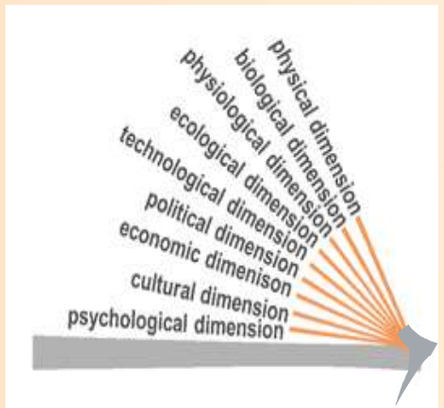
If we deal with a large SOCIETAL MESS, we can start by using the *Biomatrix Spatial Framework* which provides us with the questions "what are the aspects of (*or issues associated with)* the mess in the different dimensions and at the different levels of the biomatrix?". Based on this analysis we ask "what are the different activity systems that co-produce the mess?" We then draw them as vertical and / or horizontal supply chains within the biomatrix and continue with each activity system as the framework for further inquiry *(as described below).*

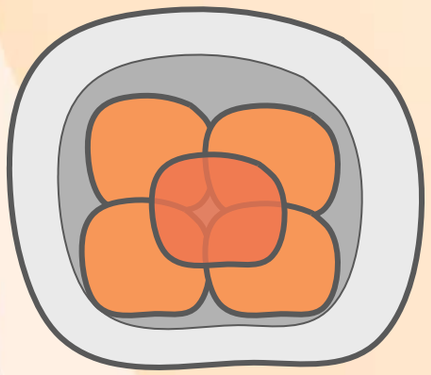


If we deal with a SOCIETAL FUNCTION *(or industry)*, we use the framework which deals with an activity system as value / supply chain by asking the he question: "what are the sequential and parallel sub-activity systems?" It is also useful to ask if it is a vertical and horizontal supply chain *(or both)* to identify the level in the biomatrix, at which a sub-system is located and the end user *(or ultimate purpose)* of the whole chain.

NOTE: framework categories as questions *(continued)*







***STEP 2* is concerned with identifying the problems.**

The question "what are the problems in the interaction BETWEEN the sub-system?" reveals the problems of the containing system, while the question "what are the problems WITHIN a sub-system?" focuses on the sub-system itself. *(Of course, the answers will overlap, because a sub-system is also a system with sub-systems.)*

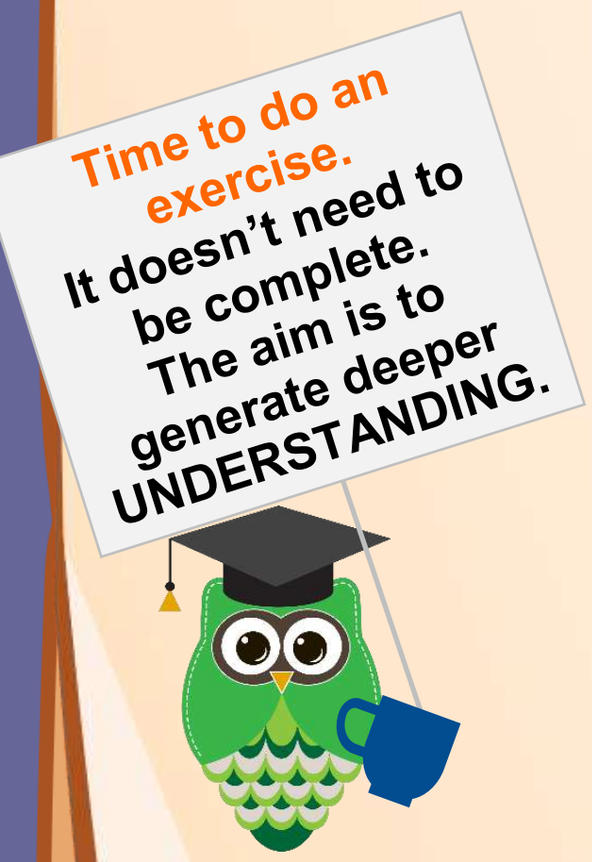
Those questions can be asked in a more differentiated manner, by using the multi-dimensional framework which prompts the questions "what are the psychological, cultural, economic, political, ecological, physiological, biological and physical issues, problems or solutions?" *(Since the sub-activity systems are located at a specific level, the level related information is automatically provided.)*

The organisational framework *(i.e. the Seven Forces of System Organisation)* can also be used in *STEP 2* to identify the organisational problems. It is however our experience that those problems are usually identified by the previous questions.

Instead we have used this framework successfully to categorise the identified problems *(from Step 2)* and proposed solutions *(from step 3)* in the *Design Notebook (of Step 4).*

However the most important use of this framework is during *STEP 5* for generating an ideal design for the system and its sub-systems. The questions guiding the design are "What should be the ideal ethos, aims, processes, structures, governance, substance (mei) and environmental relations of the system?" *(The organising principles under each of the seven forces of organisation provide further sub-questions.)*

STEP 1: Exercise



In a previous exercise you identified the main co-producing activity systems and then placed them within the generic systems hierarchy *(as exemplified by the HIV/AIDS and poverty case studies).* Continue as follows:

1. **Choose any of those mess contributing activity systems, or choose any other activity system of your concern. This could be your personal work function, or *(if you are brave)* even the industry in which you work *(such as the education, media, health-care, or electricity system, or whatever system)* and create the framework for it.**

   (NOTE: This could be a predominantly vertical chain, like one of the HIV/AIDS or poverty related activity systems. Or it could be a predominantly horizontal chain, like the energy supply chain. Or it could be both, like the nutrition system.)

   Continue to use this activity system as your case study for the exercises of the other steps of the methodology.

2. **Identify the main sub-systems of your chosen activity system and draw the whole system as a value / supply chain. *(If you feel very energetic, you can also identify the sub-sub-systems.)***

HAVE FUN!

STEP 2: Current System Analysis

2.1. Collect data about the current system

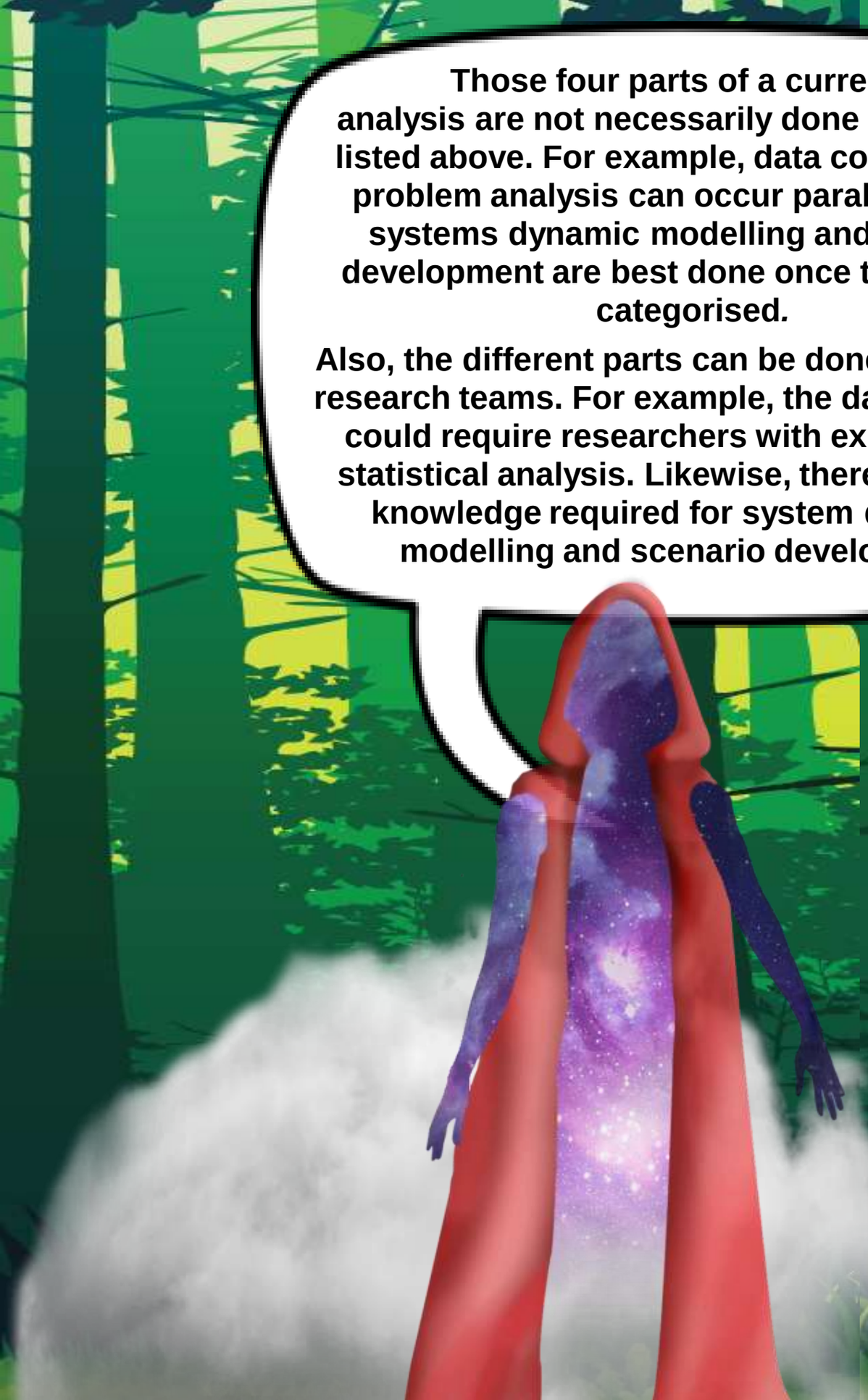
2.2. Identify and analyse problems

2.3. Research the dynamics of the system

2.4. Explore current future scenarios

Those four parts of a current system analysis are not necessarily done in the order listed above. For example, data collection and problem analysis can occur parallel and the systems dynamic modelling and scenario development are best done once the data are categorised.

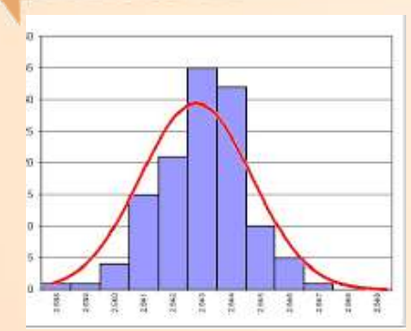
Also, the different parts can be done by different research teams. For example, the data collection could require researchers with experience of statistical analysis. Likewise, there is specific knowledge required for system dynamics modelling and scenario development.

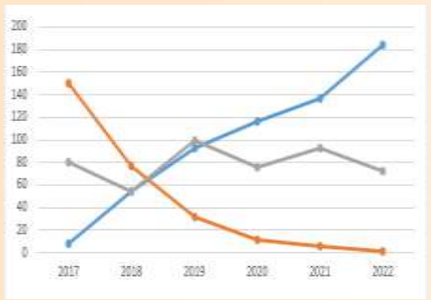


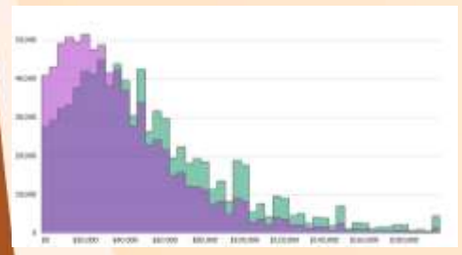
Remember:
The logic of the problem is not the logic of the solution and the logic of the current system is not the logic of the ideal system! So, stay cool and don't quarrel about the current situation!

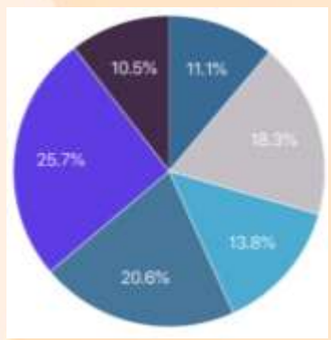
2.1. Collect data about the current system

NOTE: current system description









At the outset of a system redesign, it is useful to collect data about the system.

In public systems, statistical information about the system is often readily available.

Usually experts are needed to interpret the data, based on the way they were collected and processed and how they compare with other data. statistics. Statistics can be very misleading, if not carefully analysed. ***For example, during the C-pandemic, some publicly quoted statistics (i.e. in Germany) have been found to be based on "cases" and others on "patients". As a patient is moved from one station in a hospital to another, s/he is counted as a case in each. Thus the same patient can be counted more than once in some statistics. This can obviously lead to an inflation of the actual health related situation in the country.***

The design framework can give an indication of what kind of data are required to describe a system. Especially the organisational categories need to be fleshed out through relevant data, whereby some data may be qualitative ***(e.g. description of ethos, aims and regulatory criteria and mechanisms)*** **and others quantitative** ***(e.g. quantity relating to processing substance and processor substance, as well as their associated costs*****).**

Qualitative data can be derived from strategy documents, while quantitative data are found in the databanks of various government departments and research institutes.

Such data are collected for the whole system and each sub-system.

The collected data are incorporated into the ***Design Notebook*** **of the whole system and each of its sub-systems.** ***(See Step 4 of the Change Methodology).***

2.2. Identify and analyse problems

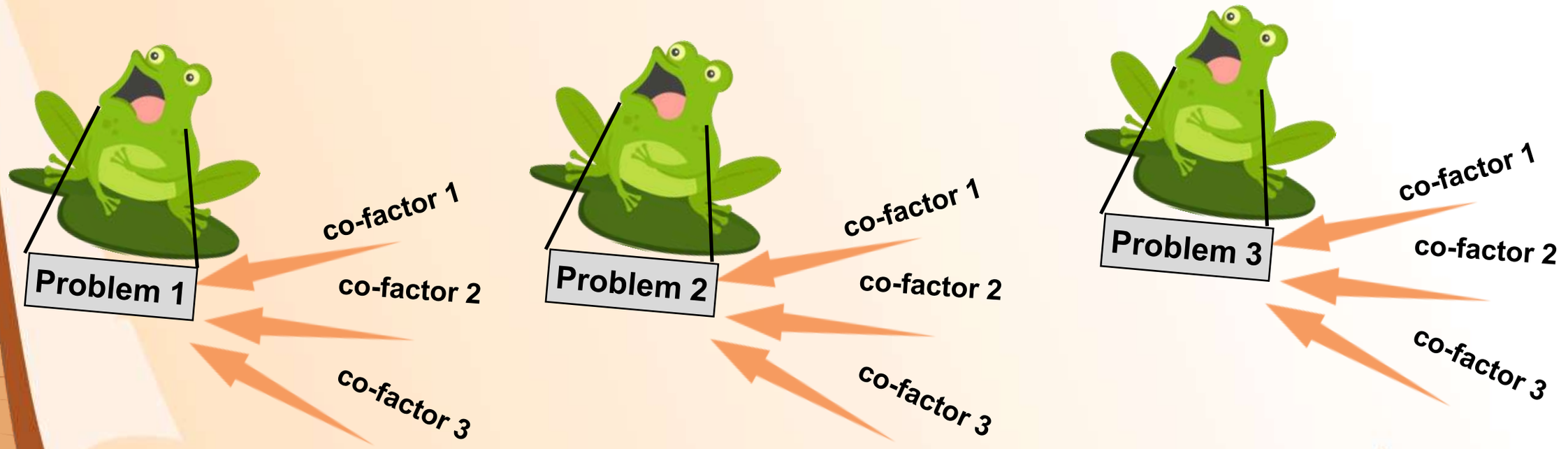
NOTE: problem analysis

As explained previously, there are different ways of dealing with problems, namely *PROBLEM SOLVING* versus *PROBLEM DISSOLVING*.

Problem solving deals with specific problems that otherwise well functioning systems experience, *as for example technical systems that break down, or an employee making a mistake*. To solve such problems typically involves root-cause analysis which detects the origin of the problem, so that it can be "fixed" *(e.g. the broken part is replaced, or the employee is trained).*

Most problems in a mess or problem-riddled societal function will of the kind that need problem dissolving. They are complex problems that emerge from the interaction of systems *(which may be dysfunctional in themselves)* and have multiple causes. The analysis of such problems involves

(1) problem identification and (2) problem co-factor identification.



NOTE: problem analysis *(continued)*

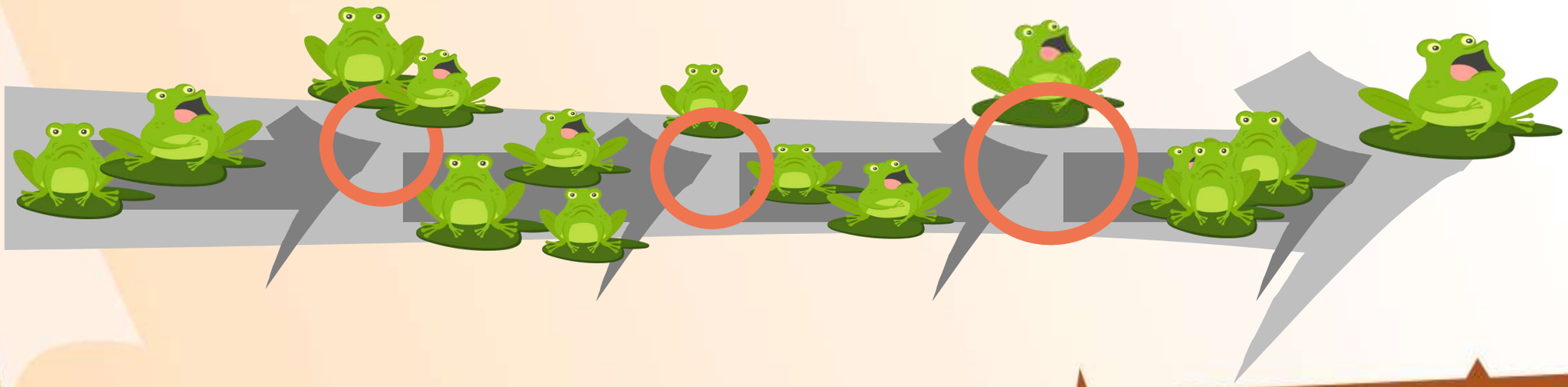
PROBLEM IDENTIFICATION

Stakeholders are asked to identify the problems they experience within their sub-system and between their sub-system and other systems.

This does not involve lengthy descriptions of the problem, but merely a brief summary *(e.g. Tweeet-length - see the case studies of HIV/AIDS in the Biomatrix Book, or the BiomatrixJam of the music industry on our webpage – click the gallery button).*

We have found it useful to ask in a first round for the 3-5 most important problems and – if necessary, continue with a further round of problems within the more specific categories of the framework. In most cases asking for problems in each of the dimensions of the system is sufficient.

In the case of public systems, a *BiomatrixJam* can be conducted to identify the problems in all parts of the system. *(NOTE: Jamming is an online method that allows the participation of large numbers of stakeholders.)*



NOTE: problem analysis *(continued)*

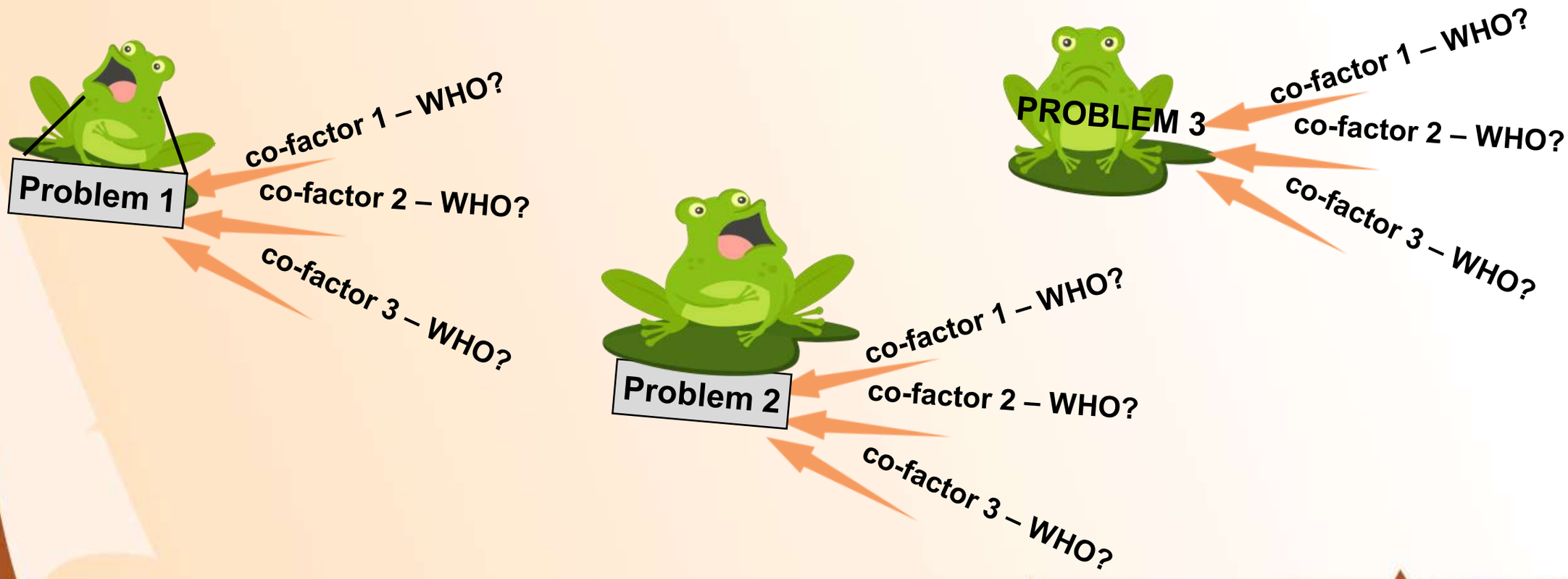
IDENTIFYING THE PROBLEM CO-FACTORS

The stakeholders are not only asked to identify the problems they have with their system, but also to identify the co-factors that co-cause each problem.

As a rule we suggest to identify at least three co-factors for each problem.

Typically, a co-factor involves another system and therefore cannot be (dis)solved by the system itself. It needs the cooperation of the other system.

The co-factor analysis also asks the stakeholders to suggest WHO is responsible for the changes required by each co-factor. This allows the categorisation of problems according to system of origin. *(See Step 4.)*



Q: We understand now, how we should identify problems and their co-factors within an activity system.

But what about a mess, like poverty? You said earlier that one can use a problem analysis for the mess as a whole and then deduce from it the co-producing systems that become the framework for dissolving the mess.

Can you explain this some more?

A: **Yes, you can use the *Biomatrix Spatial Framework* and ask participants to identify the problems of the mess in the different dimensions and at the different levels of the framework. *(See following Figure).***

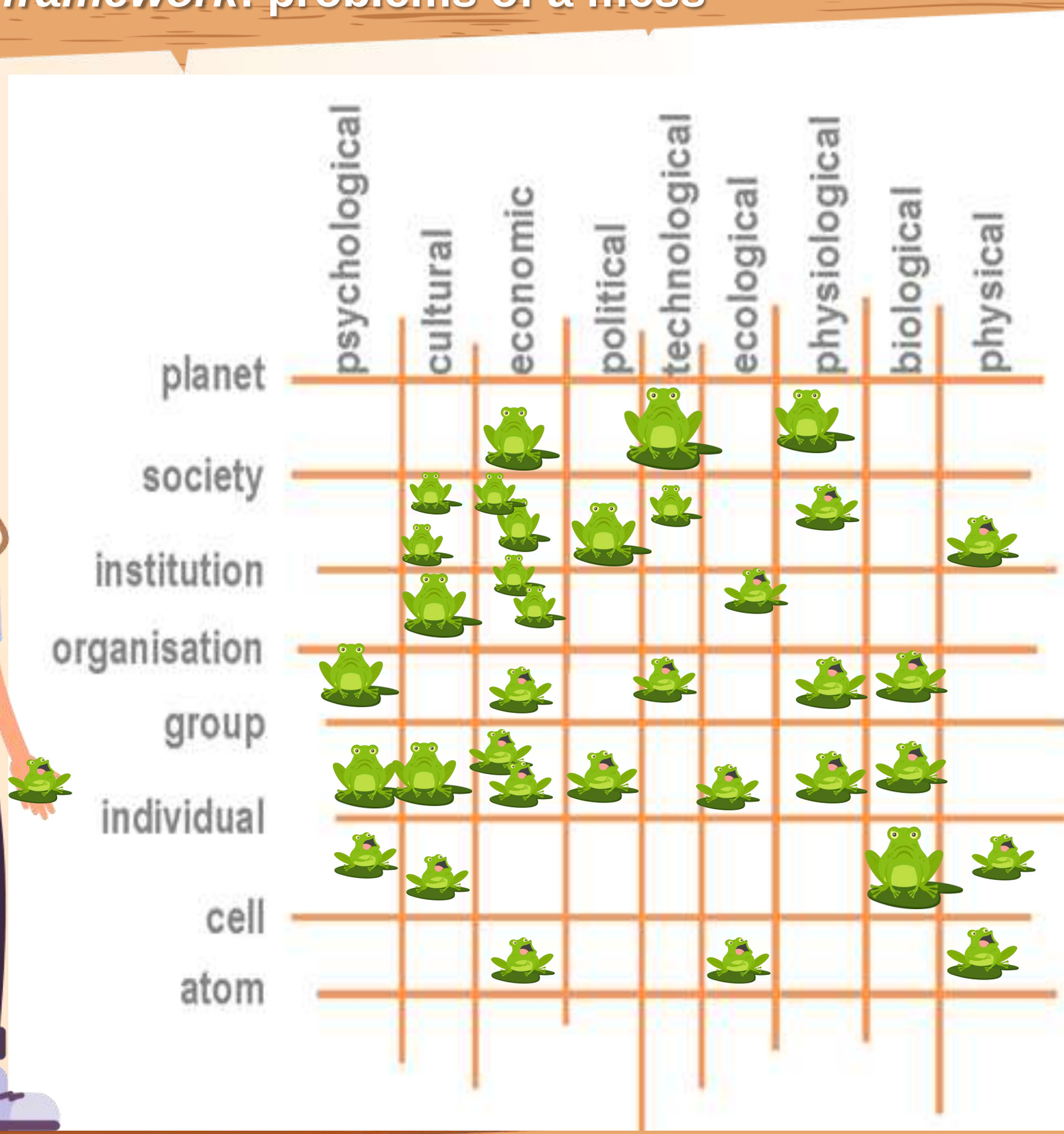
The co-factor analysis will reveal further problems that are often located at different levels and in different dimensions and make the understanding of the mess more complete.

Having populated the framework with sufficient information, the design team can

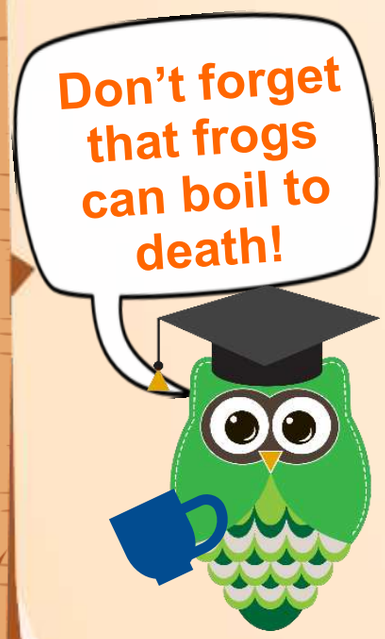
- **on the one hand identify *(i.e. tease out)* the specific activity and entity systems that are associated with the problems, and**
- **on the other hand continue with the subsequent steps of the methodology to create the overarching *Ideal Strategy Design* for dissolving the mess.**

Notice iteration between the use of different frameworks and between different steps of the methodology?

design framework: problems of a mess



EXERCISE



Continue with your case study activity system and identify problems *(the more the better)* as follows:

1. Identify two to three problems

- **for the whole activity system**
- **between subsystems**
- **within each the sub-systems**

2. Identify 2-3 co-factors for each problem.

3. Determine the stakeholder system that is responsible for each co-factor.

4. Group related problems together according to categories of your choice.

(NOTE: It is easiest if you work with columns in a table format and allow one row per problem co-factor)

Now you will have a much better understanding of what’s wrong with your case study system!

2.3. Research the dynamics of the system

NOTE: system dynamics model

As previously discussed, a system dynamics model illustrates the underlying structure according to which the CURRENT system functions and describes its complexity. It is therefore an important part of a current system analysis.

If done thoroughly *(e.g. with computer-based mathematical and statistical models)* the modelling of complex systems *(such as the spread of a pandemic, climate change, or economic forecasts)* is elaborate, costly and highly specialised. The purpose of such models is typically to support decision-making in the public domain and the output of such models has indeed influenced political agendas considerably, even if their results are not reliable *(and often doubtful).* Nevertheless, if relevant, the outcomes of such models can be incorporated into a *Design Notebook. (See Step 4)*

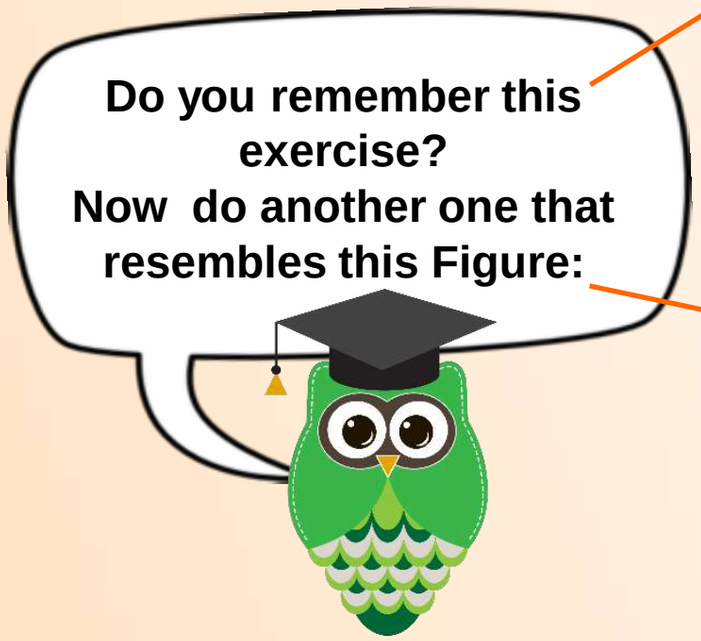
If using a more sketchy version of a system dynamics model *(such as the previously shown partial dynamics of the education mess),* a different purpose is served, namely to generate an understanding of complexity and demonstrate the need for transforming the system.

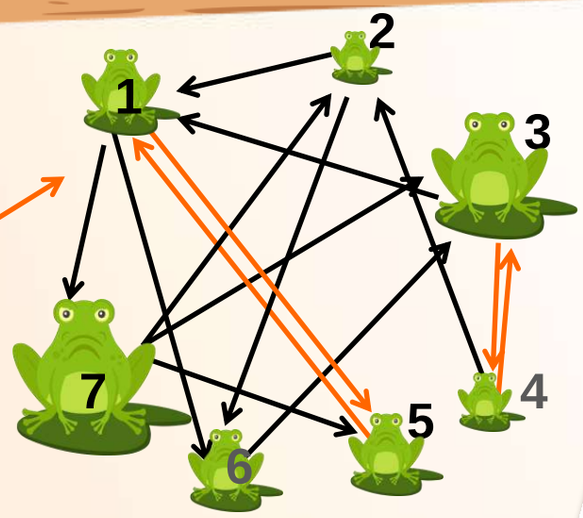
To do such a sketchy version, one can use the identified problems and problem-cofactors *(either the most important ones, or overarching ones after having grouped them together)* and explore their interaction.

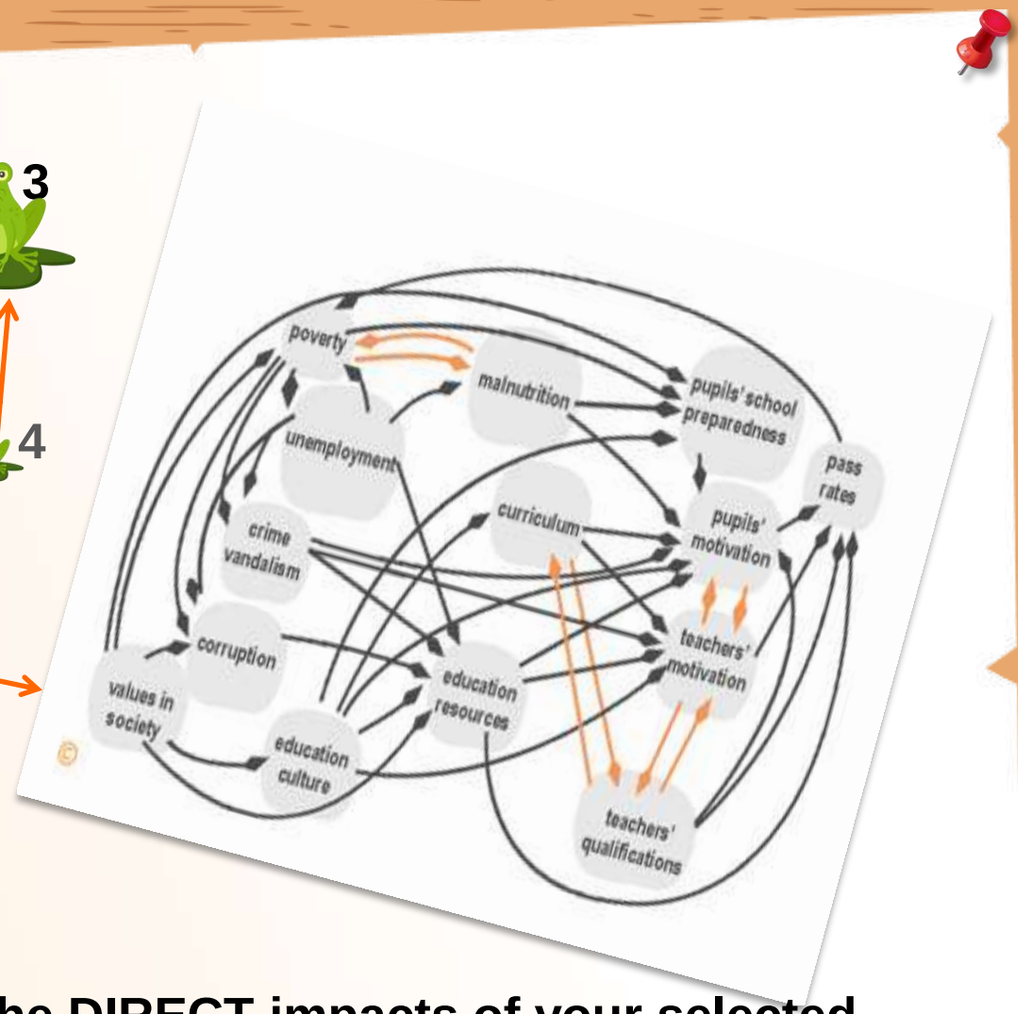
To understand the functioning of a system in general *(i.e. not only its problems),* we need to identify the variables that describe the organisation of the system. The *Seven Forces of System Organisation* can serve as framework for identifying them.

EXERCISE

Do you remember this exercise?
Now do another one that resembles this Figure:







EXERCISE:

Compile a system dynamics model by drawing the DIRECT impacts of your selected problems and problem co-factors on the others.
(Note: Indirectly, via other co-factors, everything impacts on everything else).

Select at least one problem and one problem co-factor from each sub-system and one problem and problem co-factor each from between the sub-systems.

Select those you regard as most important. Alternatively, group related problems and co-factors together under an overarching category and work with those categories as variables.

Number each arrow and describe the impact it represents with a sentence or some keywords.

2.4. Explore current future scenarios

Q: What are scenarios and why would we use them?

A: A scenario is a **STORY about the future,** as for example how a mess or a system could look like in future. Since the future is not pre-determined, it should be explored with alternative scenarios.

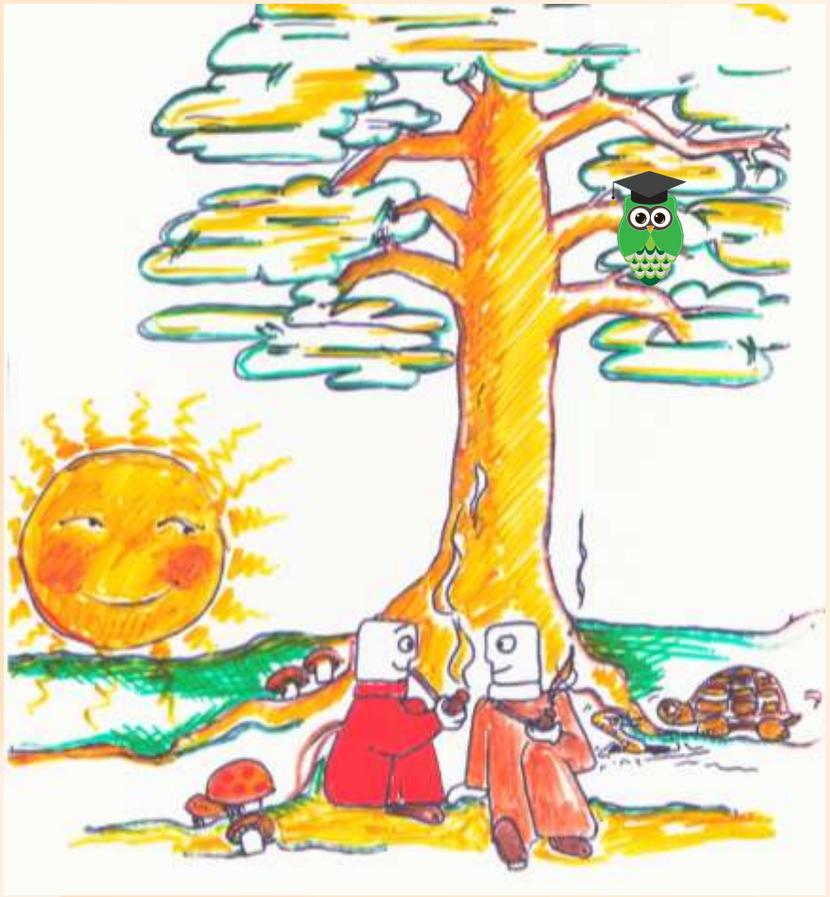
There are different types of scenarios. *(See following NOTE.)* Some use scenarios to explore the current future *(as part of step 2),* while others use them to describe a more ideal future *(e.g. to brainstorm it as part of step 3, present an ideal design as a scenario in step 5, or explore its impacts as part of step 6).* One can also do scenarios to describe how one can respond to a likely current future *(as part of step 2)* or implement a specific design *(e.g. as part of step 8).*

WHY does one use scenarios? A story is like a picture in words. It can convey complexity in an understandable way, is a powerful tool of communication and can convey a "moral" *(without preaching it)* that invites reflection.

"The scenario 's the thing, wherein I'll catch the conscience of the king."

(Shakespeare paraphrased)

NOTE: types of scenarios



One can distinguish different types of scenarios:

1. **Current Future Scenarios** ***(also referred to as Exploratory Scenarios):*** **They explore how the future could look like, based on the momentum inherent in the current system and likely future changes in its environment. They are derived from forecasting the current situation into the future.**

   To compile alternative future scenarios requires a scenario logic which explains changes in the variables and their different outcomes. This can involve mathematical and statistical methods ***(e.g. econometric, climate change and pandemic models)*** **or qualitative descriptions of the interaction of different driving forces** ***(e.g. dialectics, or the dominance of different values).***

2. **Ideal Design Scenarios: They describe possible alternative ideal futures that are desired or intended. They are normative in nature and represent a transformation of** ***(or break with)*** **the current situation.** ***(See also step 5.)***

3. **Planning Scenarios: They are concerned with operationalising a specific scenario by exploring what should be done practically** ***(i.e. which strategies should be adopted by whom)*** **in order to**

   - **avoid, mitigate or manage an undesirable scenario** ***(i.e. this is referred to as a Current Future PLANNING SCENARIO)*****, or**
   - **bring about a more desirable or ideal future through an** ***Ideal Future PLANNING SCENARIO (this can also be an implementation plan).***

Q: Is it difficult and a lot of work to do scenarios?

A: It can be difficult if you work with statistical and mathematical models in order to produce alternative current future scenarios as outcomes *(like climate or pandemic scenarios)*, or to explore policy alternatives of a system in detail *(like alternative energy futures)*. The validity of the models or method for constructing the scenarios is in the realm of the experts. The purpose of those models is to support public decision-making. The scenarios themselves can be conveyed as a story *(like how the world will look like with a 5 cm or 5 m rise in sea levels)*.

There is also a way of developing scenarios more informally by the stakeholders of a system *(as part of a change methodology as proposed here)*. Their purpose is not being a decision-making tool, but to broaden the mind to alternative futures of a system *(like alternative education, health-care or democracy futures)*.

By analogy, one can sit around the fire and make up stories about the future, or work for months on writing a novel. Each of the two ways of story-telling has its own value.

Q: And how do we go about creating scenarios?

A: Detailed scenarios need experts and their expertise. But this is not what we are concerned with here.

I guess you want some recipes for the fireside scenarios. Here are our preferred ones *(there are others methods, of course):*

- **Alternative current future scenarios**
- **Value-driven scenarios**
- **Dialectics-based scenarios.**

(See the following NOTES for more detail)

NOTE: alternative current future scenarios

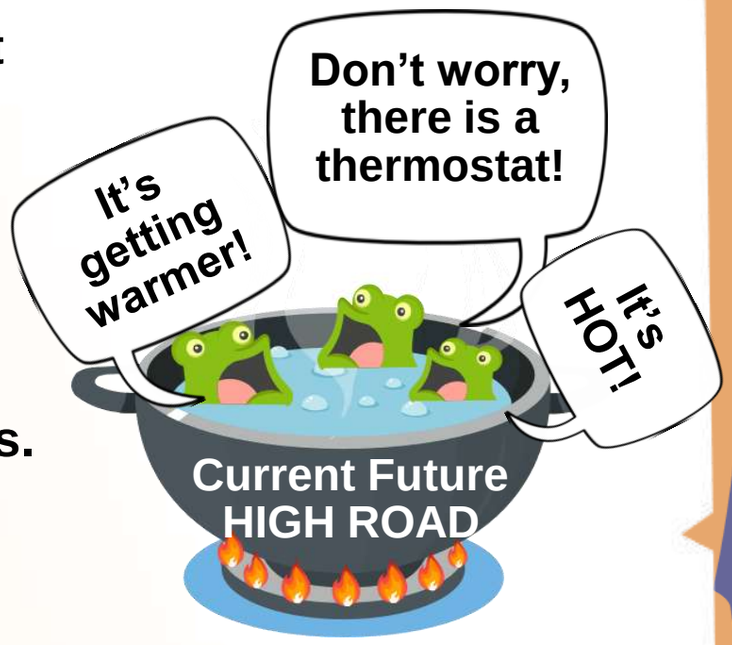
Current future scenarios are derived from projecting the current system into the future.

- **On the one hand the environment of a system will change and impact on it in different ways.**
- **On the other hand, there are different ways on how the system can respond to those changes.**

Exploring this can give rise to various alternative current futures. These alternatives are often summarised as two scenarios, namely as

- **HIGH ROAD of a lesser decline in which some driving forces within the system or in the environment make the situation better and mitigate the decline*, analogous to a thermostat preventing the water from getting too hot* and**
- **LOW ROAD of being boiled to death *(e.g. system collapse, disaster and anarchy).***

Of course, one can make more combinations to create more scenarios. However, one scenario that is not allowed is a *"Nothing Will Change Scenario",* because some things always change and create impacts. One could at best have a *"Trying to Keep Things the Same Scenario"* which explores strategies on maintaining the system as it is *(like bailing out banks to maintain the current finance system).*



NOTE: value-driven scenarios

A widely used method for creating scenarios is derived from systems thinking, which recognises that systems are part of a larger whole, as well as being a unique part.

This gives rise to the dual tendency of systems to pursue integration on the one hand and differentiation on the other.

Different values drive each tendency, such as centralisation versus decentralisation; collective versus individual; security versus freedom; cooperation versus competition; etc.

If one juxtaposes integration with differentiation, one gets a black versus white view of the world. This is demonstrated by the ideological divides of left versus right and capitalist versus socialist, which become increasingly confusing and inappropriate in the information age.

By comparison, the distinction between the high and low presence of a value creates immediately a more differentiated view of the world *(i.e. four possible scenarios),* while still remaining easy to understand without being simplistic.

INTEGRATION		
	SCENARIO 2 **high integration** **low differentiation**	**SCENARIO 4** **high integration** **high differentiation**
	SCENARIO 1 **low integration** **low differentiation**	**SCENARIO 3** **low integration** **high differentiation**
	DIFFERENTIATION	

***NOTE*: One can also use any two other values that are dominant driving forces in a system to generate four alternative scenarios.**

NOTE: value-driven scenarios *(continued)*

Scenario 4 maximises both values *(albeit each guiding different parts of the system)* and typically represents a more developed *(i.e. qualitatively rich)* system.

For example, if one uses this model to view society, one gets the four scenarios of a feudalist, socialist, capitalist and *(for want of a better word)* welfare society.

For example, in the post World War II period, some of the European democratic societies evolved a welfare state in which social security and individual freedom were well balanced and gave rise to rapid societal development and widespread prosperity. With the advent of neo-liberalism the integrative tendency was undermined by an one-sided emphasis on self-interest , while public goods were acquired by the wealthy few under the guise of privatisation. From a w/holistic perspective, this represents a decline in societal development *(i.e. a regress from scenario 4 towards scenario 1).*

INTEGRATION		
	SCENARIO 2 **high integration** **low differentiation** ***(e.g. SOCIALIST society)***	**SCENARIO 4** **high integration** **high differentiation** ***(e.g. "WELFARE" society)***
	SCENARIO 1 **low integration** **low differentiation** ***(e.g. FEUDALIST society)***	**SCENARIO 3** **low integration** **high differentiation** ***(e.g. CAPITALIST society)***

DIFFERENTIATION

NOTE: dialectics-based scenarios

A widely used method for creating scenarios in the context of a conflict situation is exploring the dialectics of power:

On the one hand, there is a status quo, which - on the other hand - is opposed by a force intending to overthrow it (*e.g. through a revolution).*

In the many the Marxist / Leninist / Maoist conflicts of the last century, this was typically likened to a conservative versus progressive power struggle. However, since the collapse of the Berlin wall, those fronts have become more murky. Nevertheless they can be explored by the same type of scenarios.

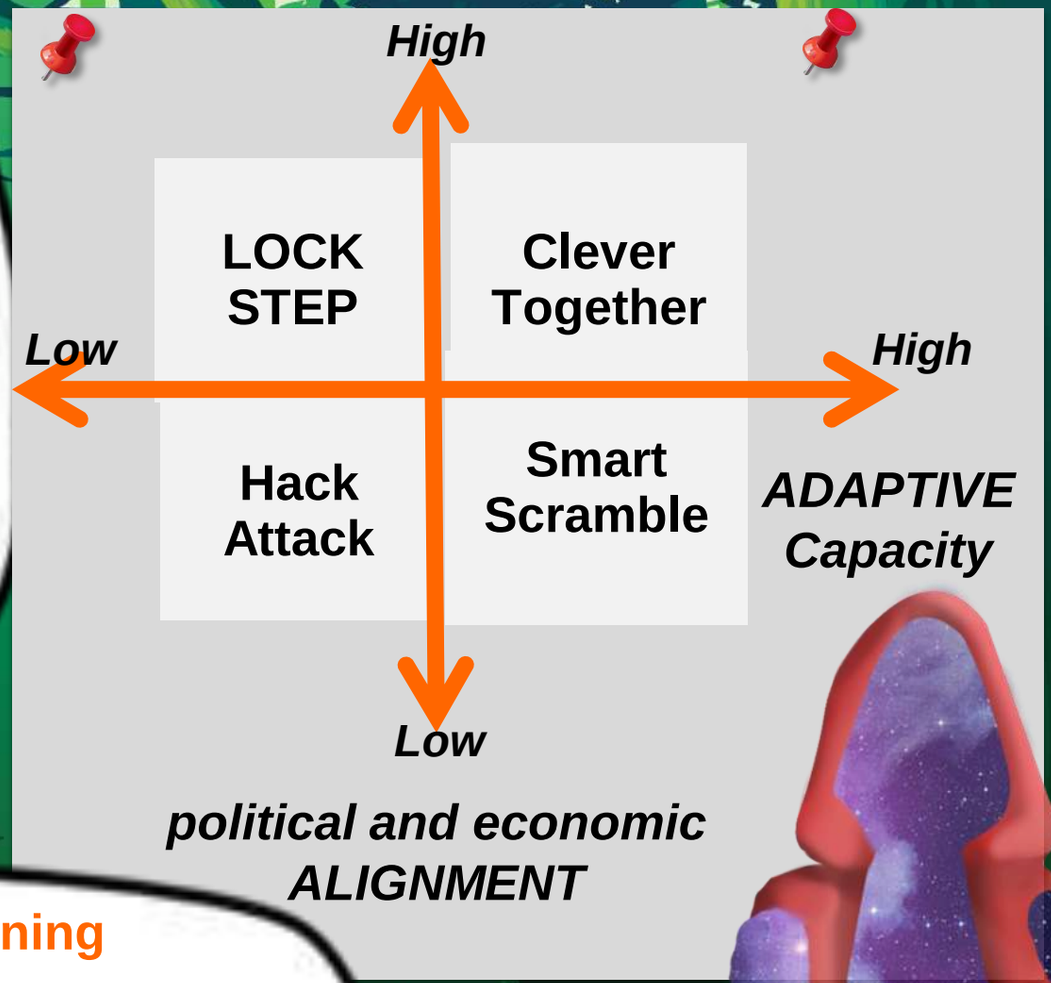
The third scenario is that of a synthesis: It transcends the power struggle by exploring the promotion of peaceful reconciliation and integration, whereby integration is an emergent property. This implies a transformed social order that incorporates aspects of the order promoted by each of the two opposing forces. An example of a *Transcending the Dialectics of Power Scenario* was the peaceful transition of South Africa which was negotiated and co-produced by the conflicting parties and which transcended the intended social order of both.

THESIS	ANTI-THESIS	SYNTHESIS
The forces that maintain the status quo dominate / succeed.	The forces that change the status quo (e.g. through revolution) dominate / succeed.	Transcending the dialectic power struggle through reconciliation between and integration of opposing forces.

A: Scenarios are widely used in companies as part of their strategic planning.

In the public domain there are the famous climate scenarios produced by the IPCC, which are derived from **statistical and mathematical modelling.**

An example of **value driven scenarios** were created in 2010, financed by the Rockefeller Foundation. One of the four scenarios *(i.e. the LOCK STEP SCENARIO)* has become especially famous since, because of its current relevance.



Q: Can you give some examples of scenarios?

Examples of some influential **planning scenarios** are:

- In 2017 the health ministers of the G 20 states plan measures and synchronisation of strategies in the event of a pandemic *(e.g. of a SARS virus).*
- In 2018 a Bio-Terror exercise was done in the USA, focusing especially on planning the role of the media in a pandemic.
- In October 2019, an international planning exercise took place in China on how to manage a potential C-Pandemic.

(Source: P. Schreyer)

This is worth reflecting on!

EXERCISE

Exercise 1: Inform yourself about the future of society and study some existing scenarios!

Exercise 2:
HAVE FUN!

1.Do some research:

We suggest that before attempting to create some scenarios for your case study system, do some research on scenarios in general.

You could, for example, explore the scenarios mentioned in the previous *Slide*.

2. Develop alternative scenarios for your case study system:

Reflect on what you have learned about your case study system so far. If your system is not changed, but carries on as in the past, what would your system be like in ten years?

Consider a best case *(i.e. High Road)* and worst case scenario *(i.e. Low Road- short of ceasing to exist).*

Describe your scenarios in a few sentences each.

3. Value-driven scenario *(optional)*

Determine which two values are dominant driving forces in your system. Then create four scenarios.

STEP 3: Brainstorm Solutions

step 3: brainstorming approaches

There are different approaches to brainstorm inputs for an ideal design, such as

- **blank slate brainstorming, which pretends that the system has been destroyed over night; that it is left with its physical resources and that one needs to explore how they can be reorganised in new ways. This approach opens the possibility for imagining ideas into completely new realms beyond anything discussed before *(although it is our experience that only few people are able to do this really well).***
- **problem-driven brainstorming, which consists of identifying the problems within each category of the framework and their co-factors and then processing them with the *(below explained) Frogs / Prince / Super(wo)men Method. (This method is transformative and inspires everybody to become creative)***
- **exploring existing solutions, which involves collecting existing solutions within the different categories of the framework. Stakeholders typically have solutions that have not been considered or implemented by the system, as you Kids experienced during your journey *(in Chapter 1).***
  Another good way to proceed is to look for proposed solutions by reviewing relevant TED talks and listening to online discussions and interviews with experts. *(See later examples.)*

step 3: brainstorming approaches *(continued)*

In praxis, one can combine those different brainstorming approaches in order to generate ideas for a design.

One can also iterate between those approaches, or start with any of them and continue with the others, or have different teams working in parallel with a different approach each.

The brainstormed information needs to be sifted, categorised and recorded in the *Design Notebook* of the sub-system that a specific idea refers to. *(See Step 4.)*

What all three approaches have in common is that they only generate various solutions and that no single one *(or even a group of solutions)* represents an ideal design *(as we will learn in Step 5).*

step 3: problem-based brainstorming

REMEMBER: There are problems that can be solved and others that need to be dissolved.

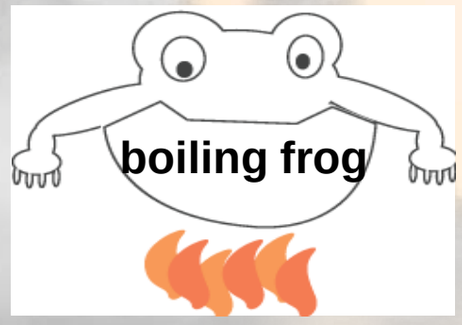
The more problems a system has, the more ideas you can generate to transform it!

To solve or dissolve a problem requires different kind of solutions.

Solving a problem implies "fixing" the problem *(e.g. repairing a car, or eliminate a mistake in an otherwise well functioning system).* The solution is derived from the logic according to which the system currently functions. It restores the system to its functioning before the problem occurred. The method for finding such solutions is root-cause analysis.

By comparison, problems that need to be dissolved, require solutions derived from a higher order logic. They cannot be found within the logic of the existing system. *By analogy, health is not found in the situation of disease.* Dissolving a problem requires a logic that transcends the problem. *By analogy, there are many different types of diseases, while creating health (which dissolves all disease), involves only a few strategies.*

The *Frog / Prince/ Super(wo)men* brainstorming method can assist in generating such transcending solutions. It uses the identified problem to jumpstart the search for higher order solutions.



step 3: problem-based brainstorming *(continued)*

Step 3 **of the methodology is concerned with brainstorming both types of solutions: solutions for solving, as well as dissolving problems.**

Also, many stakeholders have already solutions for current or anticipated problems that have not been considered or implemented yet. It is important to collect them and consider them as possible part of the design.

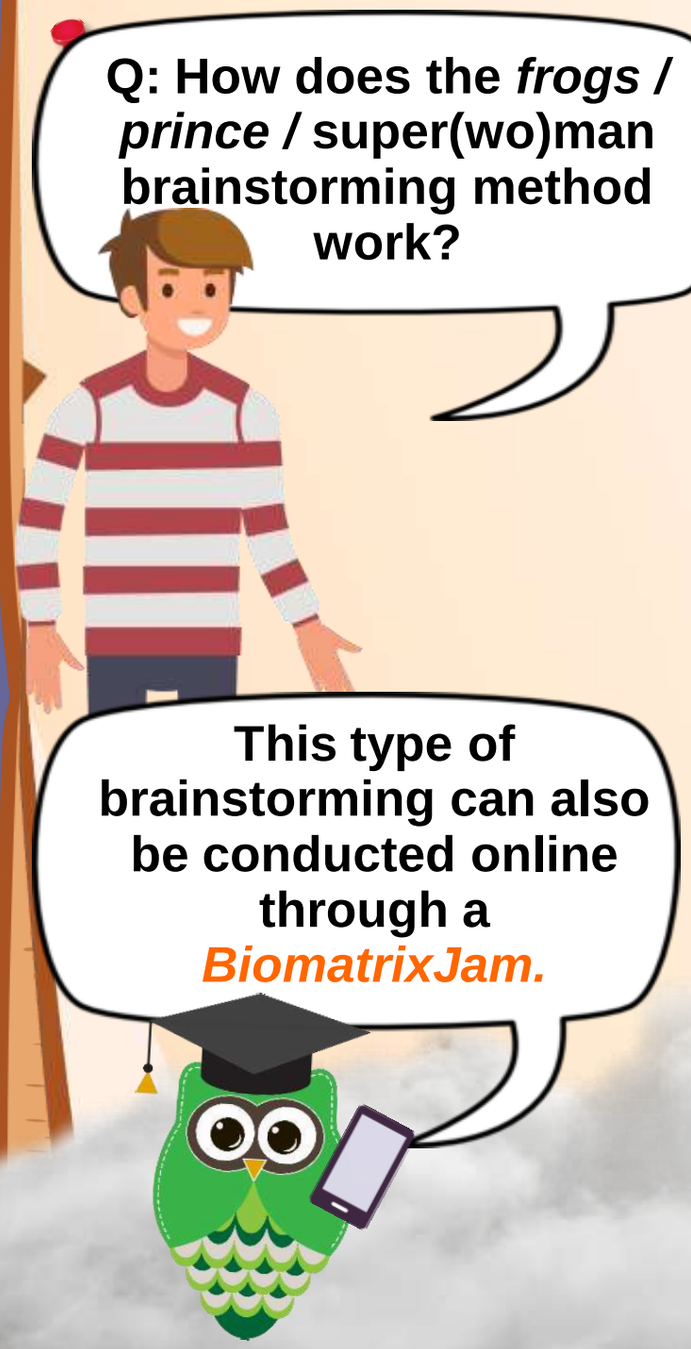
New and higher order solutions can be derived from the problems of the system by using the *frogs / prince / super(wo)men* brainstorming method. It automatically inspires the participants to think more creatively about the solution to a problem and prompts a transformative approach in dealing with a problem.

By applying this method to all problems and problem co-factors that were identified in step 2, a large number of innovative ideas are generated, of which many are associated with a higher order logic. *(See below for explanations on how to do this exercise).*

Of course, there are other brainstorming methods that can be used to generate ideas for specific aspects of a design. For example, we find a past failure analysis very useful. It involves identifying the most important failures in the history of the system, then determining the co-factors that gave rise to the failure and then process them with the *frogs / prince / super(wo)men method.*

Likewise a past success analysis can contribute useful ideas. It involves identifying the biggest successes of the system in the past and determining the success co-factors. Then one can brainstorm how they can be amplified and incorporated into the design. Although those ideas are derived from the current logic of the system, they can nevertheless contribute to a transformation if applied in new ways or a new context.

step 3: problem-based brainstorming *(continued)*



A: This is how to do the *frogs / prince / super(wo)man* brainstorming exercise

FROG *(i.e. problem):*
Regard each of the problems and problem co-factors that you identified in *Step 2* as a frog that needs to be transformed into a prince.

PRINCE *(i.e. ideal):*
"Kiss" each frog into a prince *(as the fairytale suggests - see following Slide)*. Or, in ordinary language: Transform each problem and problem co-factor by asking what is the IDEAL that I would like to put in the place of this problem situation.
(NOTE: We are NOT asking how to solve the problem!).

SUPER(WO)MEN *(i.e. strategies):*
Then for each ideal determine at least three courses of actions *(or strategies)* that will move the system towards this ideal.

MEASUREMENT *(i.e. performance evaluation and criteria):*
Then determine the evaluation procedure and criteria for measuring progress towards the ideal in order to find out if the strategy works as intended.
One can also determine specific criteria for each strategy.

RESPONSIBILITY *(i.e. actors):*
Then determine which stakeholder is responsible for each strategy.

step 3: problem-based brainstorming *(continued)*

A: In the fairy tale of the *Frog King* by the *Brothers Grimm*, the princess (*your creative self*) KISSES the FROG (or problem - *remember the boiling frogs?)* and thereby TRANSFORMS the frog (*the problem*) into a PRINCE (*the ideal*).

Q: What fairytale are you talking about?

... as problem solvers we do something like this ... ...we engage with the problems ….. ... SMOOOOCH!

...the more problems a system has, the more opportunities it has to transform itself ... smoooooch!

ONE CANNOT TRANSFORM A PERFECT SYSTEM!

step 3: problem-based brainstorming *(continued)*

A: Take for example the case study of health:

Problem (FROG): ***"I am frequently sick and pick up all the diseases that go around)***

PRINCE (Ideal): "GLOWING HEALTH"

SUPER(WO)MEN (Strategies):

- ***eat more healthy food***
- ***exercise more***
- ***take some supplements to strengthen the immune system***
- ***do stress management***
- ***do specific prevention***
- ***practice hygiene***
- ***have a positive attitude***
- ***(and similar superwo/man stuff).***

Measurement of success:

- ***number of times being sick***
- ***severity of the disease.***

SUGGESTED EXERCISE

Go back to your previous exercises and select one problem and its three co-factors and "kiss" them into princes.

Then design at least three strategies *(super(wo)men)* which will lead you towards the ideal!

step 3: problem-based brainstorming *(continued)*

A: The prince from the fairy tale represents an ideal.

Once we have identified the problems or frogs of the current system, we brainstorm the transformation of each problem into the ideal or prince we would like to have instead of the problem, *such as replacing the problem of DISEASE with the ideal of HEALTH.* A prince describes what the system should ideally be. It represents the ideal future of the system.

Why IDEAL?

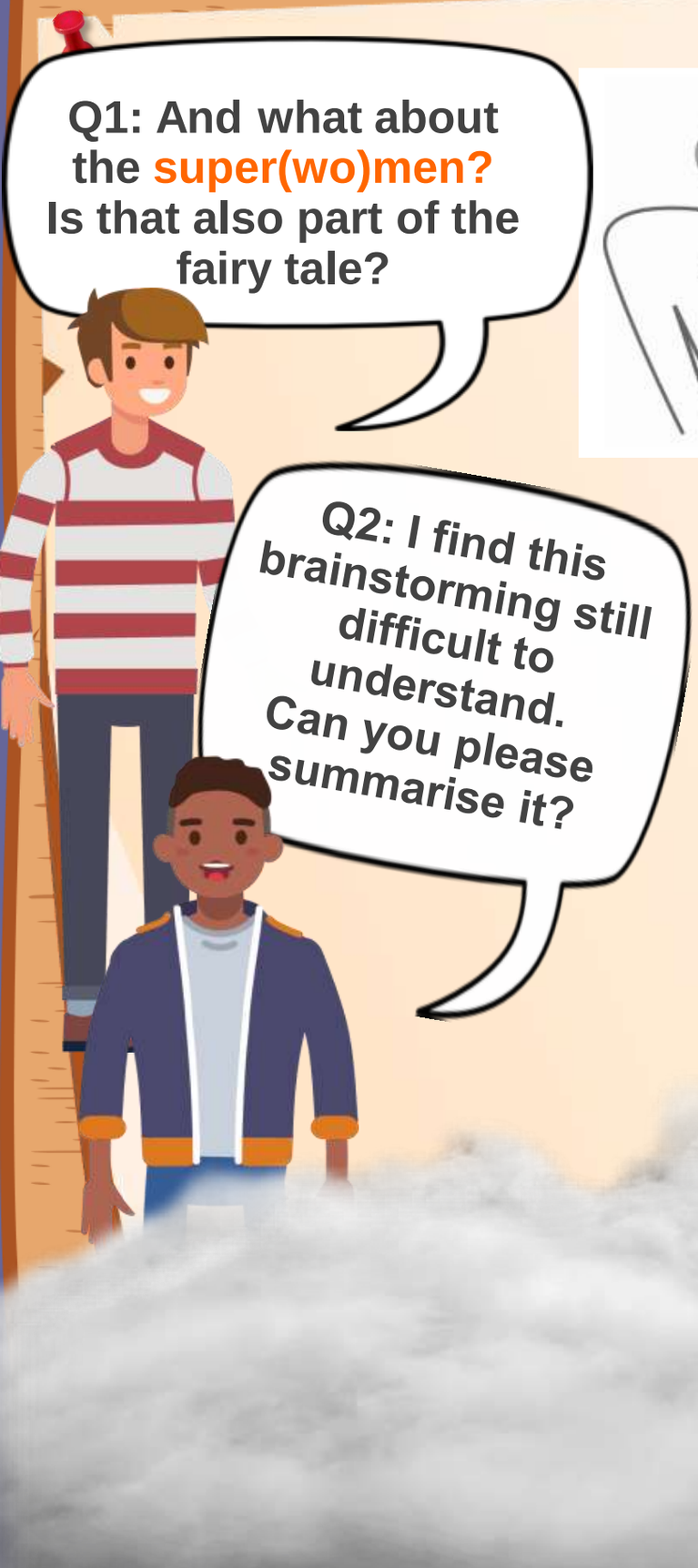
According to the dictionary, an ideal cannot be achieved. It can only be approximated. This implies that we can move towards the ideal forever *(e.g. we can get more and more healthy, beautiful and loving and our political systems can become more and more just and transparent).* The ideal is eternally valid and keeps inspiring us!

Thus, if we strive for an ideal, we can continually improve our personal life and social systems. The ideal keeps guiding us. And as circumstances change, the same ideal can be reinterpreted into different outcomes and give rise to different behaviours and systems.

LOW LEVEL IDEALS GIVE RISE TO MEDIOCRE SYSTEMS!
Therefore have LOFTY ideals!

.... and so the princess kissed all the frogs, one after another and transformed them into princes ... thinking up really royal ones *(based on high level ideals)*, not merely low level princelings ...

step 3: problem-based brainstorming *(continued)*



A1: No, the super(wo)men are not part of Grimm's fairy tale. We have some mixed tales here. Or let's say we update the fairy tale:

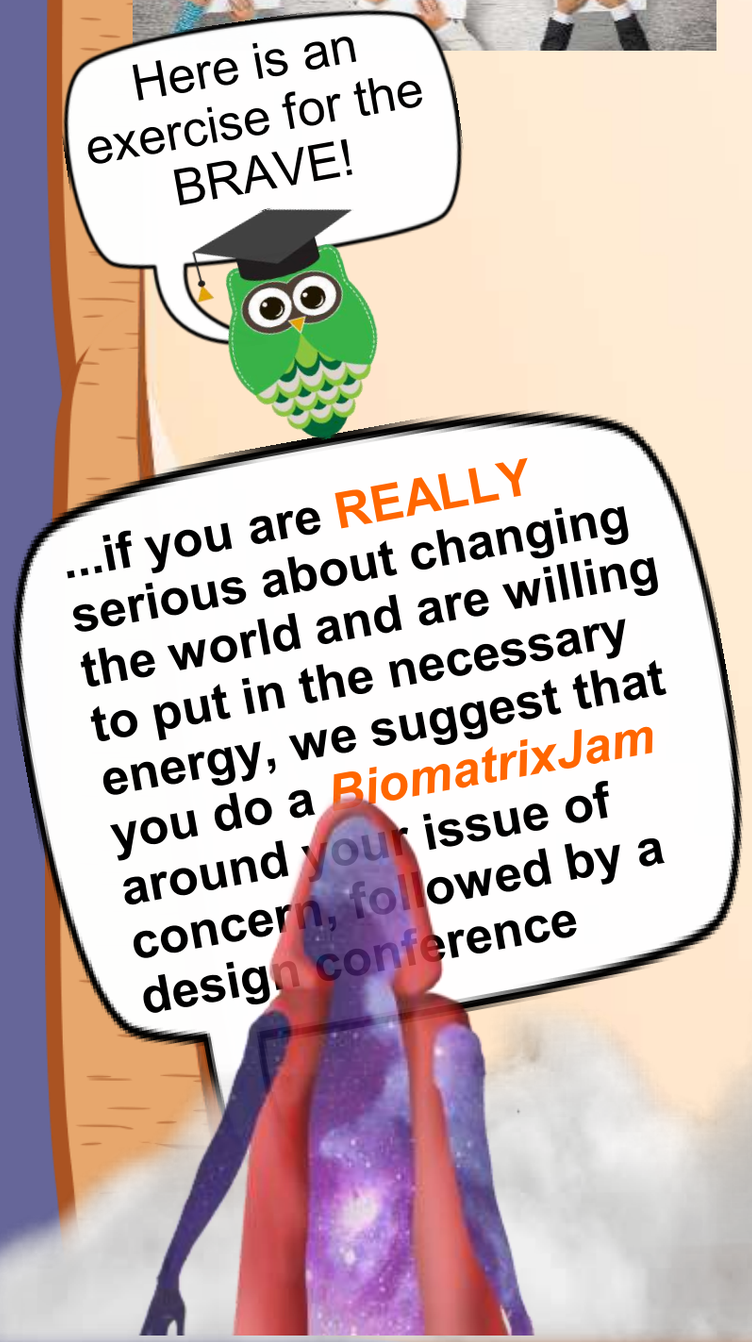
... the princess marries the prince *(of course)* and they live happily ever after in their kingdom, which is served by super(wo)men and therefore gets better and better for all its citizens, who also live happily ever after...

SUMMARY OF THE BRAINSTORMING METHOD

A2: Each problem (*which we call frog*) can suggest an ideal (*flippantly called prince*) with which we would like to REPLACE the problem. *For example, one would like to replace the problem of disease with the ideal of health, ugliness with beauty, injustice with justice, poverty with wealth, conflict with peace, etc.*

Each ideal needs several strategies or courses of action to bring it about. It emerges from the co-production of different actors *(or stakeholders)*, just as a problem has various co-factors from which it emerges.

NOTE: BiomatrixJamming



The *BiomatrixJam* is a tool that facilitates the online participation of a large number of stakeholders in:

- ***STEP 2:*** **identifying the problems they have with the system and each of its sub-systems and and identifying and analysing the problem co-factors**
- ***STEP 3:*** **contributing existing solutions and brainstorming new ones**

HOW is jamming done?

A *Biomatrix Jamming Facilitator*

- **determines the framework for the jamming issue *(i.e. the system and its sub-systems, as explained in step 1 of the methodology).***
- **prompts a least one experts of each (sub)system to fill in the *Biomatrix Brainstorming Questionnaire* which is designed to execute steps 2 and 3 of the methodology. *(The questionnaire is made available during the training of Biomatrix Jamming Facilitators.)***
- **populates the framework with this information and posts it ONLINE in order to invite widening circles of stakeholders to provide additional information.**

NOTE: **You could also consider *BiomatrixArtJamming (see the music industry example on www.biomatrixweb.com in the gallery section).* Even if people are not experts and cannot contribute problems or solutions to a system inquiry, they can nevertheless select pictures to illustrate them.**

The output of an art jam can be used to raise awareness through an exhibition *(e.g. for conferences, or in public spaces).*

Q: You mentioned that we should also collect existing solutions.

Can you say more about this and give examples?

A: In *Step 2* of the methodology the stakeholders are asked to identify the problems in the sub-system and categories of the framework *(generated on Step1)* that are relevant to them. Likewise, in *Step 3* they are asked to contribute existing solutions, besides brainstorming new ones, based on the problems they have identified.

Concerning examples of such solutions, let us summarise those that the experts proposed during your journey in *Chapter 1. (See the following Notice Boards.)*

Why not add some more solutions from other sources?

step 3: exploring existing solutions – examples

Suggestions for an ideal EDUCATION SYSTEM include:

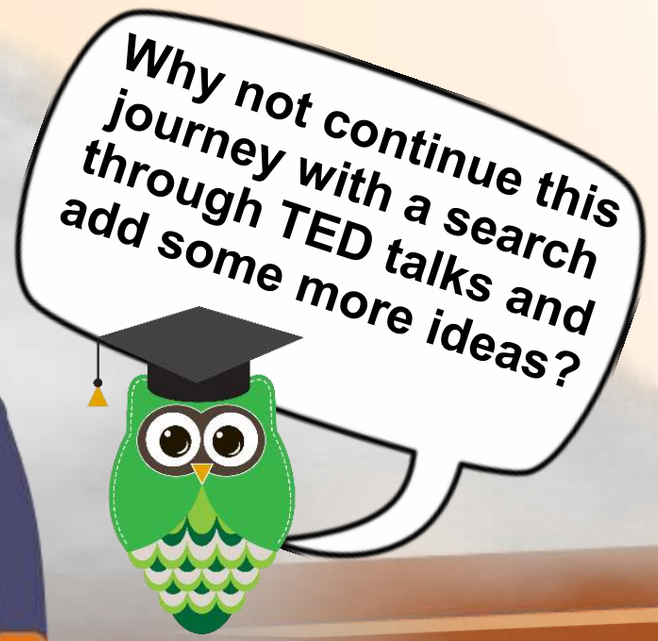
- **a curriculum that provides both, generic and standardised knowledge, as well as opportunities for developing the talents of the individual learner**
- **teaching and learning programmes that encourage connectivity and synergy through interaction with fellow learners, learning coaches and specialised subject teachers**
- **Involve off- and online, self-managed, team-managed and conventional approaches, as well as some learning from teaching**
- **incorporate rote-learning as well as investigative and creative learning**
- **alternate teaching of theory and applying it through action-learning**
- **provide an overview of the various scientific disciplines and**
- **guide learners to research specific issues that interest them within and across disciplines**

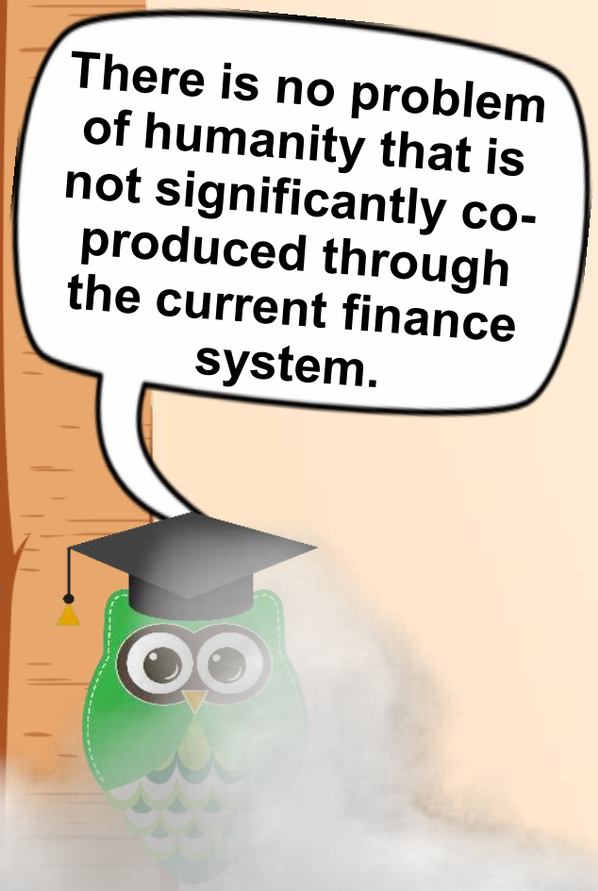
NOTE: **Please remember: A list of ideas and solutions is NOT a design yet!**

step 3: exploring existing solutions – examples *(continued)*

Suggestions for an ideal EDUCATION SYSTEM *(continued)*:

- **promote the integration of knowledge in frameworks to teach multi-dimensional and multi-level thinking and how to establish multi-and trans-disciplinary *(interactive)* databanks**
- **develop analytic and logical as well as creative and intuitive thinking and how to deal with paradox *(i.e. unity and diversity)***
- **incorporate consciousness techniques *(e.g. meditation)* to facilitate a learner's direct cognition of knowledge associated with different levels of consciousness, besides deriving other physiological, emotional and mental benefits from it**
- **a structure that allows learners of the same age to share a classroom in some subjects suitable for this, while also attending some subject specific classes according to their ability and degree of advancement, together with learners who have reached the same knowledge level, whatever their age**
- **amongst many other ideas...**





The FINANCE SYSTEM could be transformed by utilising the enormous computing power to facilitate economic exchange and determine economic value.

Ideally the system will not be based on debt, or compound interest, but will be linked to the actual value of the physical economy *(as suggested by some researchers).*

We noticed that discussions on finance do not sufficiently distinguish between the different sub-systems of finance:

(1) the exchange of goods and services and establishing their value

(2) wealth storage

(3) investment in the production of goods and services

(4) financial trading of

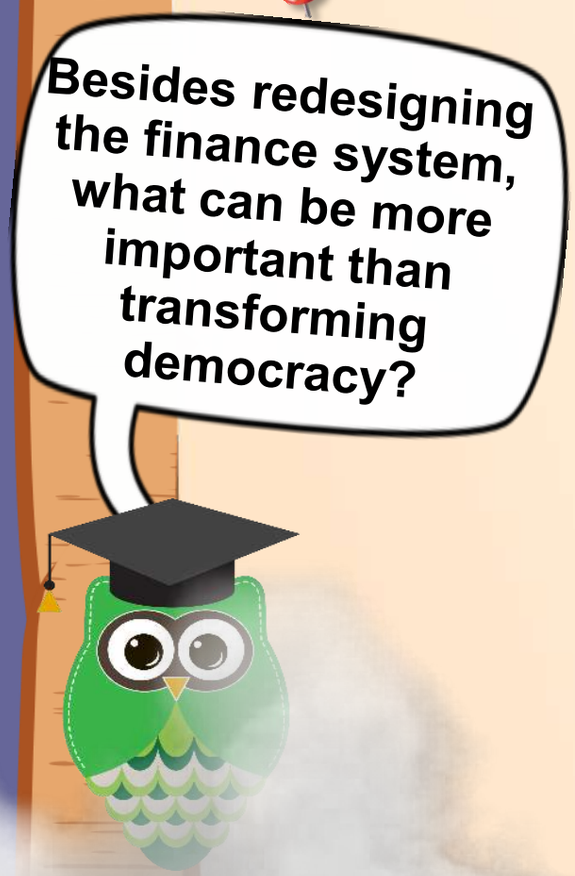
(4a) investments in the physical economy and

(4b) financial derivatives *(i.e. speculation).*

Moreover, each of the sub-systems has its own sub-sub-systems, even if some of them are executed by one *organisation (e.g. a bank).*

Because of this failure to distinguish, it is insufficiently recognised that the analysed problems and proposed solutions typically relate to one sub-system and not to others. This conceptual mess perpetuates the mess in the physical economy.

step 3: exploring existing solutions – examples *(continued)*

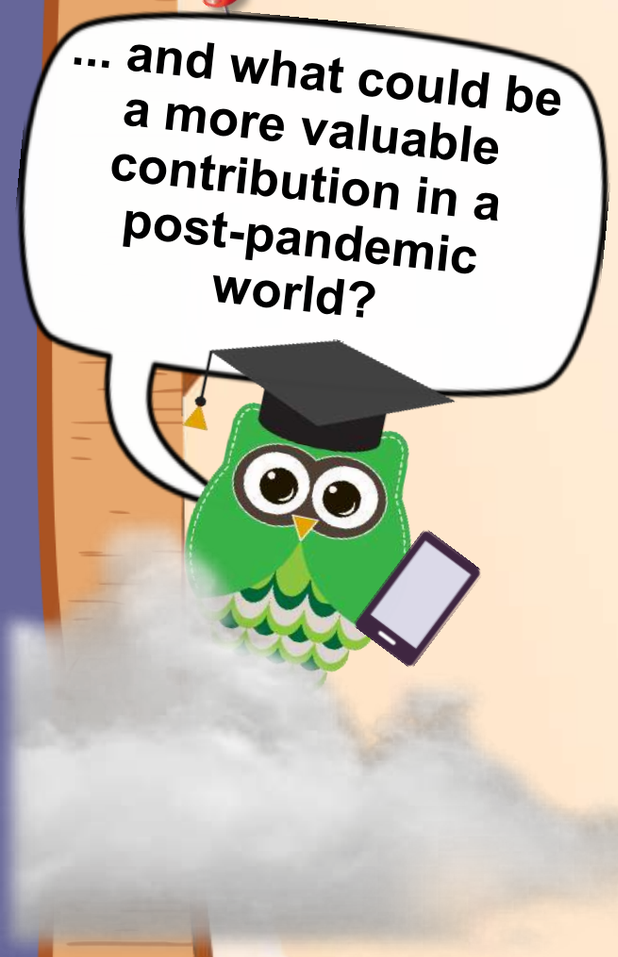


The DEMOCRACY SYSTEM could be transformed into a *W/Holistic Participatory Democracy* in which the citizens have a voice and a vote.

- **VOICE: Citizens, as stakeholders of a system (*such as education, energy, health-care, transport, nutrition)* are directly involved in its governance through forming function-specific governance bodies. They are supported by online policy jams that allow inputs from concerned citizens. Moreover, the governance of each function requires a user-friendly, interactive and w/holistically organised knowledge repository (or databank) that guides public discourse and ensure a transparent policy design.**
- **VOTE: All citizens can choose directly between alternative policy designs and decisions of strategic importance through a referendum or plebiscite.**

(See also the *Biomatrix Cartoon Curriculum in W/Holistic Participatory Democracy* in which we explain the generic w/holistic governance principles according to *Biomatrix Theory* and apply them to democracy.)

step 3: exploring existing solutions – examples *(continued)*



The HEALTH CARE SYSTEM could be transformed by a shift in WORLDVIEW from fighting and preventing specific diseases to a system that promotes and maintains health and thereby prevents all disease.

This could include a focus on strengthening the immune system,

This worldview would recognise the co-production of health by a more healthy lifestyle, supplementation of vitamins and minerals, stress management, enhancing emotional well-being, meditation, balancing subtle energies, *etc.* and other ways to strengthen the immune system.

Likewise, this worldview would recognise the co-production of disease by many co-factors from a person's outer environment *(e.g. pollutants, radiation)* and inner environment *(e.g. genetic predisposition, stress, negative emotions)*.

Why not explore the possible impacts of the in-formation age on maintaining health, as well as dealing with disease and managing the health-care system? *(See also later discussion in Part 7 on the digital, biological and consciousness phases of the information age.)*

Why not explore the scientific research on subtle energy bodies and the role of information fields in maintaining health or co-producing disease? And what about research on the efficacy of energy medicine *(ranging from the more traditional approaches of acupuncture and homeopathy to the diagnosis, prevention and treatment with electro-magnetic frequencies, photon and quantum field approaches, etc.). T*he transformation of the current disease-care system into a truly health-care system is likely to come from this kind of research *(and not merely from more digitalisation of the current system or genetic manipulation).*

step 3: EXERCISE

CONTINUE WITH YOUR CASE STUDY SYSTEM:

- ***Existing solutions:*** **Identify existing solutions (at least two) that you are already aware of and find out if they fit as strategy under one of your ideals. If not, formulate an ideal for it.**
- ***New solutions:*** **Do the *frogs / prince / super(wo)man* exercise for each of the identified problems and problem co-factors by**

  - name the IDEAL that you would like to put in the place of each of your previously identified frogs *(analogous to replacing disease with health)*

  - find at least three STRATEGIES that would co-produce the ideal

  - determining success CRITERIA for achieving the ideal, as well as criteria that measure the progress of each strategy towards the ideal

  (TIP: Complete one problem and co-factor at a time before moving to the next!)
- ***Categorise solutions:*** **Name who is responsible for each strategy and categorise the strategies according to the responsible stakeholder!**

BE CREATIVE!

Be LOFTY with your ideals *(mediocre ideals produce mediocre systems!).* Make sure that your strategies are COMPREHENSIVE *(that there are enough strategies to co-produce the ideal)* and REALISTIC *(that they are within the current abilities and resource availability of the system).*

STEP 4: Compile a *Design Notebook*

step 4: compile a *Design Notebook*

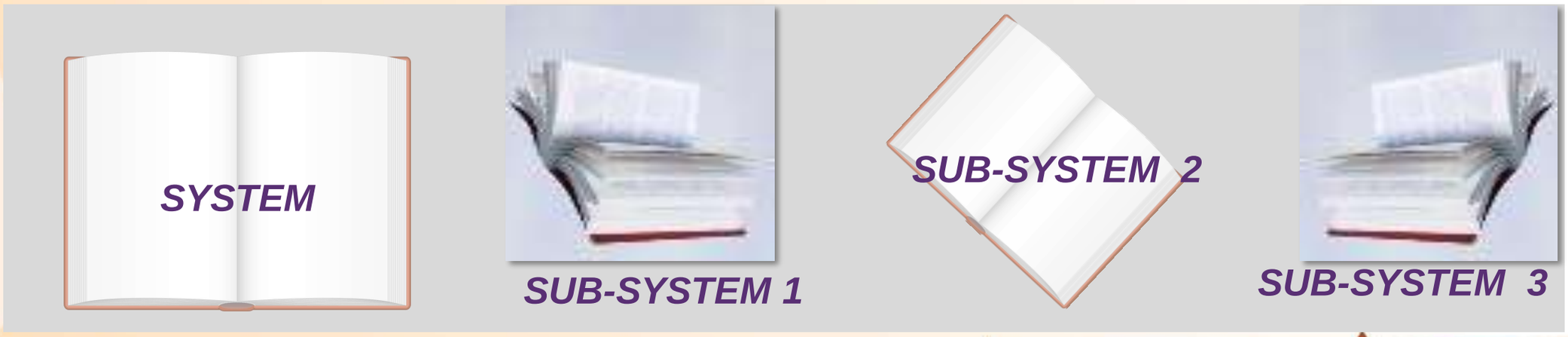
What is *a Design Notebook*?

A *Design Notebook* is a temporary databank that contains the information that a design team needs to have in order to be able to make a creative, yet viable design.

It contains the output from Step 2 (problem analysis) and *Step 3 (brainstorming),* as well as other relevant information about the current state of the system and its history.

It presents the information in an organised manner *(i.e. within the categories of a framework).*

There is a notebook that contains the information for the system as a whole, as well as a notebook for each sub-system *(or a chapter for each sub-system in a shared notebook).*



step 4: compile *a Design Notebook* *(continued)*

Why is a *Design Notebook* needed?

1. Because one deals with large numbers of ideas

If you identified 10 problems with 3 co-factors each, you already have 40 frogs *(from Step 2).*
With one ideal and 2-3 strategies for each of them you will have more than 100 strategies or proposed solutions *(from Step 2).*
If you are dealing with a large system *(such as the education or electricity system of a country)*, you deal with many more problems and proposed solutions.

2. Because one needs to sift through the information.

Depending on the method of collection, there will be more or less duplications of ideas that need to be eliminated. Also, there will be overlapping or too densely expressed ideas that need to be separated and related ideas that can be integrated into one overarching one.

3. Because the information must be redistributed

Both, the problem co-factors, as well as the strategies / solutions for co-producing an ideal belong to different stakeholders *(i.e. sub-systems)* and need to be redistributed to them.
Each sub-system needs to know the proposed strategies it is responsible for and should consider in its design. *(For purpose of clarification, the ideal and problem that gave rise to it are dragged along.)*
Thereby, each sub-system has its own notebook that contains only that information relevant to that specific system.
(*NOTE:* Because sub-systems belong to different levels in the containing systems hierarchy, the information is automatically redistributed to the relevant level.)

4. Because the information needs to be categorised.

A workable *Design Notebook* needs to contain information that is organised in a useful manner*.*
(See following NOTE.)

NOTE: categorising information

Categorising the information in the *Design Notebook*

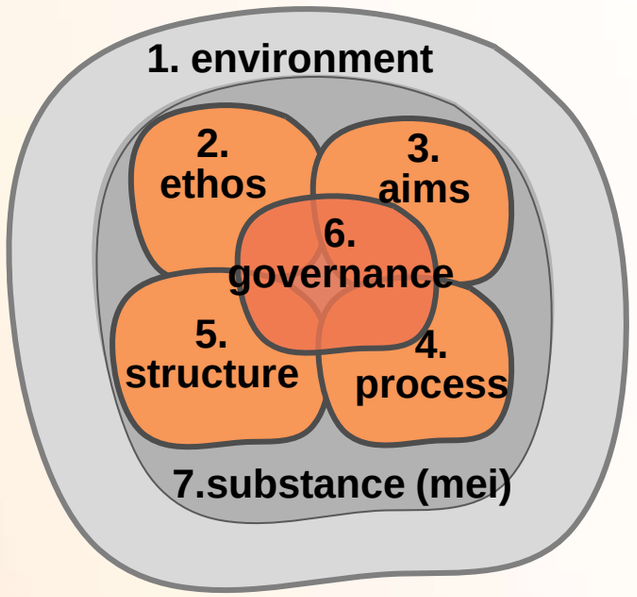
The *Design Notebook* of a system or of any of its sub-systems already contains the information that was redestributed as being relevant to it.

This information needs to be further categorised, whereby different ways of categorising are possible. We have found the following useful:

- **The problems and problem co-factors from *STEP 2,* as well as current system related information should be allocated to the dimension they belong to.**
- **The brainstormed strategies and collected solutions from *STEP 3* can be grouped according to the organisational category they best fit into. This organisational framework is also used for creating the ideal design. Thereby the notebook makes the information available to the design team in a user-friendly way.**

NOTE: As a brainstormed strategy is allocated to a specific category, the ideal and number of the problem that gave rise to it are dragged along. This allows the design team to check the context which gave rise to that strategy)

MULTI-DIMENSIONAL CATEGORIES



ORGANISATIONAL CATEGORIES

Q: We still don't quite understand the reason for redistributing information to different *Design Notebooks*. Can you explain this a bit more?

A: OK, so let me explain this differently:

If you have done the co-factor exercises properly, you will have noticed that the co-factors of most of the problems experienced by the system you want to redesign, are co-caused by other systems. Simply put, your system is the "victim" of the impacts caused by other systems *(i.e. the problem co-producers).*

To solve its problems, your system needs to persuade the problem co-producers to change their behaviour.

In many cases the co-producers are not even aware that the co-cause complex problems in other system.

Through a co-factor analysis those impacts on other systems are identified and through the notebooks this information is distributed to the co-producers so that they can deal with it.

By inviting the co-producers to participate in a co-design of your system, you have a great opportunity to explore win / win solutions for all.

Q: Do you actually mean a real book, when you speak of a Design Notebook?

A: Not necessarily. It could of course be an online databank.

Although it can be useful to have a hard copy to be able to quickly page through and add notes during the design conference.

Q: You said that a Design Notebook is a temporary databank. What about permanent ones?

A: After a system has been redesigned, much of the information that was considered for the design is not relevant anymore *(other than keeping it for reference purposes).*

At the same time, any public issue *(e.g. like a pandemic, or climate change)*, as well as a public function and industry should have a permanent databank that contains information relevant to the ongoing governance and development of the issue / system.

Such a databank could be something like an *Issue / Function / Industry Wikipedia*, only more transparent and organised according to generic w/holistic categories *(as in a Design Notebook).*

Thus, after the redesign of a system, its *Design Notebook* could become the foundation for a permanent databank of the transformed system. And even before a system is being transformed, such a databank could be established to inspire thinking about it and eventually changing it.

NOTE: the functioning of a *W/Holistic Participatory Democracy* depends on a well-structured public discourse, which needs to be in-formed by relevant and reliable data.
As we will explain in more detail in the democracy curriculum, the establishing and maintaining of such databanks is the responsibility of the according Executive Government Department and its associated *Stakeholder Forum.*

STEP 4: EXERCISE

1. CATEGORISE

If you have done the previous exercises you will already have done some categorisation of the information.

Review it and compile a *Design Notebook* from it.

NOTE:* Our suggested categories are for large system redesigns and may be an "overkill" for your case study system. Maybe a categorisation according to stakeholders may be more appropriate for it. Also, you may not yet be sufficiently familiar with the organisational categories! *(Just do your best!)

2. REFLECT

Reflect on what you learned from the categorisation and write it down in a few sentences.

STEP 5: Ideal System *Design*

Q: WHY do we need a DESIGN?

In step 3 we identified existing solutions and brainstormed new ones.

Is that not enough?

A: OH NO!

As we have already mentioned, a list of strategies and solutions is not a DESIGN!

Just remember the patched together car!

A patched together car?

Read on!

step 5: system design - *introduction*

A *SHOPPING LIST* of to do and nice to have items is NOT a design.

On the contrary, introducing solutions that are aimed at improving only one part of the system without considering to change others also, is likely to make the whole system incoherent and inefficient.

The more solutions we introduce into a system that are not part of a larger design, the more patched up and problem riddled the system becomes.

Just read the following famous story of the BEST CAR IN THE WORLD!

step 5: system design – *introduction* *(continued)*

Russel Ackoff, a famous systems thinker, used the example of a car to illustrate this as follows: Imagine you take the best features of the best car models that are on the market and combine them into one car with the aim of making the best car in the world. Will you get the best car? No! Instead of a best car you will get a very sub-optimal one *(if it drives at all!*). Why? Because "the parts don't talk to each other", as one of our students formulated it.

Yet, this is exactly the way we try to improve our current systems: with lobby driven, patched together policies.

And sadly, the current management paradigm educates managers in this partial change approach which emphasises the self-interest of economic actors *(e.g. maximising profit and efficiencies)* and perpetuates the fallacious assumption that the sum-total of self-serving producers will give rise to a common good.

We regard management education as being a MAJOR co-producer of the world's complex problems! It URGENTLY needs a transformation based on a w/holistic paradigm! We therefore

- **invite all graduates of MBA programmes to do the *Biomatrix courses as a Post–MBA Programme* and then**
- **facilitate a *BiomatrixJam,* or participate in one for creating an ideal design of management education!**

Q: So HOW do we design the BEST car in the world?

...or the BEST education or health care system...?

...or the BEST finance or whatever system...?

A: We have to make an IDEAL design of the system as a COHERENT WHOLE, based on

- the seven forces of system organisation as the theoretical context and
- a w/holistic ethos.

(See following Notice Boards for more information on each of these points)

step 5: system design - *IDEAL based*

A: Remember, an IDEAL is an aim that, by definition, cannot be achieved *(or only temporarily, like the beautiful moment which slips away as soon as it is experienced)*. But one can approximate an ideal forever and it can inspire forever!

An ideal design is created around a core ethos which determines the purpose of the system as an ideal outcome *(i.e. what it wants to do and achieve) and guides behaviour (i.e. how it should act)*. For example, the aim of the public media should be to provide truthful and factual information *(i.e. as "what")* in a free and transparent manner *(e.g. as "how")*.

An ideal design can give rise to different strategies (*i.e. courses of action)* with which to approach it. If the environment changes and the planned way of approaching the design becomes impossible, one can choose a different strategy. For example, the media can do their own research, select from research done by others, or invite the public to report on issues of importance to them, amongst other strategies. Thus, while the ideal remains the same, the path to approach it can change.

See the following examples of ideals that we would suggest that some of our societal systems should pursue. *(You may, of course, prefer other ideals!)*

***NOTE:* An ideal design is not a detailed plan, but a set of broad ideas that can give rise to different plans, according to different circumstances at different times!**

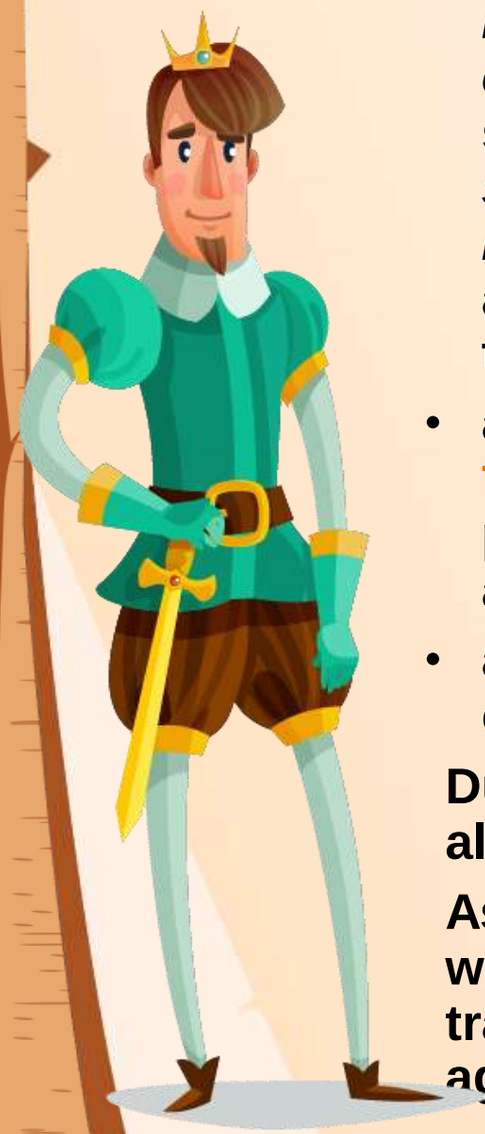
step 4: system design - *IDEAL based (continued)*

For example, if our social systems were designed to pursue ideals, we would have

- **MEDIA that are guided by truth *(informing about facts and their context, instead of producing a-contextual bits of news, propaganda, or partial, fake and gap news)* as well as freedom of speech *(presenting diverse interpretations and opinions of different stakeholders, instead of censoring opinions that do not fit the mainstream agenda)* and transparency *(who says what)***
- **a HEALTH system that is focussed on health *(preventing disease and creating health)*, instead of fighting disease with unhealthy means *(death from medical treatment is the third highest cause of death in the USA!)* and that emphasises personal choice and responsibility regarding one's health**
- **an EDUCATION system that is guided by development, whereby the potential of each learner is developed, catering for their unique interests and talents *(e.g. allowing learners to move through education according to their own pace and interest, instead of shepherding them through a standardised system that delivers the same subject knowledge to the same age group and thereby being too slow for the learners talented in a subject and too fast for learners with less interest and ability regarding a subject; in both cases, this retards the development of the learner*);**

and at the same time ensuring that all members of a society share some collective knowledge in pursuit of a desirable societal development;

step 4: system design - *IDEAL based (continued)*

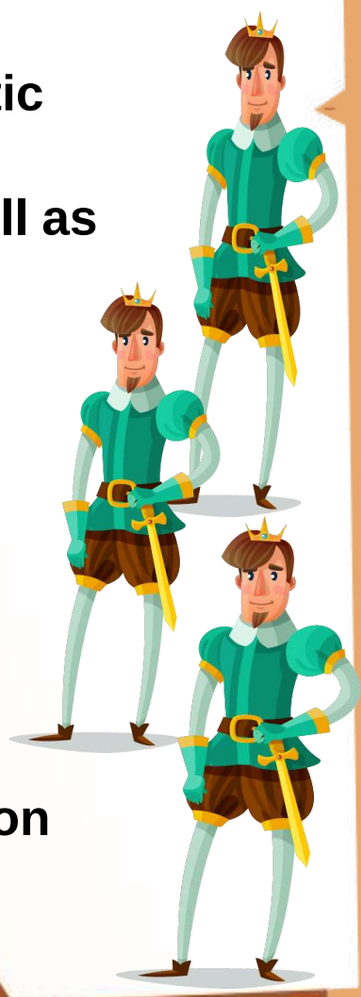


And an education system that is also guided by truth, which on the one hand develops rational thinking and teaches the scientific method *(e.g. knowledge and skills for acquiring needed and relevant information, evaluate its truth, contextualising it, create meaning, consider impacts)* and on the other hand presents relevant knowledge such as overviews of scientific disciplines *(i.e. to allow learners to search for, contextualise and evaluate more detailed content knowledge from the media and online sources), and*
an education system that develops both, reductionist and w/holistic thinking in order to be able to deal with growing complexity.

- **a SCIENCE institution that is guided by the pursuit of truth, as well as freedom of research, instead of being forced by economic and political interests to produce profitable solutions and ideological agendas.**
- **and so on....whatever ideals and strategies we COLLECTIVELY come up with**

During the industrial age, these systems were more coherent and aligned with the realities of their environment.

As the information age proceeds, changes are made to the systems which make them increasingly incoherent. They need to be transformed to become appropriate for the realities of the information age, guided by desirable IDEALS.



step 5: system design - *COHERENT whole*

A: Coherence implies that the parts of a system *(i.e. the sub-systems)* interact with each other in such a way that they "hang together", reinforce each other and co-produce the desirable outcomes of the whole system with optimal functioning.

Think of the previous example of the patched together "best" car and compare it with the appearance and performance of just about any newly produced car. The difference between the two types of car is COHERENT DESIGN!

Likewise, our current problem riddled finance, education, transport, health-care, energy and other systems are legacy systems of the industrial age with more and more solutions patched on, whereby each solution seems to make the mess bigger.

Although patched up systems may still function *(like a patched up car can still drive)*, their performance is sub-optimal and problematic and often hugely resource intensive. However, the main problem of those systems is that the fragmented solutions *(be they good or bad in themselves)* make the whole system more problem riddled. Their "disease" is not lack of "treatment", but that the treatment does not produce health. It does not improve the system to become a thriving, vital and coherent whole.

To transform a sub-optimal system and make it a coherent whole that performs optimally, requires

- **FIRSTLY, its redesign based on Seven Forces of Organisation and**
- **SECONDLY, the cascading of the ideal design into all parts of the system.**

step 5: system design - *SEVEN ORGANISING FORCES*

A: Briefly, the seven forces that co-produce the organisation of a system are the following:

1. ENVIRONMENT: This force deals with the impact that the environment and its systems have on the specific system that is being redesigned. *(This force is explored through the method of environmental scanning.)*

2. ETHOS: Ethos refers to the field of in-formation *(such as worldview, values, beliefs)* that determines the form and function of a system. *Examples are the DNA of the organism, character of a person, culture of society and the laws of nature.* In the context of a design the ethos refers to the system specific values and beliefs that shape the design and give rise to its aims.

3. AIM: Aims describe what the system wants to do and achieve *(e.g. the mission, vision, objectives, goals and strategies of the system).*

4. PROCESS: Process is concerned with the flow and transformation of substance *(or mei, short for matter, energy and information "things")* within a system. *(Transformation of mei means processing mei input into mei output as intended product and un-intended by-product.)*

step 5: system design - *SEVEN ORGANISING FORCES (continued)*

***5.* STRUCTURE:** **Structure outlines the configuration *(i.e. the arrangement)* of substance *(i.e. of acting and support mei, such as machines, buildings, equipment, as well as workers and managers)* with which the processing is done.**

6.* GOVERNANCE:** **Governance describes how the performance and development of a system needs to be "steered" into a desirable direction and refers to activities such as planning *(e.g. setting aims*) and regulating (*e.g. ensuring that aims are achieved).

7.* SUBSTANCE (MEI):** **It refers to the substance of a system, namely the mei *(matter, energy and information "things" or resources)* of which the system is composed *(i.e. which are being processed and which are the processing and governing structures).

NOTE: **The ethos, aims and governance describe the IN-FORMATION REALITY *(or conceptual reality*) of a system, while the substance that is being processed and that does the processing and governing represents the PHYSICAL REALITY of the system.**

step 5: system design - *applying the seven forces*

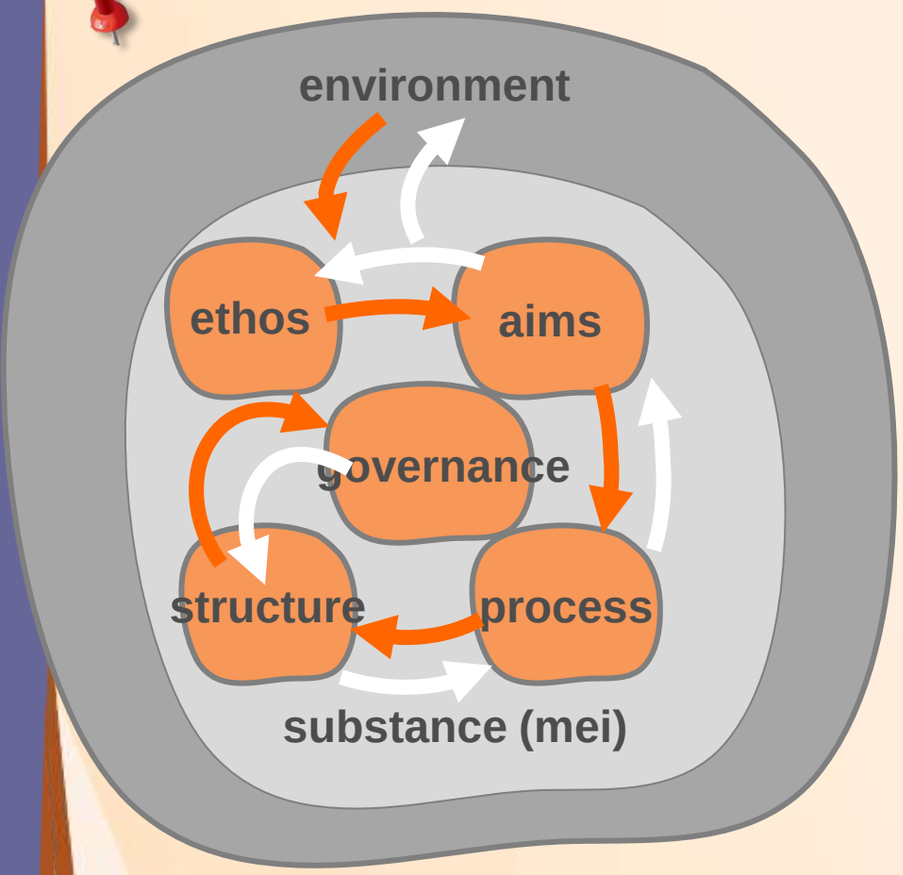
A: The seven forces of organisation and their organising principles are the DESIGN FRAMEWORK that you use for creating the design of a system. It gives rise to a seven faceted design. ***(You can call this framework a TOOL, if you want!)***

The seven facets together describe how the system should be organised.

If the forces reinforce each other, the system will function coherently. If they contradict each other, the system will have serious organisational problems.

To ensure that the forces reinforce each other, they have to be introduced in a clockwise manner. ***(See the following Figure, as well as the discussion about clockwise and counter-clockwise change in Part 7.)***

step 5: system design - *applying the seven forces (continued)*



Creating COHERENCE through Clockwise Design

To create a coherent design one needs to work through the seven forces in a clockwise manner *(symbolised by the orange arrows).* This means starting the design by

- **choosing the desired ethos *(and check that it is compatible with the environment)***
- **and in accordance with the ethos, the overarching aim *(or purpose)* of the system *(NOTE: An aim is one value from the ethos of the system that is projected into the future to be attained.)***
- **then one should design the ideal processes *(or activities)* that the system should pursue in order to achieve its purpose under consideration of the best possible resources**
- **then design the ideal structures that should do and support the processing under consideration of given resources**
- **then determine the governance *(i.e. aims setting procedures through planning, as well as regulation through monitoring and evaluating the performance of the system according to the designed criteria).***

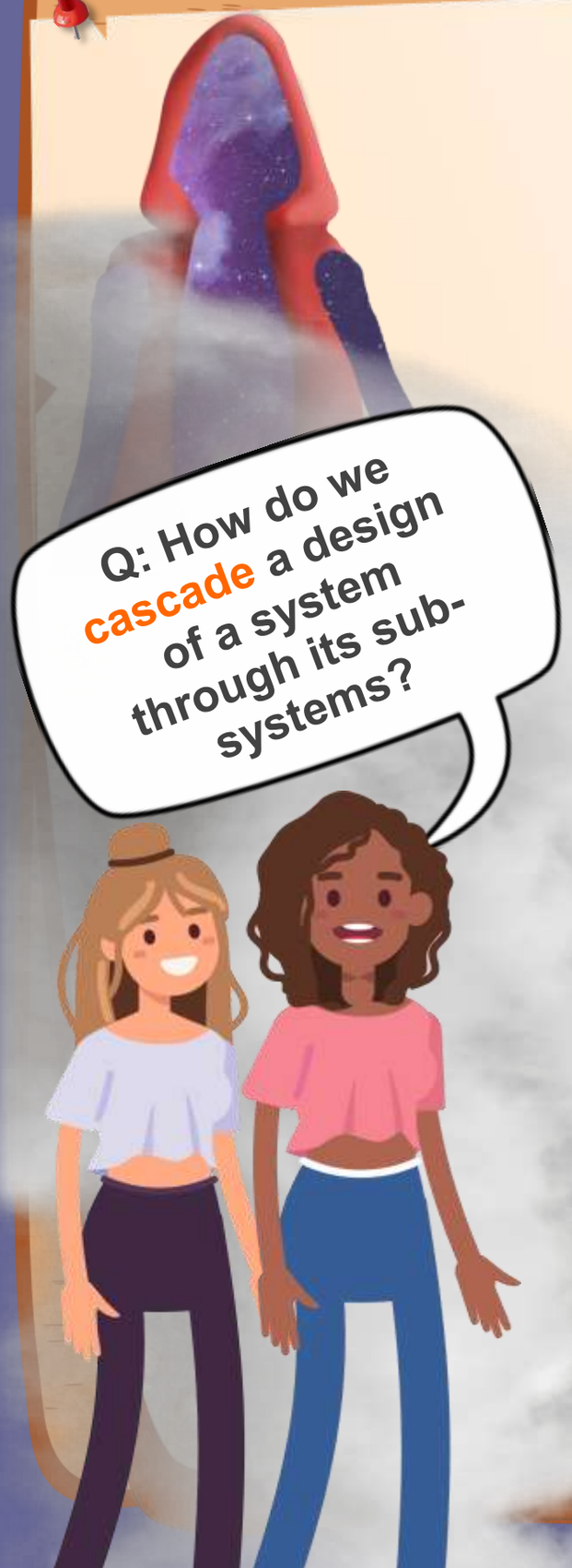
The system is coherent, if the forces reinforce each other, namely:

- **if the governance reinforces structure, which channels process flow that achieves the aim according to the ethos and**
- **If ethos and aims are aligned with and serve the environment.**

(This reinforcement is illustrated by the white arrows.)

A coherent design is the result of a CLOCKWISE DESIGN through the seven forces and their COUNTER-CLOCKWISE REINFORCEMENT of each other.

step 5: system design – *creating coherence*



To ensure coherence between the system and its sub-systems, the seven faceted design of the overarching *(or containing)* system is cascaded into all its sub-systems.

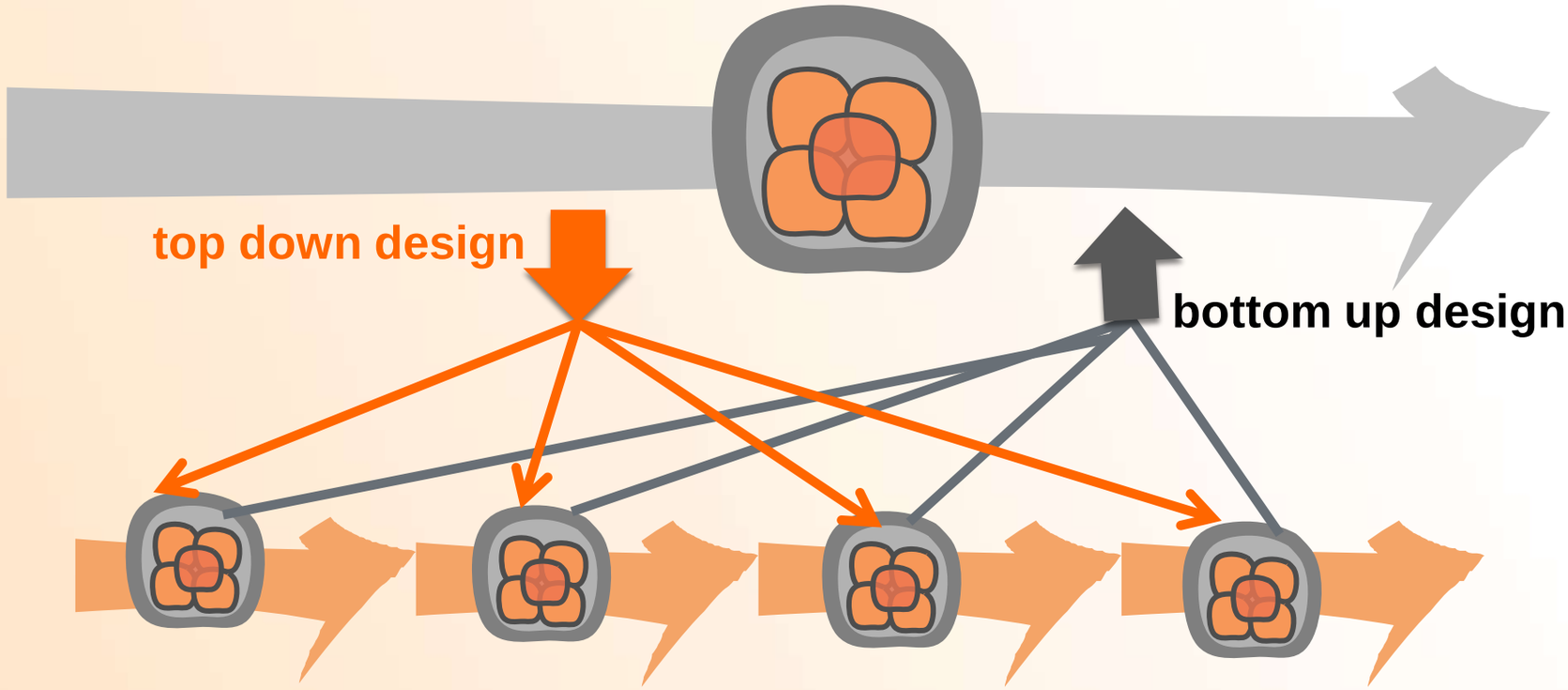
For example, in the previously mentioned electricity supply chain, the design for the whole supply chain would have to be cascaded into its renewable and non-renewable sub-systems.

Cascading implies iteration between a top down and bottom up process. On the one hand, the sub-systems have to change themselves in such a way that they co-produce the intended outcomes at the level of the whole system. On the other hand, there can be developments in any one of the sub-systems *(e.g. new technological developments, or resource constraints, or undesirable environmental impacts)* that will necessitate a change in the overarching design.

In praxis, in a large design *(like the redesign of the electricity or nutrition, or education chain)* there will be a design team for each sub-systems, as well as a coordinating design team for the system as a whole *(with mutual representation between them).*

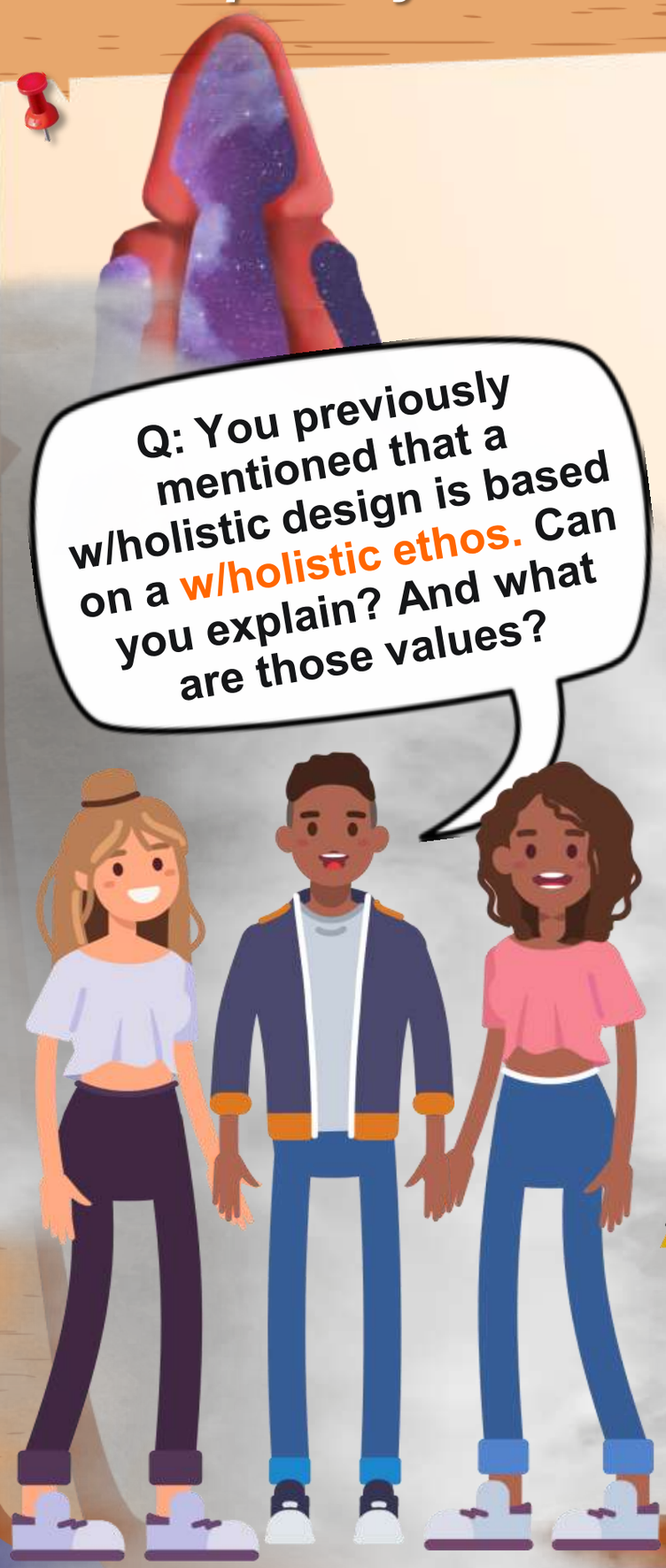
Thereby the information flow from the sub-systems to the overarching system *(i.e. bottom-up)* and from the whole system to the sub-systems *(i.e. top down)* is assured and coherence between the levels is achieved. *(See the following Figure.)*

step 5: system design - *applying the seven forces (continued)*



A **coherent design** is the result of iteration between a TOP DOWN and BOTTOM UP design process.

Step 5: system design - *generic w/holistic ETHOS*



A: A system unfolds according to its ethos *(worldview, values, beliefs and guiding principles).*

A fundamental change in ethos will lead to a transformation of the system.

Without a transformation of ethos a system transformation cannot occur, as any change would involve "more of the same" kind of strategies.

Thus, transforming the legacy systems of the industrial age requires a fundamental change in ethos.

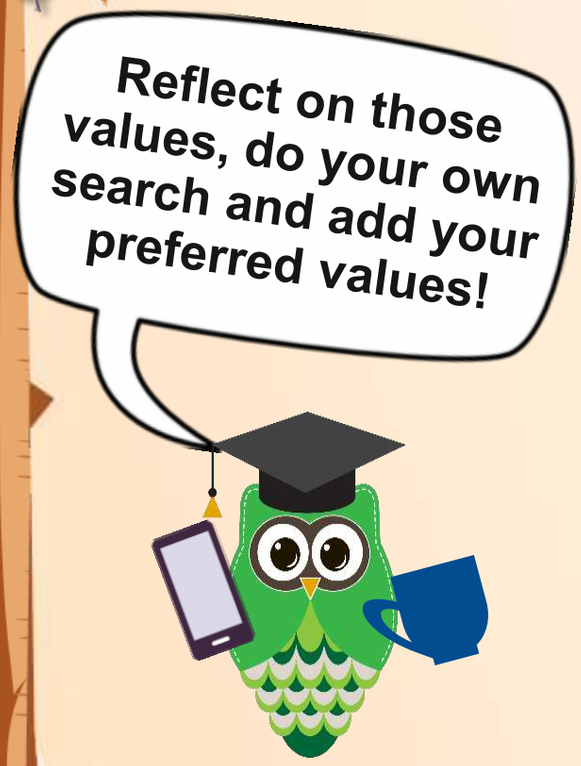
We also propose that the foundation for such a change is a transformation in worldview from reductionist to w/holistic thinking.

Each worldview is associated with different values *(what is regarded as desirable),* beliefs *(how the world works)* and guiding principles *(how our affairs should be regulated)*.

This begs of course the question, if there is a generic w/holistic ethos that can guide the redesign. *(See our list of preferred values in the following Slide.)*

***NOTE:* The redesign of the societal legacy systems of the industrial age need to be based on both, a w/holistic worldview to extend *(not replace)* the existing reductionist one, as well as a consideration of the realities of the information age.**

step 5: system design - *generic w/holistic ethos (continued)*



From an initial research of the literature on w/holistic -, systems -, complexity -, ecological - and related thinking, the following values can be derived:

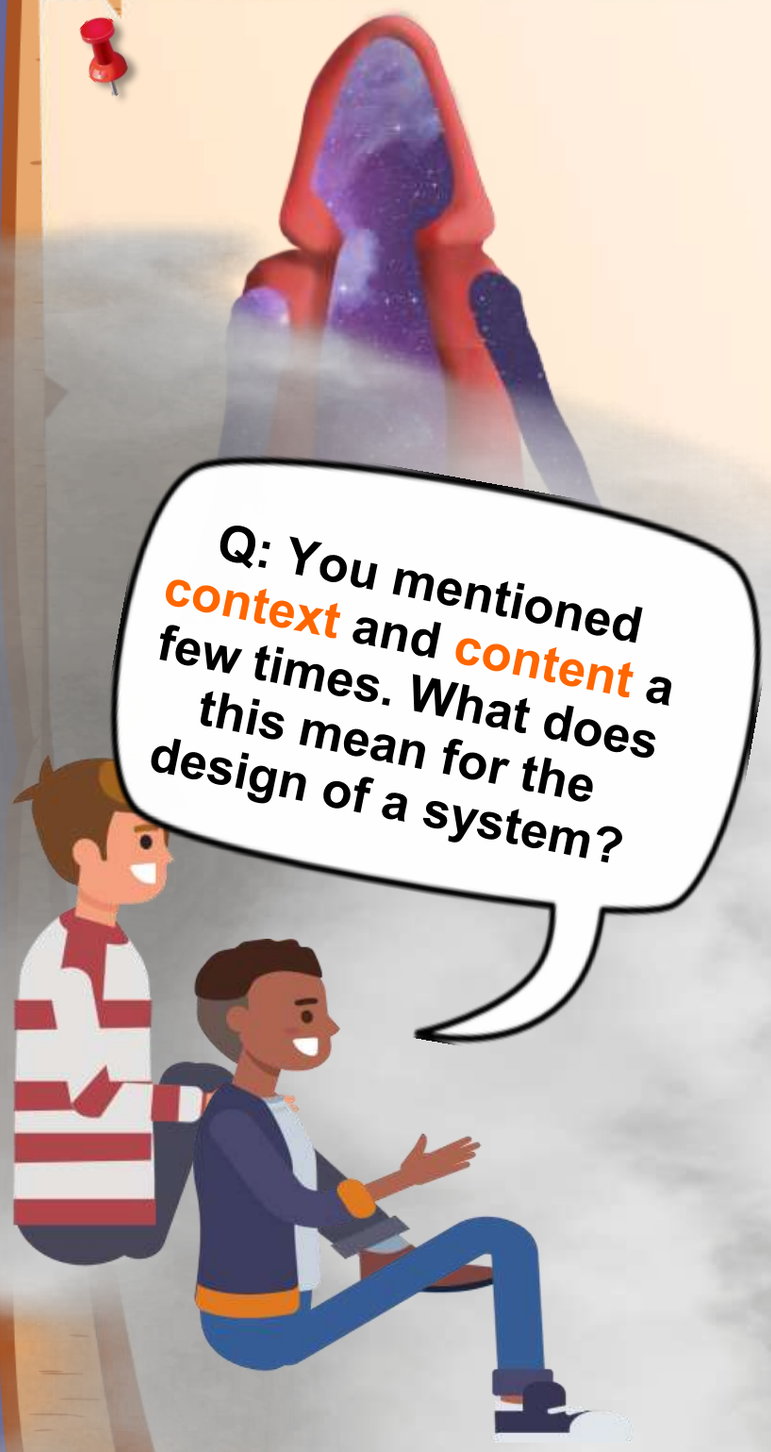
life enhancement and support and respect for all life; sustainable development *(i.t.o. the carrying capacity of nature);* maximising self-governance;
desirable *(i.e. ideal based)* development;
fair benefits to stakeholders;
balanced interaction between systems *(i.e. give and take);*
minimising of negative impacts on other systems;
w/holistic functioning *(i.e. according to generic organising principles);*
science based consensus truth, learning, self-reflection and self-responsibility;
transparency;
etc. *(add your own preferred values)*

Those generic w/holistic values represent context, while the interpretation of each generic value in a specific system *(such as the finance, education, health care, or any other system)* gives rise to the specific ethos of that system as content.

Thus, what is desirable development, or what is a fair benefit to stakeholders, or what is the scientific truth, will differ from system to system and could even change within the same system at different stages of its development.

Without adhering to a w/holistic ethos, a system cannot function w/holistically. And without a more w/holistic functioning of our current psychological and societal systems, we will not be able to co-produce a more peaceful, just, fair, free and egalitarian world and dissolve its current problems.

step 5: system design - *theoretical context*



A: Without a sound theoretical or empirical foundation that guides system analysis and design, one gets ad hoc, patched together and disorderly systems that co-produce complex problems and problem riddled systems.

We therefore need to understand the difference between CONTEXT and CONTENT.

We also need to understand how we can develop context knowledge, namely through DEDUCTION *(i.e. derived from a theory)* and INDUCTION *(i.e. derived from empirical research of the observed reality).*

(See the following NOTES for more detail)

step 5: system design - *theoretical context (continued)*

CONTEXT versus CONTENT

A framework *(as discussed in step 1)* is a generic context within which information about a specific system is identified as content.

Another way of looking at context is to view it as a set of generic QUESTIONS that one should ask during a PROBLEM ANALYSIS *(e.g. what are the economic, political, etc. problems of an issue and at which level),* or DESIGN *(e.g. what are the ethos and aims, etc. of the system)?*

The answer to these generic questions is the system specific content.

Thus, each system design represents unique information content, even if it is derived from the same context information.

NOTE: **The context information can be derived from a theory *(i.e. DEDUCTION)* or from empirical evidence *(i.e. INDUCTION)* .**

Theory Based Context *(DEDUCTION)*

The context or framework can be derived from a theory.

For example, the *Biomatrix Organisational Framework* is derived from *Biomatrix Theory*. It describes seven forces that determine the organisation of all systems and is therefore a useful framework to guide the ideal design of a system *(i.e. how the system should ideally be organised).*

Likewise, the previously discussed *Biomatrix Spatial and Temporal Frameworks* are derived from the same theory. They infer that all systems span levels and are multi-dimensional. These frameworks lend themselves especially for identifying the problems and brainstorming solutions at all levels and in all dimensions of a system.

Put differently, those frameworks prescribe generic categories *(or headings)* for the analysis and redesign of all systems.

Context Derived from Empirical Research *(INDUCTION)*

Another source of context *(or frameworks)* can be derived from empirical research, such as:

- **identifying the existing sub-systems of a system *(e.g. of the electricity, finance, or education industry)* as they currently exist and derive a framework from them in order to analyse and redesign the system**
- **observing patterns of repeated behaviour in a system or between systems that can serve as a frame of reference *(e.g. "connecting the dots" of observation).* A pattern is also the basis of an analogy, which can be useful to understand systems and transfer knowledge from one to another system.**

step 5: system design - *how to do the design*

A: A design is done by a *DESIGN TEAM.* In smaller systems, the team is assembled to represent all parts *(i.e. sub-systems).* In a large systems *(such as the electricity system),* there will be a design team for the overarching system *(i.e. the whole value/supply chain),* as well a team for each sub-system or group of sub-systems *(e.g. the group of renewable and non-renewable generators)* and their sub-systems. The teams are coordinated through mutual representation.

Guided by a FACILITATOR *(who knows about w/holistic theory and methodology)* and the *Biomatrix Organisational FRAMEWORK (i.e. the Seven Forces of System Organisation)*, the team sifts through the brainstormed ideals, strategies and solutions of its *DESIGN NOTEBOOK*; and starting with the ethos and overarching purpose of the system, creates a broad design by working clockwise through the other categories.

If the notebook contains mutually exclusive ideas, these are assembled into alternative designs, following the same procedure. *(In large systems, it is useful to have a different team working with each design alternative.)*

A system redesign starts with a broad design *(or alternative designs)* of the containing system *(i.e. the overarching value / supply chain).*

Each overarching design is cascaded top down into the sub-systems and their sub-sub systems and will elicit a bottom-up response. Through repeated ITERATION between the different (sub-)designs, they become increasingly aligned and refined. Thereby each design alternative emerges as a COHERENT WHOLE across all its containing system levels.

(*NOTE*: The *Biomatrix Design Courses* develop *Design Facilitators*, while the *Biomatrix Programmes* are designed to allow a team to self-manage the transformation of its system, guided by videos, manuals and exercise templates.)

step 5: system design - *how to do the design (continued)*

AIMS

To do an activity system design, the team typically starts by selecting one or more high level ideal(s) that should describe the aim *(or purpose)* of the overarching activity system *(i.e. the function or industry as a whole).*

For example, we would suggest the ideal(s) of personal development for the education system, health for the health-care system, clean, abundant and free supply for the electricity system, and so on. (Your ideals could differ, of course.)

ETHOS

Each aim is an outflow of and association with a specific ethos *(i.e. values and beliefs derived from a worldview).*

If the ethos and aims are not in harmony with each other, the system will be incoherent and problem riddled.

Different aims and ethos will give rise to alternative designs of the system. The *Design Notebook* is likely to contain some diverse information that gives rise to alternatives.

***NOTE:* Once you conducted a *Biomatrix Questionnaire* or participated in a *Biomatrix Jam,* or read the collective output of all stakeholders in the *Design Notebook*, you will notice that similar ethos and aims related ideals arise repeatedly in different contexts and from different stakeholders. Thus the overarching ideals of the system practically suggest themselves as the team sifts through the design notebook.**

Q: Can you give an example of an incoherent aim and ethos?

A: Yes, sadly, examples can be found in practically every industry, since the overarching aim of most businesses is to maximise profits.

With this aim, there will be conflict with the ethos of the industry, such as producing HEALTHY food in the nutrition industry, or SUSTAINABLE energy use in the electricity and transport industry.

Or, if the aim of a scientist is to receive a research grant or getting published and if achieving this depends on producing profitable solutions or supporting a mainstream ideology, the ethos of pursuing TRUTH is likely to be compromised.

This conflict between aims and ethos is a major cause of the complex problems that plague our cultural, economic and political systems and also impacts negatively on planetary systems.

EXERCISES

1. What would be your ideal(s) for the following systems?

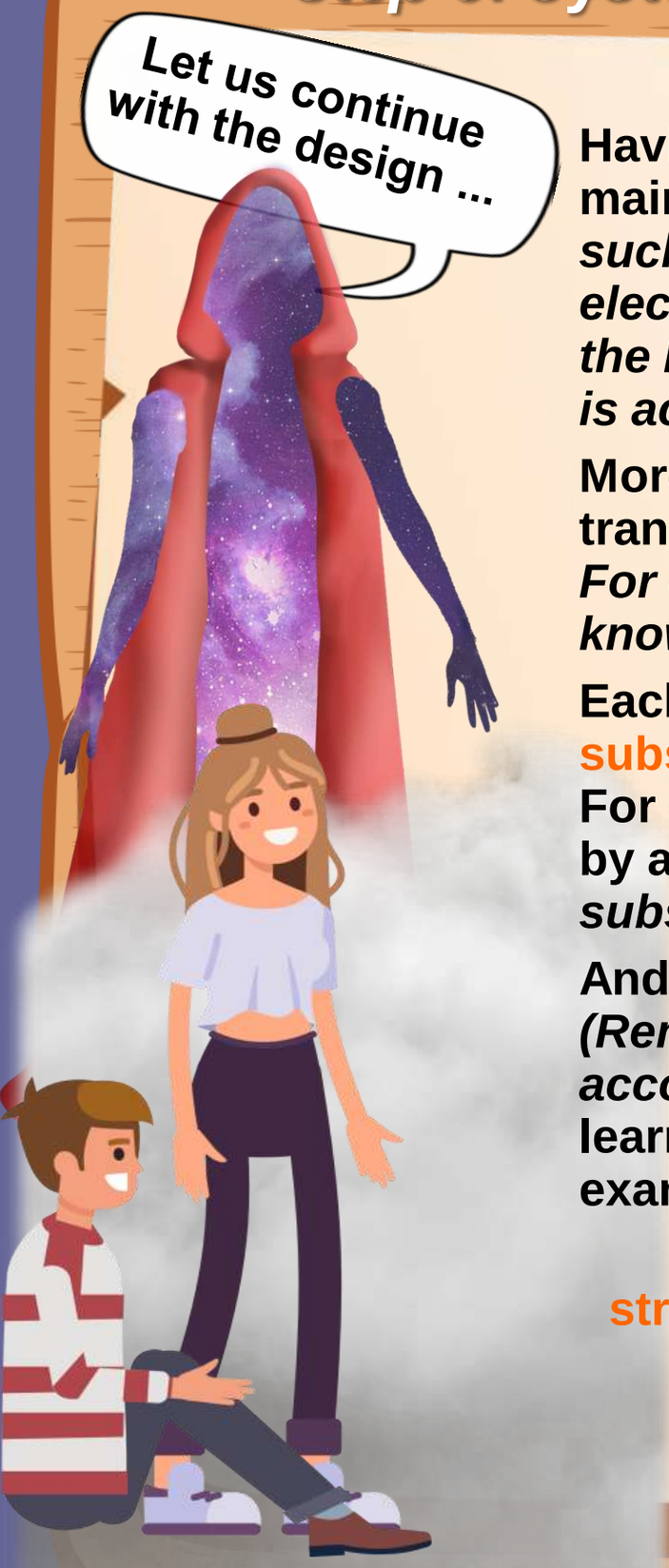
- education
- health care
- electricity
- transport
- housing
- finance
- public infrastructure
- public governance (e.g. legislative, executive, judiciary)
- family life (parenting, marriage, child rearing, etc.)
- your work life
- your exercise regime
- any other system of your concern

2. Give one example each of how the current system violates this ideal.

REFLECTION

Reflect on what you learned from this quick and broad exercise.

step 5: system design - *how to do the design (continued)*



Having formulated the high level aims and ethos, the team will explore the main PROCESS(es) with which to achieve the intended aim(s) of the system ***such as teaching / learning in the education system; generating in the electricity system; treating and preventing disease and promoting health in the health-care system, etc). (Remember: A purposefully organised process is actually a sub-system.)***

More specifically, a process describes how an input substance is transformed into output substance and also produces by-products.
For example, learning transforms the minds of pupils to become knowledgeable, while a by-product could be confusion.

Each process has its own acting and support STRUCTURES and according substance ***(i.e. material, energy and information resources).***
For example, learning can involve lessons ***(as support substance)*** **provided by a teacher** ***(as acting substance)*** **, or self-study** ***(with the pupil as acting substance)*** **through research assignments** ***(as support substance).***

And each process needs to be REGULATED so that it achieves its aims. ***(Remember: this involves planning, monitoring and evaluating of outcomes according to criteria, as well as adjustment and rewards).*** **For example, learning is regulated by a curriculum and evaluated by means of examinations.**

Alternative ideals and ethos give rise to alternative processes and structures with different resources and different regulatory requirements.
For example, compare school-based with on-line education.

Q: Can you explain more about different aims and ethos giving rise to different designs?

A: During brainstorming, one will come up with different strategies *(i.e. structured processes),* some of which are mutually exclusive.

Therefore, related ideas need to be grouped together in the *Design Notebook* and the *Design Team* works those into alternative designs for the system.

For example, depending on the ethos of society, one can consider alternative electricity system scenarios based on a different mix of renewable and non-renewable energy generators.

Or, depending on the ethos of education, one could conceive alternative education scenarios with different curricula, a different form of delivery (e.g. a mix of online and face to face teaching), a learning approach through traditional knowledge transfer and / or a coaching and discovery approach, a grouping of pupils according to age or according to competency in subjects, amongst many other possibilities.

Of course, each scenario has different impacts in terms of cost, by-products, safety, sustainability, etc.

step 5: system design - *how to do the design (continued)*

Typically, many of the brainstormed strategies and collected solutions are mutually exclusive and cluster into different types and combination that can be incorporated into alternative designs. The alternatives could have different ethos and aims, or they could even have the same ones, but use different processes, structures and substance to attain them.

Also, not all ideas from *step 3* are suitable to be included in a design. Some could obviously exceed available resources, or technological capabilities, others violate the general ethos of society, or violate one of the generic organising principles and therefore need to be excluded or amended.

Who can judge this? The design team –being a team of experts - will make the choice of which ideas group together logically to form alternative designs and which ideas are unsuitable for any design. *(This is a content-based judgement.)* The facilitator will point out violations against a generic organising principle. *(This is a context-based judgement.)*

However, the team does not judge which of the alternative designs that it proposes *(based on the different ideas generated during brainstorming)* should be chosen for implementation in society. Ideally, the design iteration phase *(see step 7)* will generate a stakeholder consensus, as well as a wider societal consensus through a political discourse regarding the preferred choice. If not, the usual political process will be used for the decision. *(For more detail see the Curriculum in W/Holistic Participatory Democracy).*

Now I have to share with you a design SECRET:
Social systems must have maximum SELF-GOVERNANCE.

To achieve this, you have to design the governance of the system *(governance being one of the seven forces of organisation!)* in such a way that it "WIRES" *(or structures)* the system for self-governance and ongoing change.

Amongst others, this implies creating ongoing planning structures *(i.e. coordinated planning forums for the system and its sub-systems that meet at regular intervals for strategic and operational planning around fixed agendas – which of course allow additions).*

Those governance structures channel a continuous SELF-REFERRING Plan – Implement – Evaluate – (Re)Plan Cycle. *(See the NOTE below.)*

This cycle needs to be performed in a self-reflective and learning manner in order to ensure organisational learning. Thereby the system can keep changing itself in accordance with its changing environment.
The system has become self-governing.

NOTE: In the management literature this cycle is referred to as strategic performance management cycle. It will be discussed again in Step 9, as this cycle drives both, the implementation of the design, as well as the subsequent performance of the system.

step 5: EXERCISE

Now for a design exercise!

EXERCISE

Create two alternative ideal designs for your case study system.

Read through your categorised ideals and strategies from your Design Notebook exercise .

Can you derive two alternative ideal design scenarios from this information?

For each alternative describe the

- **ethos and overarching aim of each design alternative,**
- **process with which the aim will be achieved**
- **structures *(i.e. both acting and support structures)* that are involved in the processing**
- **regulation, namely how you will monitor the outcome of the process and by what criteria you evaluate the outcome and how the performance will be rewarded / sanctioned.**

REFLECTION

Reflect on what you learned from this exercise.

Q: Earlier on you referred to an overarching *Ideal Strategy Design* for dissolving a mess. Can you explain this in more detail?

A: In *STEP 1* we explained that a mess *(or complex problem or issue)* needs to be dissected into its co-producing activity systems; and that to dissolve it, each of those activity systems needs to be redesigned.

We also mentioned that it is useful to have an overarching ***Ideal Strategy Design*** for dissolving the mess as a whole; and that this design in-forms *(or is cascaded into)* each of the mess co-producing activity systems.

According to the organisational framework, the design should consist of an overarching ETHOS, AIM(s) and REGULATION that is of relevance to all co-producing activity systems.

The organisational framework also contains the categories of PROCESS and STRUCTURE and SUBSTANCE. In the context of an *Ideal Strategy Design* these can be combined into strategies *(i.e. as structured processes)* with which to co-produce the aim of the design. Put differently, the ideal design of each of the mess co-producing activity systems can be summarised and formulated as a strategy. Together, these strategies will co-produce the dissolving of the mess.

In praxis, the creation of such an *Ideal Strategy Design* will involve ITERATION between the overarching design and that of its activity systems.

STEP 6: Make an impact assessment

step 6: impact assessment – *introduction*

The implementation of a design has consequences for other systems within the biomatrix *(i.e. the stakeholders)* .

Step 6* of the *Biomatrix Change Methodology* is concerned with analysing and assessing the potential impacts of a design on its stakeholder systems. *(The method can also be used for evaluating the impact of already existing systems.)

Ultimately, the choice which of the ALTERNATIVE DESIGNS will be implemented rests on an assessment analysis.

Only by considering in sufficient detail the impacts of each design within the web of the biomatrix, can we evaluate alternative designs and select the one that produces outcomes inspired by the intended aim *(i.e. Ideal)* on the one hand, while minimising negative impacts on the other hand.

***For example, different energy designs will have different economic, environmental, health and other consequences.* These need to be compared and discussed, before the most suitable design is chosen for implementation.**

We also need impact assessments of future technology developments to avoid threats to life.

NOTE: In a *W/Holistic Participatory Democracy* the choice between alternative designs rests with the citizens. Therefore, a public discourse *(e.g. via the public and social media)* on the alternative designs and their impacts is of utmost importance. Without it, there cannot be a truly democratic society. *(See also the Biomatrix Curriculum in W/Holistic Participatory Democracy and the Biomatrix Curriculum in W/Holistic Public Discourse.)*

C: It seems to me that there is little concern about the impact of our economic activities on the various social and natural systems.

C: Especially the negative impacts of by-products and the discarding of unused and discontinued products seem to be ignored by business.

Q: Has impact assessment something to do with being green?

A: Yes, indeed, assessing the impacts of our economic activities on planetary systems is the foundation for being green.

However, there are also impacts on the psycho-social systems that need to be considered!

In fact, we should assess the impacts of all our activities on other systems!

assessment - based green is cool!

green – washing is uncool!

step 6: impact assessment - *frameworks*

In order to capture all impacts, one needs a framework.

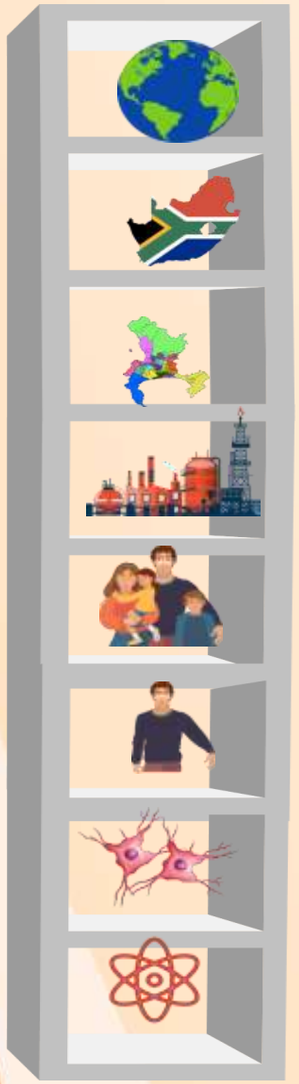
The previously discussed frameworks are also useful in this context:

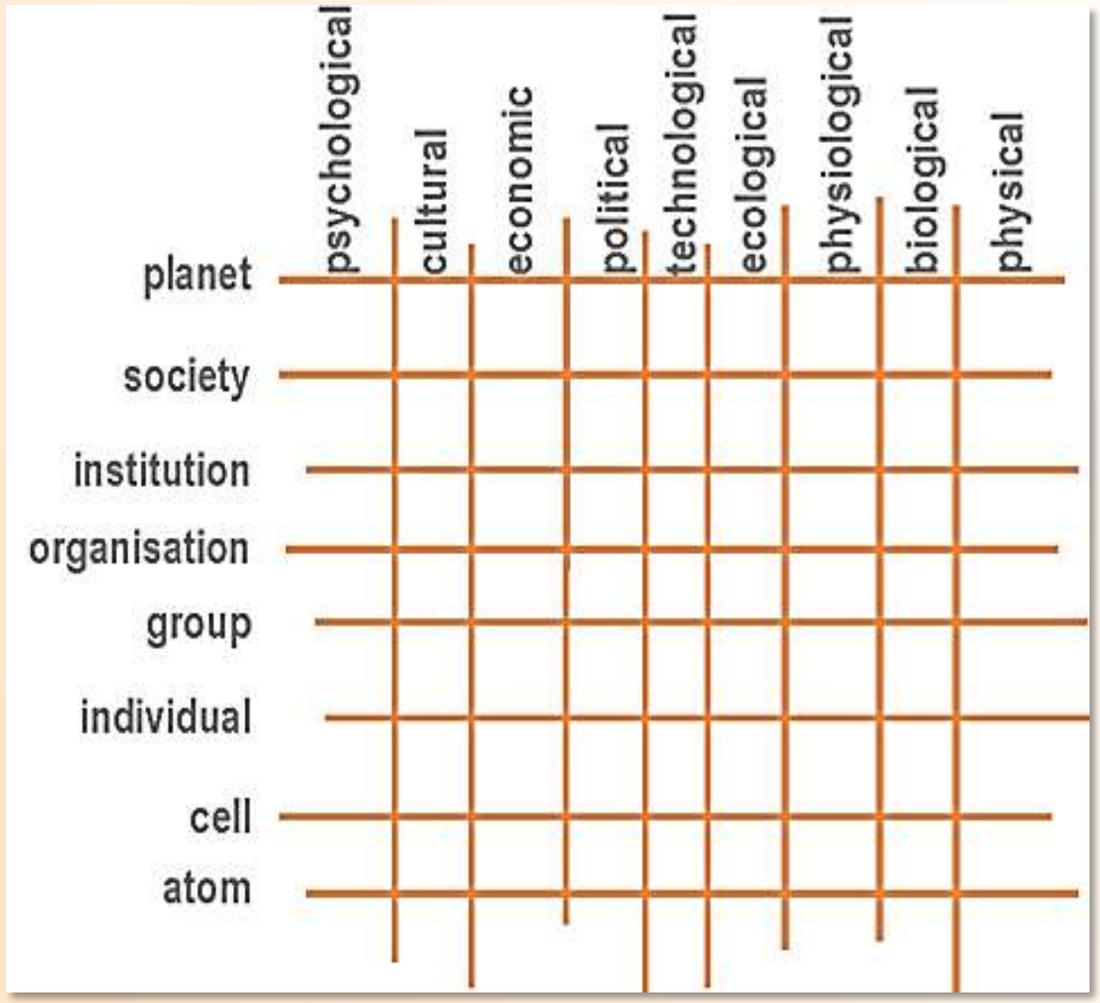
- **to do an assessment of the overarching ideal strategy design or whole system design one can use the *Biomatrix Spatial Framework* and determine its impacts on the different dimensions and levels of the biomatrix**
- **to do an assessment of one of the mess co-producing activity systems or sub-system of a value / supply chain, one can work with the multi-dimensional framework**
- **To do a very detailed impact assessment (especially of a sub-system), one can also use the organisational framework.**

(See also the following NOTES.)

REMEMBER: **An impact assessment needs to be done for the system as a whole, as well as for each of its sub-systems.**

NOTES: frameworks for impact assessment

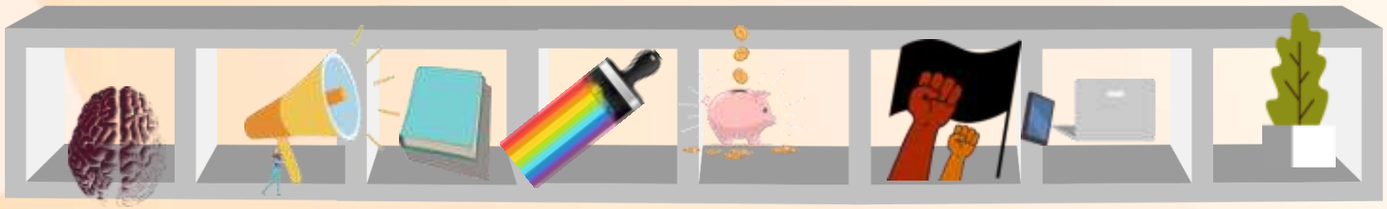




The *Biomatrix Spatial Framework* is useful to assess the impacts of a design in general on the different levels and dimensions of the biomatrix.

One can use the categories of the framework to identify the different stakeholders which are affected by the design and explore how they are impacted on. Or one can describe the actual impacts in each of the categories.

We also find this framework useful to assess the impacts of societal functions, especially in the cultural domain *(e.g. the education, science and media system).*



NOTES: frameworks for impact assessment *(continued)*

To explore the impacts of an activity system in general, one can use the multi-dimensional framework, since most activity systems impact on each of the dimensions to a greater or lesser extent.

To explore how "green" the systems of the physical economy are *(such as the electricity, transport, or nutrition value / supply chain),* it is especially useful to use the *Biomatrix Organisational Framework* to assess each sub-system in terms of the following:

- **selection of inputs for processing mei *(or substance)***
- **processing outputs of the system *(i.e. of both, products and by-products)***
- **continuity *(i.e. tapping)* of outputs *(i.e. which includes storage and transporting of mei)***
- **selection of processing structures *(i.e. acting and support structures)***
- **discontinuing / discarding of processing structures**
- **regulation *(e.g. choice of evaluation criteria)***

NOTE: For example, if electric cars or windmills are assessed in terms of the whole supply chain, their "greenness" becomes questionable.

***NOTE:* In a green economy, the minimising of negative impacts on nature should guide the choice of one design option over another, not merely cost and profit considerations as is currently the case.**

step 6: impact assessment - *measures*

The regulatory aspect of a design will include a set of criteria according to which the output and performance of a system is evaluated.

It is important to note that these measures can be quantitative, as well as qualitative.

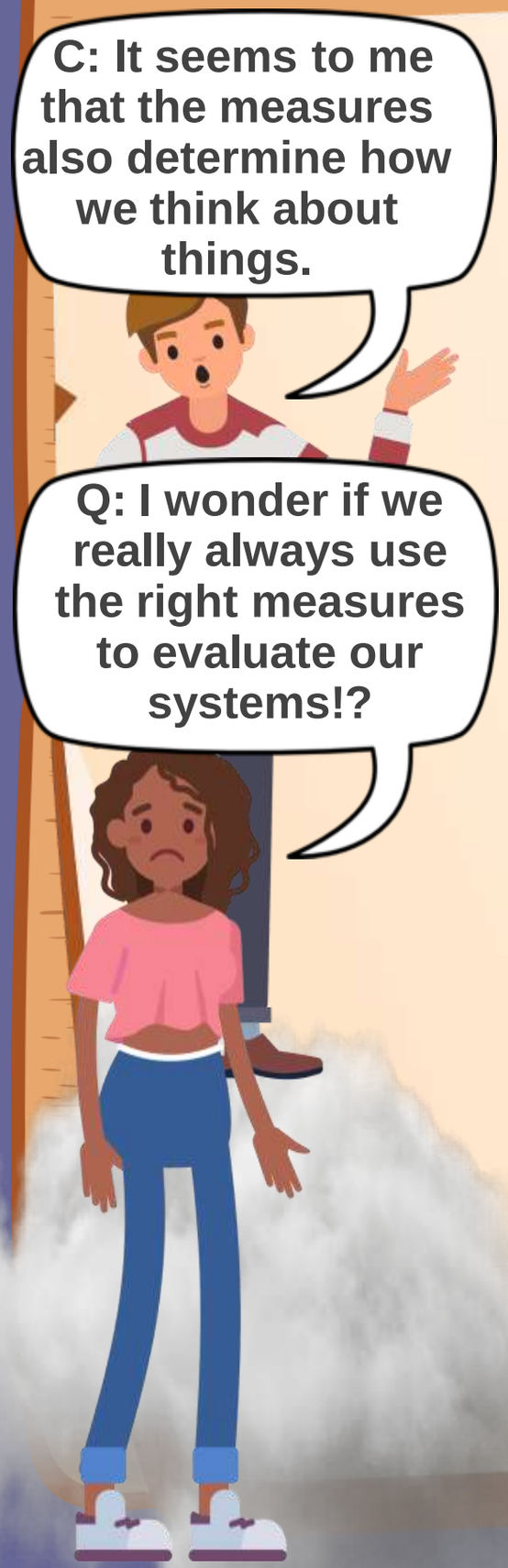
- **Quantitative measures include the *cost,* number and size of a thing, issue and occurrence, etc.**
- **Qualitative measures can relate to quality of life, moral, emotional and aesthetic impacts *(e.g. degree of happiness, contentment, joy, health, peace of mind, beauty, love)),* moral considerations *(good versus bad),* emotions (degree of anger, fear, love)**

NOTE: Quantitative measures lend themselves to statistical analysis. By comparison, the evaluation of qualitative measures requires an evaluation in terms of degrees and comparisons *(e.g. through fuzzy logic).*

NOTE: Some of the generic regulatory principles are:

- **You get the behaviour you reward.**
- **You observe the behaviour you measure *(i.e. if you don't measure it, it will not be noticed)***
- **You can only reward what you measure.**

step 6: impact assessment – *measures* *(continued)*



A: You put your finger on an important and often ignored issue: Your measures determine how you evaluate and thereby perceive the world!

Sadly, economic thinking dominates the world and reduces everything to quantitative measures, especially cost and returns on investment – the famous bottom-line!

The prevalent quantitative assessment of phenomena and the well established quantitative measuring methods are detrimental to the perception and evaluation of qualities, especially cultural goods, *such as those associated with education, science, media, art and religion.*

For example, the current assessment of education systems emphasises quantitative criteria, such as cost and pass rates, while neglecting criteria concerned with the quality of education, such as the development of talents, or the emotional wellbeing of the individual learners, or the appreciation of the cultural heritage of society, or the honouring of truthful scientific pursuit. And there is hardly any assessment of undesirable by-products, such as confusion, boredom and the retardation of the development of the individual learner, or of youth unemployment at the societal level.

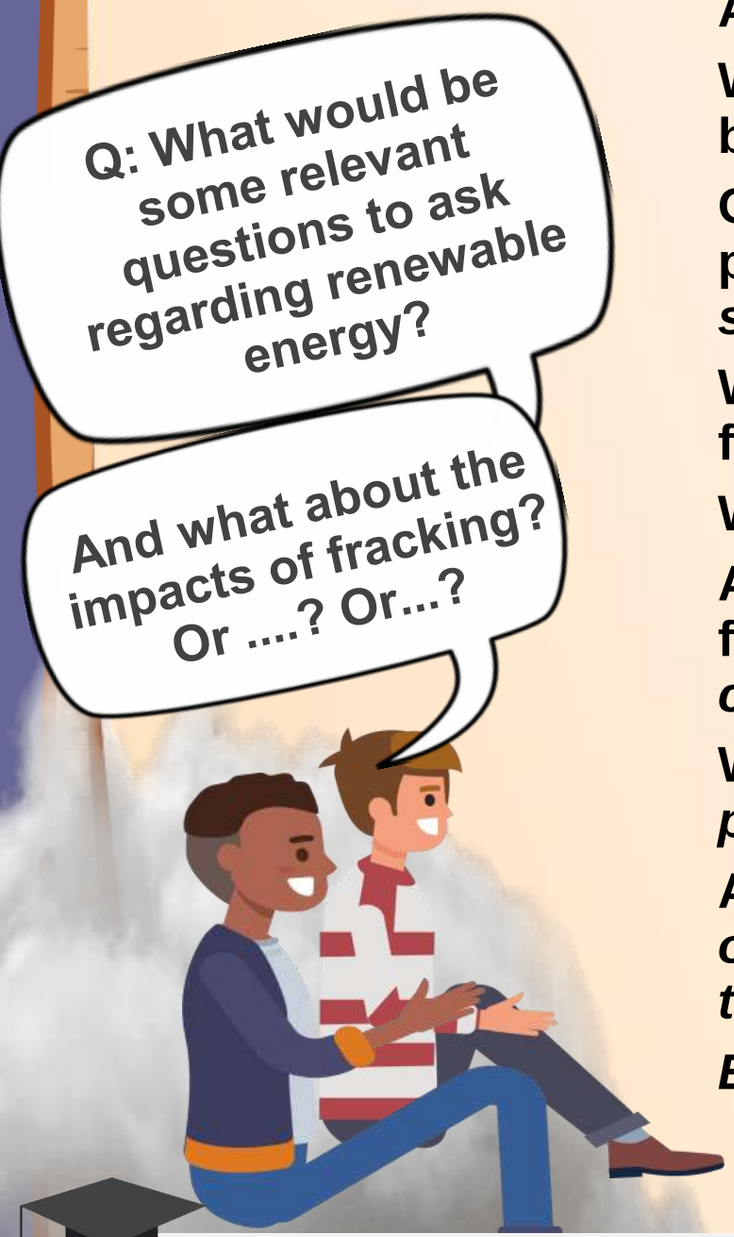
In doing meaningful impact assessments, the question of how qualities can be measured needs to be explored. The use of analogies, images and symbols can be useful, as well as fuzzy logic. And can we learn from music about qualitative measurement?

The measurement issue is another interesting challenge that needs to be dealt with in the evolving information age!

Q: You keep referring to the energy system as case study.
Can you give some examples of the kind of specific questions one would ask concerning its impacts?

A: OK, let's look at a few selected examples of the kind of impacts one could explore, based on the questions of the organisational framework. *(See the following NOTES.)*
Then have a look at some of the impacts of Germany's Energiewende *(i.e. energy transformation to renewable energy)* so far and reflect on its "success" *(as a broad and qualitative measure of its outcomes)* .

NOTES: exploring some impacts of the energy system



A: Some of the questions that need to be answered in more detail are:

What is involved in the production and discarding of solar panels and batteries? *(Evaluation of processing structure and by-products)*

Or the production of the concrete on which the windmills rest and the production and discarding of their blades? *(Evaluation of processing structure and by-products)*

What about the impact of solar farms on agricultural land prices and on food production? *(Evaluation of processing structure and by-products)*

What is the impact of windmills on wildlife? *(Evaluation of by-products)*

And what is the comparison between CO2 emissions of electric and fossil fuel burning cars? *(Evaluation of by-product of the whole supply chain i.t.o. processing and production of processing structure)*

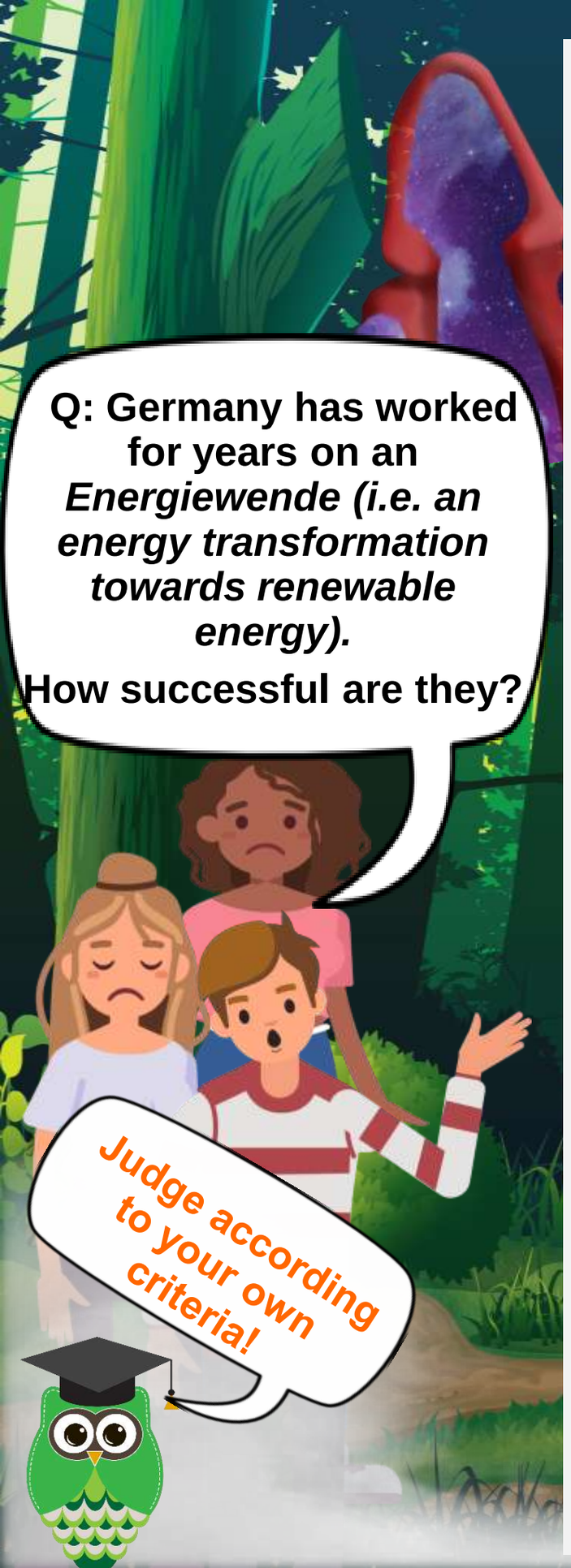
What is the real cost of fracking? *(Evaluation of whole supply chain i.t.o. processing, processing structure and by-products)*

And how energy efficient is it *(i.e. how much energy is put in for what one gets out)? (Evaluation of all processing and processing structure of the whole supply chain versus final output)*

Etc.

Questions, questions, questions….

Have fun researching the REAL cost, or Co2 emissions, or energy efficiency, or by-products of your favourite renewable energy solution *(e.g. like electric cars?)!*



A: That depends on what you mean by success. It is a broad and vague measure *(unless you use it to check if politically prescribed goals are being achieved in time)!* Nevertheless, let's evaluate in other ways.

Germany's contribution to the global Co2 emissions is about 2.2%. Its ethos is zero Co2 emissions and its aim is to approximate this by 2050 for the purpose of being an example to the world and leading it in becoming climate neutral!

What are some of the results so far? The current contribution of solar and wind electricity is an impressive 32 %. But because electricity is only about one fifth of energy consumption, their share of total energy consumption is only about 7 %. Hence the drive to promote electric cars, as transport is still based on non-renewable energy.

AND SOME OF THE RESULTS AND IMPACTS SO FAR?

The highest electricity prices in Europe; a landscape plastered with ugly windmills that threaten to become an environmental disaster after decommissioning *(not to mention that they are killing fields for birds and insects, reduce the forested areas and rest on tons of concrete, which require high energy inputs to produce);* an economic collapse of the solar industry *(which was bought up by the Chinese)* due to the political mismanagement of energy subsidies and the hypocrisy of importing atomic and coal generated electricity from neighbouring states while closing down such plants in order to be green.

Then the diesel and petrol car industry is facing economic collapse in favour of imported (?) electric cars *(which are far from CO2 neutral, although declared as such by political decree who declare electric cars as green, because the generating of CO2 in their production is ignored).* Besides, if all cars were to drive on electricity, the electricity supply would have to be more than double and its current wind and solar component would need to increase 7-8fold *(HW Sinn).*

And the height of greenness: new shipping terminals are being constructed to handle imported gas *(from fracking!)* from the USA and Canada.....

Q: We researched that global CO2 emissions have been rising steadily from 22.4 billion tons in 1990 to 35.8 in 2013 and 36.4 in 2019, besides a pandemic induced decline to 34,1 in 2020).

Even if Germany would have zero emission, it would have practically no effect on the global climate situation.

So what is the role of an *Energiewende*?

A: An interesting question.

Indeed, the impact of the *Energiewende* on the climate is negligible (*although politicians and the marching green youth seem to believe otherwise*).

That leaves the question, if Germany is indeed a role model to the world, judging by the results so far. An *Energiewende* that is politically enforced and retards economic progress will not inspire the world.

By comparison, an *Energiewende* as a vision to inspire the German entrepreneurs to develop new environmentally friendly energy technologies and sell them to the world would be.

But this would require a different political climate!

Q: Looking at the results of the *Energiewende* so far, it doesn't seem that there was a coherent design and implementation plan for the industry as a whole.

Does this mean that government is incompetent?

A: Indeed, there was no "masterplan", *(although some researchers called for one, without success.)*

Instead, the energy policy seems more to consist of an ad-hoc collection of strategies based on knee-jerk reactions to external happenings *(e.g. the Fukushima accident inspired the closing of atomic power stations),* while other policies derived from a lobby-driven pursuit of corporate interests.

As to the competence of government ... as long as we have the current *(industrial age legacy)* model of democracy, we will not get better decisions. We need a new model of democracy that emphasises the self-governance of systems and enhances their creativity, guided by visions, albeit within broad, coordinated and w/holistic regulatory frameworks.

INFORMATIONAL

Want to know about information age relevant societal governance?

Study the *Biomatrix Curriculum in W/Holistic Participatory Democracy!*

step 6: EXERCISE

EXERCISE

Do an impact assessment for the two alternative designs you did in the previous exercise.

Consider at least their multi-dimensional impacts.

CHOOSE

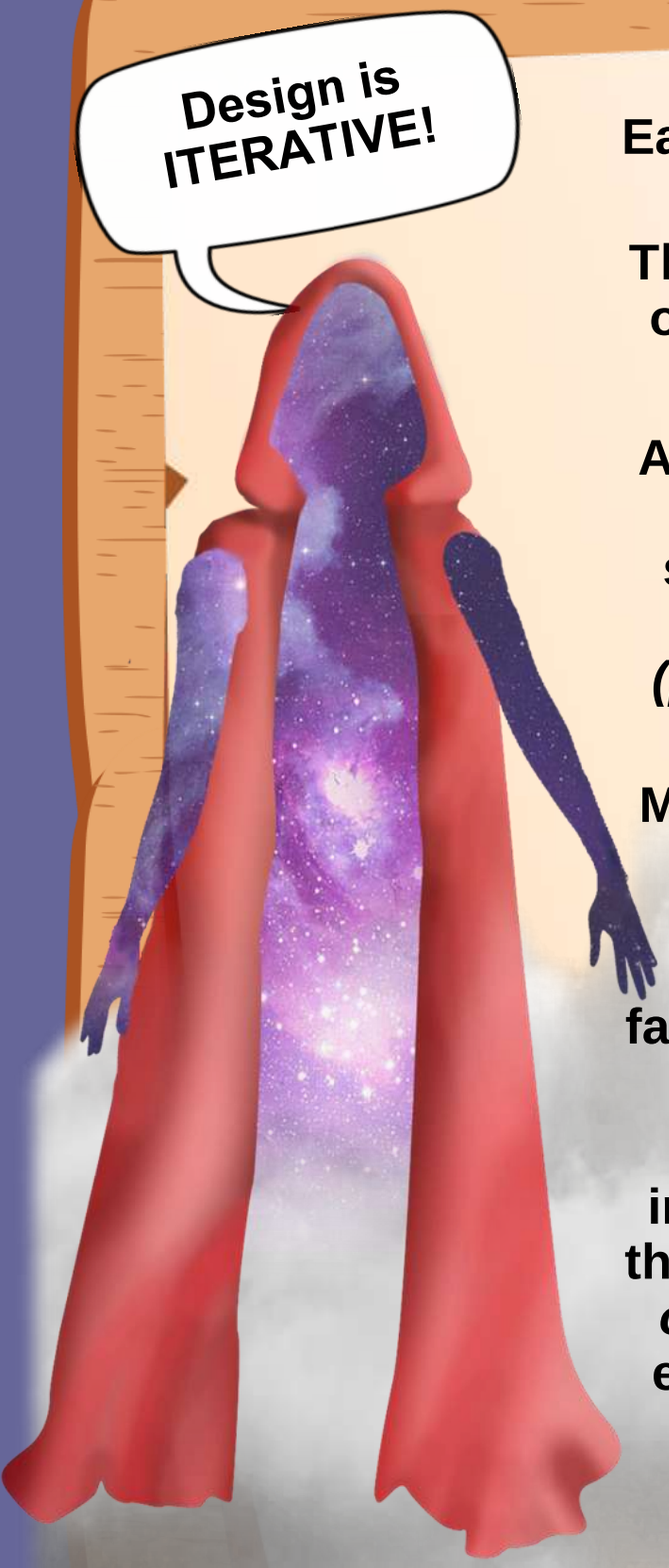
Then choose which design would you prefer to implement on the basis of the impacts and explain why.

REFLECT

Reflect on what you learned from this exercise.

STEP 7: Do design iterations

step 7: design iterations



Each of the alternative designs needs to be viewed, commented on and amended by widening circles of stakeholders.

This serves to improve the design and establish its viability on the one hand, and aligns stakeholders around a design on the other.

Design iterations can be repeated after the different steps.

A first round of design iteration can take place after *(or as part of)* the design phase *(i.e. Step 5*), allowing widening circles of stakeholders to refine the design. This could also reveal that an important issue, or stakeholder was excluded in the design *(prompting iteration back to Steps 2 and 3*), or that a sub-system was forgotten *(prompting iteration back to Step 1).*

More iteration takes place after the impact assessment phase *(i.e. Step 6).* Impacts are of great relevance to stakeholders and the iteration allows them to identify additional impacts that were missed by the design team during *step 6*. This iteration also facilitates a choice between different design options, as the choice of which design to implement, often depends on its impacts.

Sometimes a design iteration is also necessary after implementation planning *(i.e. Step 8),* especially if it is found that the design cannot be implemented as desired *(e.g. because of lack of resources, or political considerations, or whatever).* This may even necessitate an amendment of the design itself (i.e. iterating back to *Step 5*).

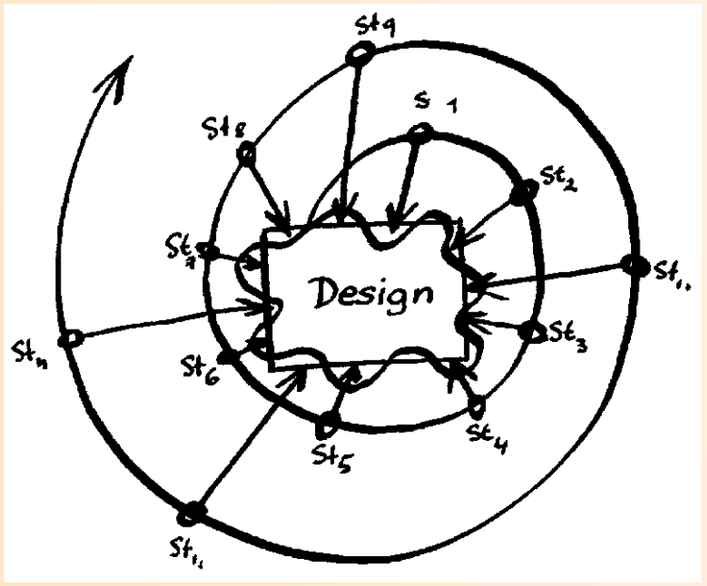
step 7: design iterations *(continued)*

One cannot successfully implement a design unless stakeholders agree with it and are willing to implement it.

Design iterations allow stakeholders to participate in and engage with the design. Thereby they get familiar with the design and will be more motivated to do their bit to bring it about. *(See the case study of the Redesign of Paris on the following Notice Board.)*

In a participatory democracy, the iteration process involves a public discourse *(e.g. through the public media and even public meetings).* It contributes to generating an understanding of the system and in the case of alternative designs, clarifies the different scenarios for the future and their impacts and consequences. This allows the citizens to make an informed choice about which alternative to vote for.

step 7: design iterations – case study



Case study of the redesign of Paris

During the 1970s, urban decay in Paris in France necessitated the design of an urban renewal strategy, while France's participation in the EEC *(European Economic Community)* at the time, required an evaluation of the role of France and Paris in Europe.

Lack of cooperation between political parties and other stakeholders meant that no shared strategy could be found regarding either problem. This prompted the involvement of a team of consultants (Ozbekhan, 1977) who followed a systemic design approach, which became known as idealised design. An initial group of designers who represented no specific political groupings, but who took into consideration the interests of various stakeholders produced an initial ideal design for the future of Paris.

This design was presented to an increasing number of stakeholders, whose input and choices were incorporated into the design. Consultative meetings with specific stakeholder groups, questionnaires and Delphi exercises were also used to amend the design in an ongoing manner. *(The circular Figure shows this continuity as a widening spiral of stakeholder involvement.)*

In the later phases of the design process the media got involved and numerous people were giving input to the design in some way or another. In the end, the political parties of all ideological persuasions unanimously accepted the design.

Q1: Is a design iteration something like the design going viral?

A1: YES, going viral is a good analogy. In fact, in a lively w/holistic democracy, the national development design(s) and plans should IDEALLY go viral throughout that society. This is an important aspect of participatory democracy in the information age!

Q2: The Paris study shows that the design team seems to have a big influence on what the design will be like. Is this not a potential danger?

A2: Yes, a design team can have a big influence. However, if the *Biomatrix Methodology* is used, stakeholders from all parts of the system shape the design from the start *(i.e. through participation in steps 2, 3 and 5).* This was not the case in Paris redesign process.

Probably the most interesting lesson from the Paris case study is that the importance of the design process did not depend as much on the initial design, as on the unfolding PUBLIC DISCOURSE around it. This discourse changed and aligned MINDSETS and thereby made the implementation of the design possible.

step 7: EXERCISE

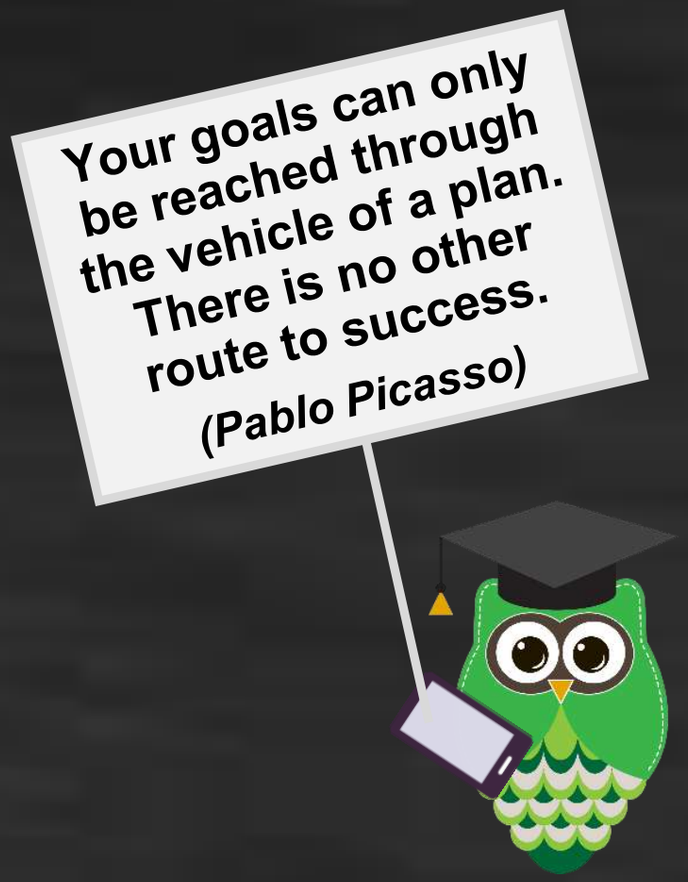
EXERCISE

ITERATE *(i.e. read and work)* through the information you generated in the previous steps and refine your alternative designs and add to their impacts.

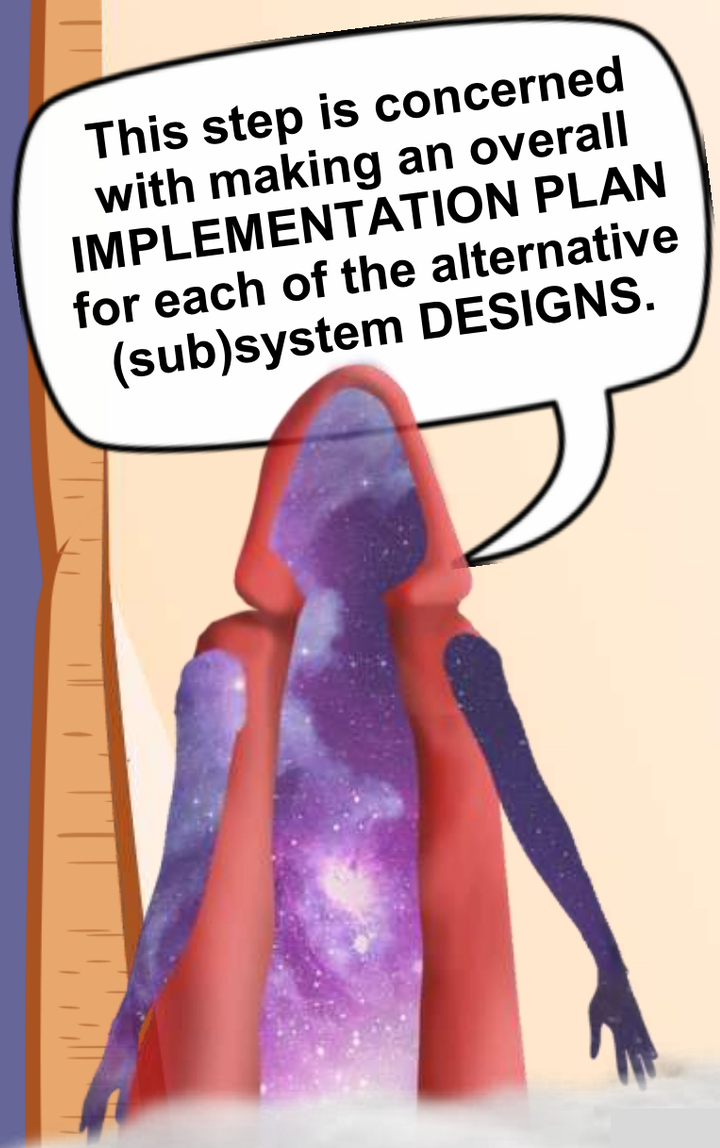
REFLECTION

- **Reflect on what you learned from this exercise.**
- **Reflect on the Paris case study and its relevance for societal governance in general.**

STEP 8: Implementation Planning



step 8: implementation planning - introduction



What is an implementation plan?

A design and a plan are a CONTINUUM.

A design can also be called a plan, albeit a broad one, *analogous to an architect's drawing of a house.* It describes what the system wants to BE *(i.e. its state)* and DO *(i.e. its courses of actions or functions and their intended outcomes).*

An implementation plan describes how this design of the system can be manifested. It describes what needs to be done – i.e. the strategies *(or courses of action)* that are required to (re)build the system according to the design.

By analogy, a design is like the plans of the architect, while the implementation plan is like the builder's project plan.

There can be design iterations as well as implementation planning iterations.

With each design iteration, the design becomes more detailed, *analogous to the more detailed drawings of the house (like the electricity, plumbing and other functional drawings).*

Likewise, the implementation planning can become increasingly detailed, *analogous to describing the building steps in increasing detail.*

NOTE:

An IDEAL DESIGN is a SPATIAL PLAN,
which shows the whole system, its organisation and parts at a glance.

An IMPLEMENTATION PLAN is a TEMPORAL PLAN,
which shows the step by step creation of the system as a timeline.

Yes, there is also iteration between spatial and temporal planning!

Q1: I am getting confused. You use terms like activity system, function, strategy and course of action. Are they all the same?

A1: They are related concepts, whereby ACTIVITY SYSTEM is the overarching term. It refers to an organised course of action *(as explained in Part 3).*

If an activity system is a permanent part of an entity system, it is called a FUNCTION, *like the nutrition function of a person, or the education function of a society.* A function is set up to continuously serve a purpose for an entity system.

If the activity system ends when its aim is achieved, we call it a PROJECT. *For example, the building project ends, as soon as the house is finished.*

A STRATEGY refers to a planned activity system, either a planned function, or new course of action within a function, or a planned project.

Q2: My confusion is about process and activity system. What is the difference?

A2: The more detailed definition of an ACTIVITY SYSTEM is that it is a purposeful and structured process that is governed to achieve its aims.

Within this definition, PROCESS refers to a flow of mei *(or substance),* which involves an activity.

Thus another definition of activity system would be that it is organised process. When the management literature talks about process this is what they mean and which is the same as our term activity system.

NOTE: Life is also full of unorganised or random processes or activities *(e.g. like accidents).*

ENDS and MEANS interchangeability

An outcome is an END that should be achieved. A strategy *(or course of action)* is a MEANS with which to achieve the end.

Ends give rise to means, which become ends to be achieved with more detailed means, and so on.

For example, the intended END to achieve health gives rise to different strategies (or MEANS), such as strengthening the immune system, practicing hygiene and preventing specific diseases.

If formulated as an end, having a strong immune system is achieved by the means of healthy nutrition, supplementation, exercise, stress management, emotional wellbeing, etc.

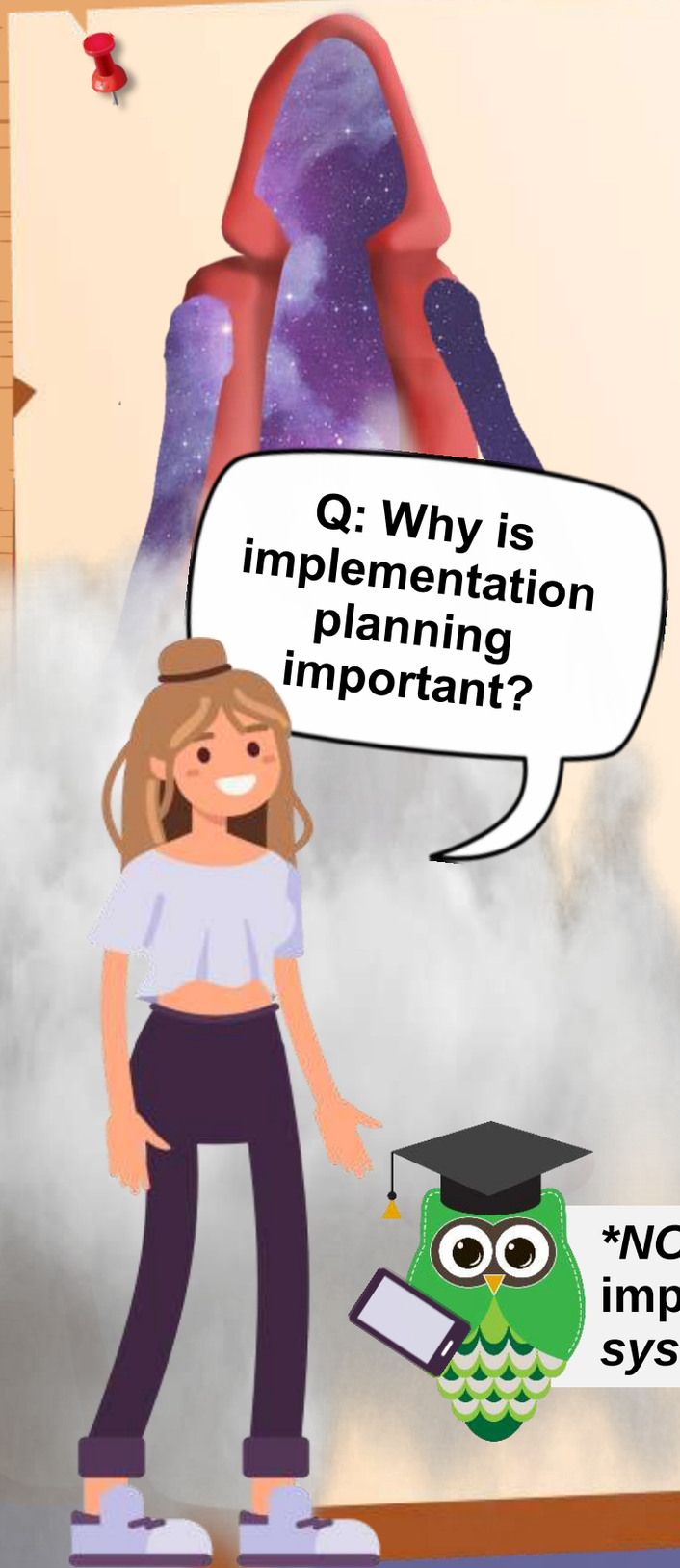
Each of those means becomes an end to be achieved with further means, such as researching healthy nutrition and supplementation, exploring an appropriate exercise programme and learning to meditate, etc.

Once these means are put into action the immune system of the person will be strengthened and the increasing health will dissolve the previous disease – i.e. the person will increasingly move towards the ideal end of health.

You can plan hygiene and prevention in the same manner.

Thus, what is an outcome and what is a planned course of action depends on who looks at it and at what level in the systems hierarchy they occur.

step 8: implementation planning – introduction *(continued)*



A: Once a detailed implementation plan is made, it becomes clear if the design can be implemented or not.

The plan could reveal various reasons why the design cannot be implemented, *such as the design being too costly, or exceeding available material resources, or not being supported by its stakeholders, or not being sustainable, or cannot be accomplished in the available time, amongst many other reasons.*

In any of those cases, the design needs to be reviewed and amended, or an alternative design will have to be chosen.

Thus there can be iteration between design and implementation planning.

If one forces the implementation of a design without planning it beforehand, one can seriously damage or even destroy the system*.

Implementation planning reveals that the design can be implemented!

***NOTE:* Read in the *Biomatrix Book (page 459)* about the failures in implementing the design of an *education system* and a *health care system* due to insufficient implementation planning.**

step 8: implementation planning - method

In principle, implementation planning is quite simple. In a nutshell it consists of

- **determining the necessary action steps *(list or draw them),***
- **establish their sequence *(i.e. which step must be taken before another and remember, steps can be sequential and parallel)***
- ***Estimate the* duration of each step *(i.e. how long each is likely to take until completion)***
- **determine the resources *(or mei)* required for each step**
- **describe who is responsible for each step.**

NOTE: **Of course, if you deal with a large system, implementation planning can become very detailed. And in some systems there will also be risk issues to be dealt with. Thus, you may have to involve experts in the planning, as well as computerised project management programmes.**

step 8: implementation planning – method *(continued)*

A: Yes. Imagine that one wants to transform the content of the education system of a country according to an existing ideal design. This will involve the following strategies :

- **redesign the curriculum**
- **rewrite school books**
- **retrain teachers**
- **develop support materials for teachers**
- **etc.**

If one also wants to change the structures of the system *(e.g. introduce on-line education),* there will be additional strategies.

Then each strategy is broken down into more detailed action steps, their sequence determined and their duration estimated. Now one will know how long the implementation of the design will take!

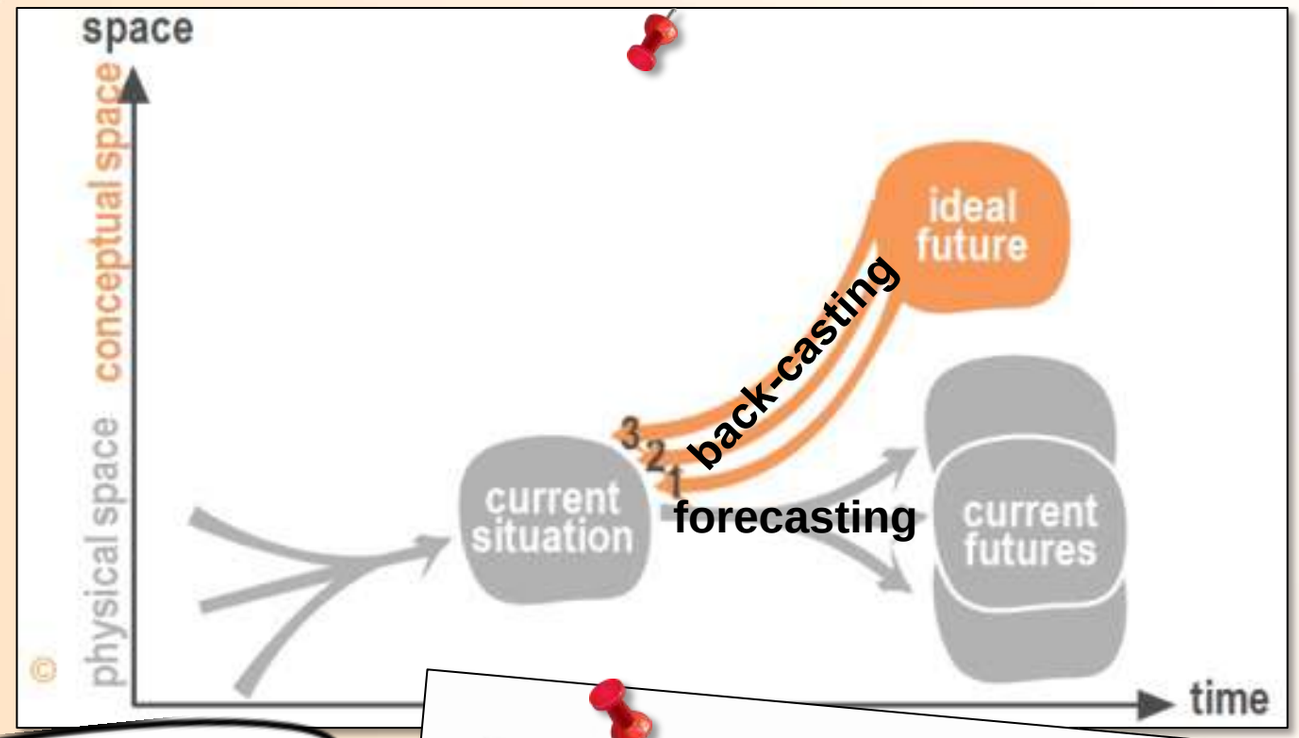
Then the resources for each step are determined. Now one will know, if the available resources are sufficient for implementing the design!

Then one needs to find out who *(i.e. which stakeholder)* is responsible for which action step. Now it will be known who must do what and if the design can be implemented, because the responsible stakeholders are willing to perform the necessary actions.

(See also the illustrations on the following Notice Board.)

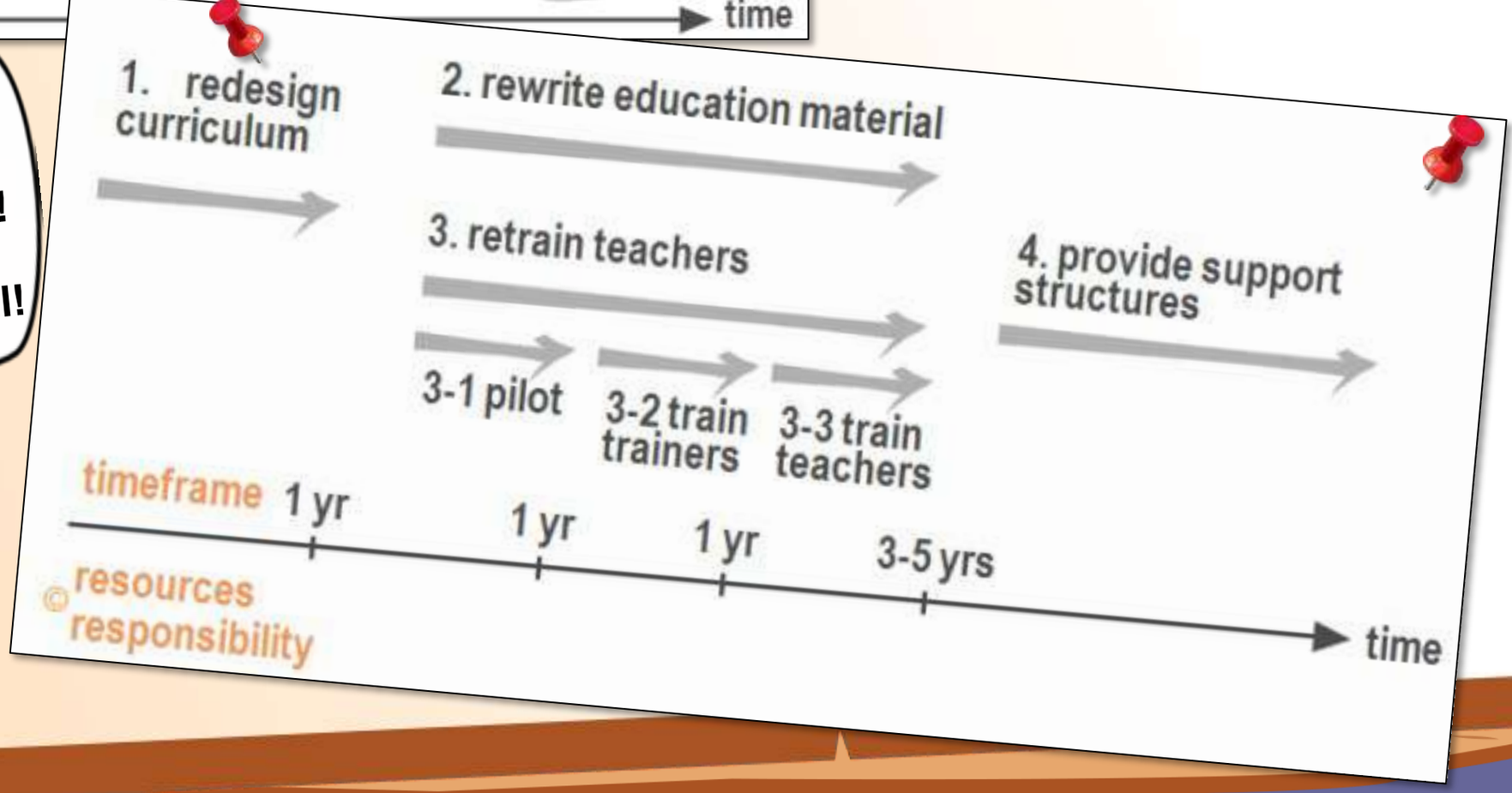
***NOTE:* To determine the strategies with which to implement a design is also referred to as back-casting.**

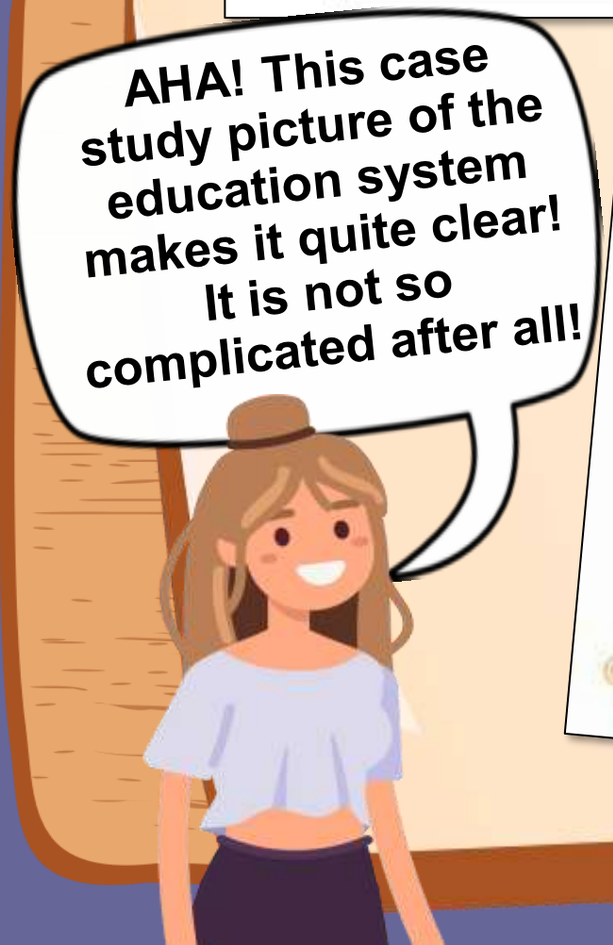
step 8: implementation planning – *education case study*



NOTE: **To determine the strategies with which to implement a design involves BACK-CASTING.**

By comparison, extrapolating the current functioning of a system into the future is called FORECASTING.





step 8: system design - *timeline*

A: A timeline depicts a period of time as a line, on which intended outcomes or other important events are marked according to their sequence of occurrence.

Let us use the previously mentioned *German Energiewende* as an example. At its inception, the share of renewable sources of electricity was 16 % and the *German Ministry of Economics and Technology* prescribed the targets of achieving 50 % by 2030 and 80 % by 2050.

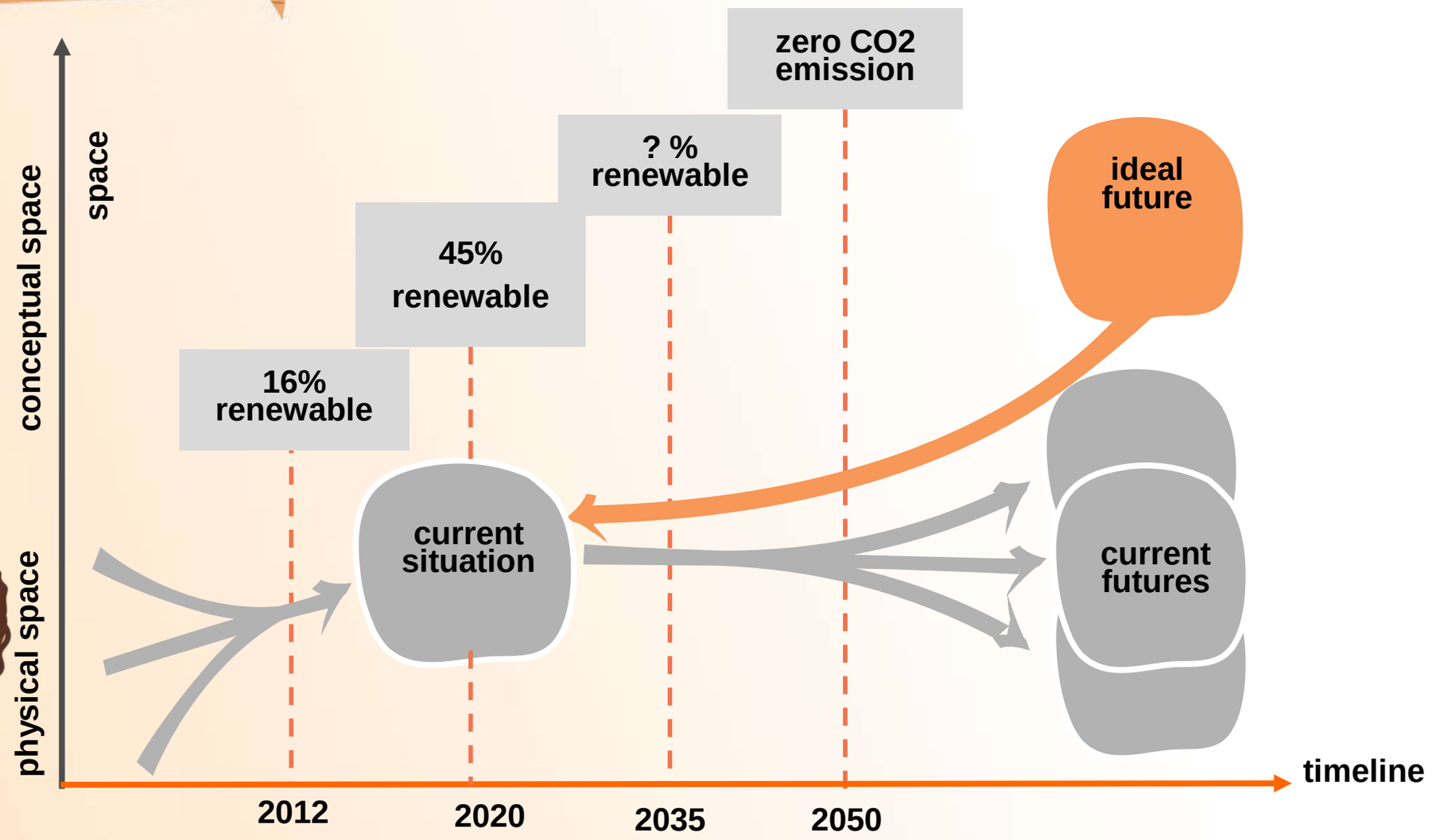
Those targets were determined more or less ad-hoc and without a thorough planning exercise, let alone a transformation design.

In the intervening years the renewable share has reached the current percentage of 45% *(with solar and wind amounting to 32%)* and the initial targets have been increased to achieve zero CO2 emission by 2050. *(Source: HW Sinn).*

This result was largely driven by political decisions *(e.g. a combination of regulation and subsidies)* and not by economic ones.

(See the following illustration of the German Energiewende timeline.)

step 8: system design – *timeline (continued)*



Some other timeless ideals of an electricity system design could be *CLEAN, FREE, DECENTRALISED, RENEWABLE, ECO-FRIENDLY,* etc.
However, to approximate those ideals would require an ideal design and implementation plan of an alternative (and more desirable?) *Energiewende!*

step 8: system design – *timeline (continued)*

A: REMEMBER **that ideals are timeless and cannot be attained, but they can be approximated *(e.g. the generating of electricity can become increasingly clean, cheap, decentralised, eco-friendly, etc.).***

Therefore, a combination of different energy ideals could prompt different energy policies and solutions. *(As it is, the German Energiewende has so far resulted in Europe's highest electricity prices, amongst other problems. Not an elegant or inspiring policy!)*

More ideals can INSPIRE more and different DEVELOPMENTS *(including technological developments)* with which to transform the system.

step 8: implementation planning – *timeline (continued)*

A: Your question actually throws us back to a previous step, that of ideal design.

If an ideal design for an *Energiewende* would have been made, it could have been driven by a list of timeless *ideals (such as mentioned above).*

In this case, alternative strategies like decommissioning the non-renewable atomic and coal generators, the large-scale introduction of solar, wind and bio-gas generators and various import strategies would have been assessed against those ideals and within the whole supply chain.

Each alternative would have been evaluated in terms of the ideals and under consideration of processing outputs *(both products and by-products),* as well as the production, utilisation and *(at the end of their life-span)* discarding of the acting and support structures and their multi-dimensional impacts on various stakeholders.

Thereby it would be established how clean, cheap, decentralised, eco-friendly, etc. each design alternative really is.

By making an implementation plan for each alternative, the specific timeline of each design would be established.

The choice of which alternative design is actually implemented, will depend on the ethos and development aims of society, as well as the other needs of society *(i.e. electricity is one of many functions that a society needs).* Thus the choice of which design alternative will be implemented also depends on how many resources a society is willing to allocate to it. *(Choosing between policy options is discussed in more detail in the Biomatrix Curriculum in W/Holistic Participatory Democracy.)*

step 8: system design – *timeline (continued)*

A: Indeed, organisations and governments often attempt to achieve aims by prescribing sub-aims along a timeline without prior design and / or planning. They do so because of the doubtful believe that this motivates stakeholders, or because they want to enforce change (or both).

They use regulatory "sticks" *(like rules, licensing and taxes)* and / or "carrots" *(like monetary rewards and subsidies)* to force the systems to change.

However, as exemplified by the German *Energiewende* and the South African education and health-care systems *(and we could add other examples from our management experience),* this approach typically creates new problems, while trying to solve others.

The w/holistic *Biomatrix Change Methodology* outlines clearly the need for both, design and implementation planning.

To achieve intended outcomes via driving them through an ad hoc timeline is clearly doing it the wrong way round. Instead following the steps of the methodology (and if necessary iterate between them) will yield a feasible timeline based on the designed strategies. Accordingly designed and planned reinforcements *(which could of course include sticks and carrots)* will allow the achievement of the planned aims in an orderly and sustainable manner.

step 8: implementation planning – planning iterations

A: Yes, there will especially be iterations in the implementation planning between the sub-systems that make up the value / supply chain and the overarching system that contains them.

Because the overarching system is co-produced by its sub-systems, the implementation plan for the whole system represents the integration and coordination of the implementation plans of all sub-systems.

There could also be implementation planning iterations between some of the sub-systems, as well as between a sub-system and its sub-sub-systems.

And of course, there could be problems with implementation in some of the sub-systems which could require changes in the overall implementation plan.

There may even emerge the need to review the original design, if the implementation planning of a sub-system reveals that the design for that sub-system cannot be implemented and affects the implementation of the design for the overarching system!

Once a detailed and coherent implementation plan exists for a system and all its sub-systems, it is known that implementation is possible. It is also known, how long it will take before the whole system is transformed.

Thus **the timeline will be an outflow of planning** instead of an ad-hoc prescription!

Design and planning iterations do not necessarily imply a fundamental change, but rather an adjustment and **refinement** in parts of the design and / or plan.

Design and planning iterations **align** stakeholders and **motivate** them to implement the strategies they have co-designed and are responsible for.

Design and planning iterations create **COHERENCE** between the system and its sub-systems!

step 8: EXERCISE

EXERCISE

Do an implementation plan for each of your alternative designs.

EVALUATE

Assess the feasibility of each design option *(i.e. can it be implemented, based on the available resources? Can it be implemented, based on the willingness of stakeholders to cooperate?)*

Do you have to do a planning or even design iteration?
If yes, do it now.

CHOOSE

Which of your design options would you prefer to implement and why?

REFLECTION

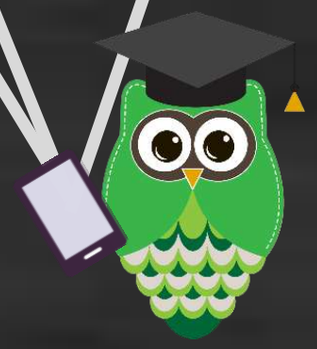
Reflect on what you learned from this exercise.

STEP 9: Design Implementation and Ongoing System Development

To accomplish great things,
we must not only plan,
but also believe,
not only act,
but also dream.
(*Anatole France*)

(*The other half of the truth:*
Anatole France, paraphrased)
To accomplish great things,
we must not only believe,
but also plan;
not only dream,
but also ACT.

"Plans are only good
intentions,
unless they immediately
degenerate into
HARD WORK."
Peter Drucker



Step 9: design implementation *(continued)*

A: Once the implementation planning is complete, each sub-system implements its share of the design according to its own implementation plan.

As each sub-system continues to change according to plan, eventually the whole system *(e.g. the whole industrial or functional value / supply chain)* gets transformed. Thus, the transformation of a system is CO-PRODUCED by ALL its sub-systems.

If one sub-system fails to implement, the transformation of the whole will be flawed. New problems will arise in the whole system as well as some of the other sub-systems. This may even jeopardise the whole design, analogous to a car which fails to drive because it lacks a part.

The outcomes of the implementation are measured at regular intervals against criteria, in order to measure the success of the implementation. *(The success criteria are determined during the design process, such as criteria associated with the different dimensions, or the seven forces of system organisation.)*

If intended outcomes are not reached, adjustments to the plan or the implementation will be made. In the case of unforeseen happenings or obstacles preventing the implementation, more design iteration could become necessary.

In the course of implementing the design, a system gets transformed, the complex problems it co-produced get dissolved and more desirable outcomes for its stakeholders will be generated in future.

Q: Does the transformation of a system imply that all its sub-systems must be transformed also?

A: No. To transform a whole system does not necessarily imply that each of its sub-systems must be transformed also. Some may only require few *(or even no)* adjustments to their current functioning.

How much each sub-system has to change is determined by the design process in which all sub-systems have to participate.

Q: And after the implementation is complete and the system is transformed, will there be *"happiness ever after"?*

A: If you mean that the system will stay forever the same, the answer is no.

If you mean that the system is **"WIRED" for self-governance and ongoing change and development,** the answer is more of a yes.

We can learn from nature that systems evolve, because they are self-governing and can therefore learn and adapt themselves to their changing environment.

By comparison, our social systems are not really self-governing. Even the current model of democracy *(which claims that the people govern)* is not based on self-governance, but on representative governance.

Thus, let us explain what it means to "wire" a social system for self-governance.

"Wiring" a system for self-governance and ongoing self-driven change and development s the **ULTIMATE** aim of its transformation.

step 9: ongoing system development *(continued)*

Self-governance of a social system implies that it must be capable of changing whenever necessary, because it needs to adapt to changes in its environment, or because it desires to do *so (e.g. to express its creativity).*

To do so, it needs to be "wired" *(or structured)* for self-governance through an ongoing Plan – Implement – Evaluate - (Re)Plan Cycle *(which we already mentioned in Slide 532).*

Once a system has established this cycle as part of its ideal governance design and follows it regularly and learns from it, it is "wired" for self-governance. It can change and re-invent itself, any time in future, besides adapting to its changing environment.

Of course, this cycle is also cascaded into all sub-systems to ensure coordination throughout the system.

(This cycle is depicted and described in more detail below.)

step 9: ongoing system development *(continued)*

strategic planning

ideal design

scan the environment

(re)plan / maintain

operational planning

self-reflective organisational learning

record the learning in repository

evaluate

implement

communicate learning to relevant stakeholders

step 9: ongoing system development *(continued)*

The Figure above depicts the ongoing self-governance cycle, which allows a system to continuously learn and change itself. Thereby the system keeps developing in accordance with its ideal design on the one hand and changes in the environment, on the other hand.

The cycle starts with regular strategic planning *(e.g. at least once a year, more frequently in systems whose environment changes rapidly*). It consists of

- **scanning the environment, exploring its inherent threats and opportunities and planning the responses of the system to them**
- **reflection on the ideal design, especially its ethos and aims *(e.g. mission and vision)* and choosing strategies accordingly. *(Alignment with design makes the system authentic.)***
- **reflection on what was learned during the last planning cycle *(as recorded in the knowledge repositories)* and building on it.**

The strategic plan is cascaded into an operational plan *(or implementation plan in the case of a project)* which prescribes the specific action steps that need to be taken in order to implement a strategy *(or a project).*

These steps are implemented by the system.

The outcome of the implementation is evaluated *(against success criteria that are part of the ideal design)* and reflected on.

Important learning is recorded in knowledge repositories, which are aligned to the organisational structure. *(Their initial establishment can be an extension of the Design Notebook.)*

If necessary there is replanning *(to make corrections),* or if the implementation was successful, the effort is maintained *(if it is an ongoing strategy)* or ticked off as completed *(if it was a project).*

Thereafter a new strategic planning cycle starts.

step 9: ongoing system development *(continued)*

A: The plan – implement – evaluate – (re)plan cycle is the process by which the activities of the system are governed.

The governance structure within which this flow of governance information happens is made up of PLANNING FORUMS, whereby the whole system and each of its sub-systems have such a forum.

The forums meet at regular intervals to engage in the governance of the system through this plan – implement – evaluate – (re)plan cycle.

The operational planning forum consists of the members of the system. In the case of strategic planning meetings, this forum is extended through representatives from other forums *(i.e. representation of sub-systems on the system forum and vice versa).* This ensures the continuity and coordination of the flow of the governance information throughout the system and all its parts *(i.e. the strategic plan of the whole system is cascaded into its parts for more detailed strategic, as well as operational planning and according implementation).*

step 9: ongoing system development *(continued)*

A: By conducting this governance cycle in a self-reflecting and learning manner and then recording important learning and communicating it to the relevant stakeholders, ORGANISATIONAL LEARNING occurs. Thereby the whole system and each of its sub-systems keep learning from their own and each other's experiences.

Management consultant will tell you that most systems *(be they private organisations or societal governments)* make the same type of mistakes over and over again. They fail to learn.

One can also observe in many organisations, that its members have creative ideas, but that they are not taken up. Again, this is a failure of organisational learning, because the ideas are not presented to and reflected on by the appropriate planning forum, nor recorded in the appropriate knowledge repository.

The reason why organisational learning is not taking place is that they do not have formally established structures and procedures for it. They lack formal knowledge management that is linked to an ongoing governance cycle.

Q: We thought that only people can learn *(besides robots, of course)*?! Now you imply that organisations *(and probably governments)* too, can learn.

A: All systems can learn. This is the essence of evolution. Systems that don't learn, die out.

Concerning organisational learning, many managers have the illusion that by sending staff on education courses, the organisation will learn.

Indeed, no! An organisation can learn without any of its people having any new knowledge per se. Instead, organisational learning occurs during the plan – implement – evaluate – (re)plan cycle.

As the members of the planning forum reflect on their experiences since the last planning cycle, they know what was successful *(and should be maintained or even magnified)* and what was unsuccessful *(and must be changed and improved).* They synthesise their insights and record them in the appropriate knowledge repository.

NOTE: IDEALLY, the concept of *LEARNING ORGANISATION* implies that if all members of the system were to be suddenly replaced with equally qualified people, the system would carry on as before, because the organisation relevant knowledge is entrenched in the system *(e.g. through plans, structures, procedures and knowledge repositories)*.
(The repositories are also a tool for inducting new members.)

Q: *Can you tell us more about the knowledge repositories and knowledge management?*

A: Insights from reflecting on recent experiences can occur during strategic, as well as operational planning. However, those insights are of a different nature and therefore require operational and strategic knowledge repositories.

The structure of the knowledge repositories is firstly aligned to the organisational structure. This implies that each function of an organisation *(or sub-system of a system)*, as well as the whole organisation *(or whole system)*, has its own operational and strategic repositories.

Concerning the structure of each repository, this depends on the nature of the (sub)system. There could also be a different structure for operational repositories *(e.g. related to each action step)* and strategic ones *(e.g. using the multi-dimensional or organisational framework as described in Step 1)*.

NOTE: Remember how the information from problem analysis *(Step 2)* and brainstorming *(Step 3)* got redistributed to the *Design Notebook* of the system that can deal with it?
The same applies to organisational learning. Knowledge that arises in one planning forum could be relevant for another forum and needs to be communicated to them and recorded, so that they can reflect and act on it during the next planning cycle. Thereby organisational learning has taken place.

PART 7:
W/Holistic Change MANAGEMENT

C: PHEW. This is a lot of information!

We thought that all we need is a methodology for problem (dis)solving and system (re)design!

Q: And now we also need change management. Why?

And what is the difference between them?

**NOTE: Methodology vs. Method*

A **methodology** consists of a series of **methods.**

For example, the manual gives you some methods, while the manufacturer has still other methods as part of a whole methodology, which is derived from the way the product was designed and produced.

A: The difference between a change **methodology** *(e.g. for problem (dis)solving and system (re)design)* and **change management** is like this:

If one of your gadgets stops working, the trouble shooting section in the instruction manual gives you a METHOD for fixing the problem.

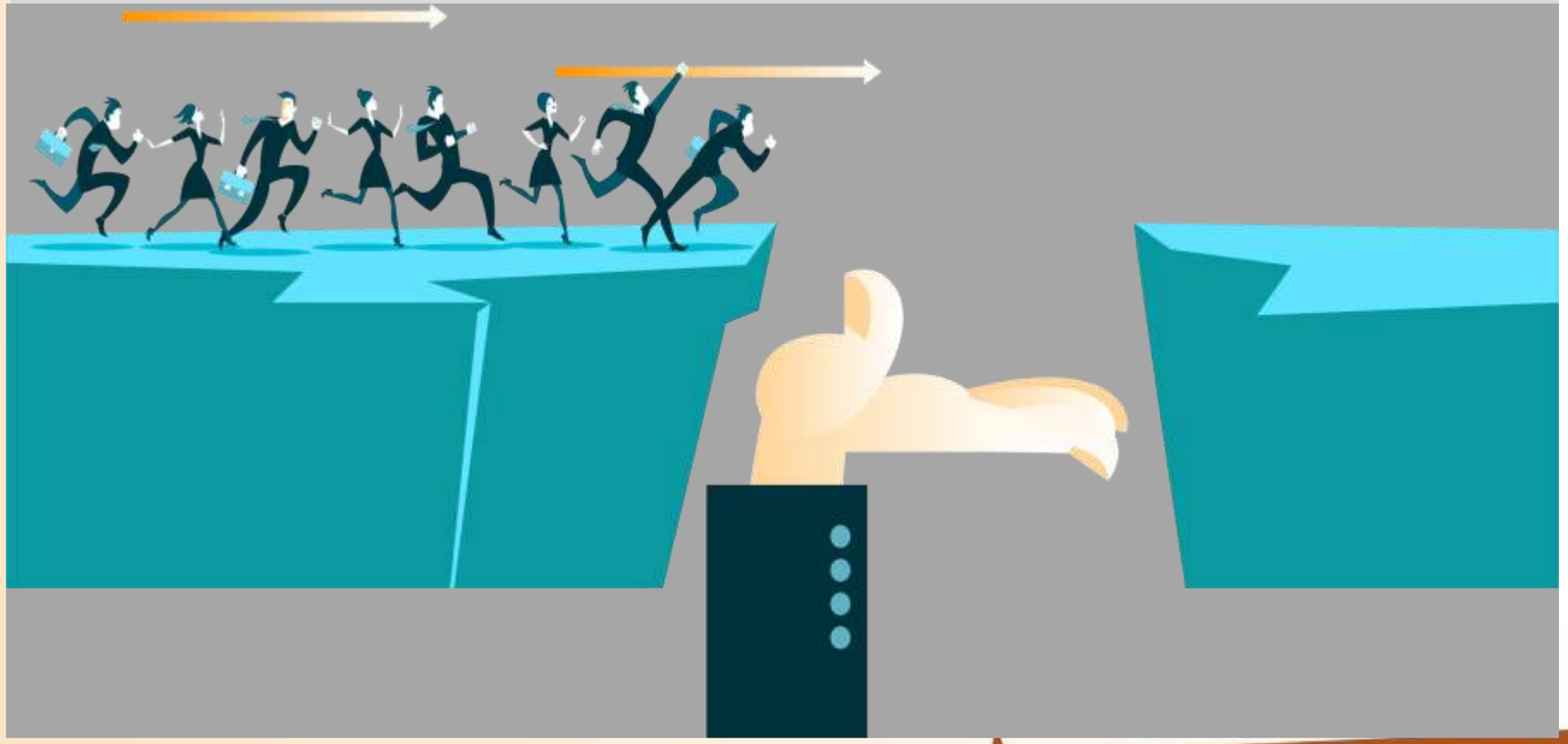
However, this method is not enough. You will need to APPLY it *(by fixing the gadget yourself according to this method)*, or manage the change in another way *(such as going to a repair shop, or returning the faulty product to the seller)*. Those activities are change management.

What is the use of a design if it doesn't get implemented?

NOTE: why change management?

Organisations and governments *(and your personal life too)* are littered with good ideas / strategies / designs / plans which

- **either were not implemented at all *(because no-one took responsibility for taking them up and / or pulling them through)***
- **or failed because of wrong change management *(such as selecting a poor methodology, failing to engage and support the stakeholders, overlooking important stakeholders, or having insufficient resources for the change, amongst other difficulties)***



Part 7.1
W/Holistic change management principles

- Resistance to change
- Momentum versus intent
- Clockwise versus counter-clockwise change
- Emerging change
- Order vs. Chaos
- Creating order
- Transformative change
- Transforming a system
- Speed of change
- Momentum of change
- Reducing resistance to change

resistance to change

Most social systems resist change in the short term, but change radically in the long term.

As you probably experienced already, the first reaction to proposing a change is usually something like:

- **No, this can't be done!**

  or

- **This change? Not in a thousand years!** ***(Those are famous words by a statesman who was out of office a year or so later, due to the change he referred to, which was largely brought about by external developments.)***

Likewise, if you had told someone 10 years ago what is happening now in your organisation or in society, they would not have believed that such radical change could ever occur.

Thus, if radical change is anyway inevitable, why not steer the process into a desirable direction, guided by an ideal design of your system?

momentum versus intent

Remember:
Systems can change by DEFAULT (*i.e.* MOMENTUM), or DESIGN (*i.e.* INTENTION)

Remember:
Change by DEFAULT leads to a CURRENT FUTURE, while change by INTENT can lead to an IDEAL FUTURE *(if it is guided by an ideal design)*!

MOMENTUM

The thinking, strategies, laws, structures and resources that are entrenched in the current system perpetuate the way that the system currently functions. They give rise to the MOMENTUM of the system, which implies that the system will keep doing more of the same. Momentum represents habit or a default setting. It drives a system into a CURRENT FUTURE.

The larger the system is, the bigger is its momentum and the more effort and time are required to change it, *analogous to turning or stopping a small boat versus a super-tanker.* Any attempt to change a system will meet the resistance arising from the momentum and could be deflected or stopped by it.

Change arising from momentum is likely to make the system increasingly problem riddled and out of sync with the environment. Eventually the system could collapse, be taken over by another system or forced to transform. The frogs have boiled to death! *For example, the current finance system falls into crisis after crisis and the adaptive changes (like the bank bail-outs) are made to maintain the current system (as it is apparently too big to fail). When the next crisis comes is merely a question of time and a collapse of the whole system is a real possibility.*

momentum versus intent *(continued)*

INTENTION

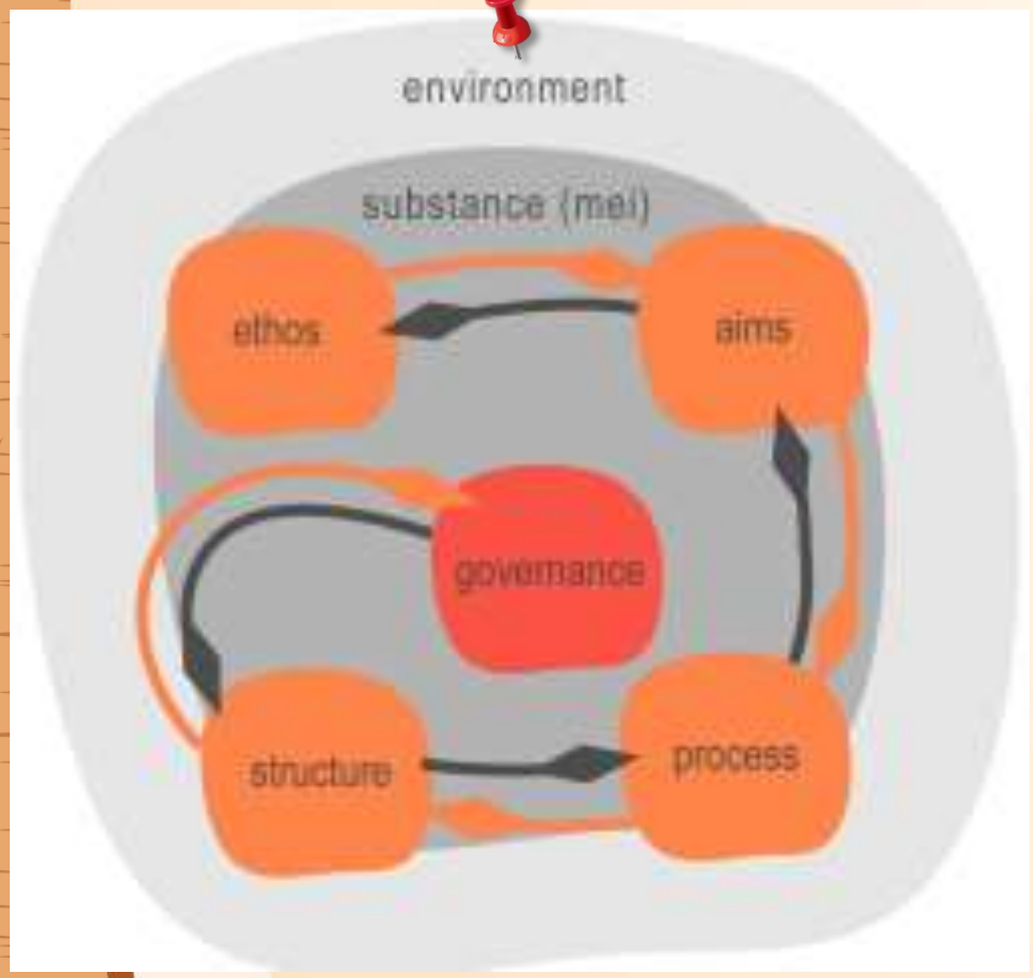
Intentional change is based on a desire to change, or is derived from a need to change due to a change in its outer or inner environment.

- **If the intended change is an outflow of current thinking it also represents momentum and leads to a current future.**
- **If the intended change is an outflow of a w/holistic ideal design, the system will transform and its own complex problems and those it co-produces, will dissolve.**

NOTE: **Yes, we could even transform the finance system w/holistically and in the interest of citizens, if we would make an according IDEAL DESIGN and implementation plan.**
And if some leading governments were to get together and spearheaded its implementation.

The alternative is a reset of the current system by a finance lobby that perpetuates and even accelerates the MOMENTUM of redistribution from the 99% of humanity to the 1% super-rich *(a dystopian current financial future indeed)!*

clockwise versus counter-clockwise change

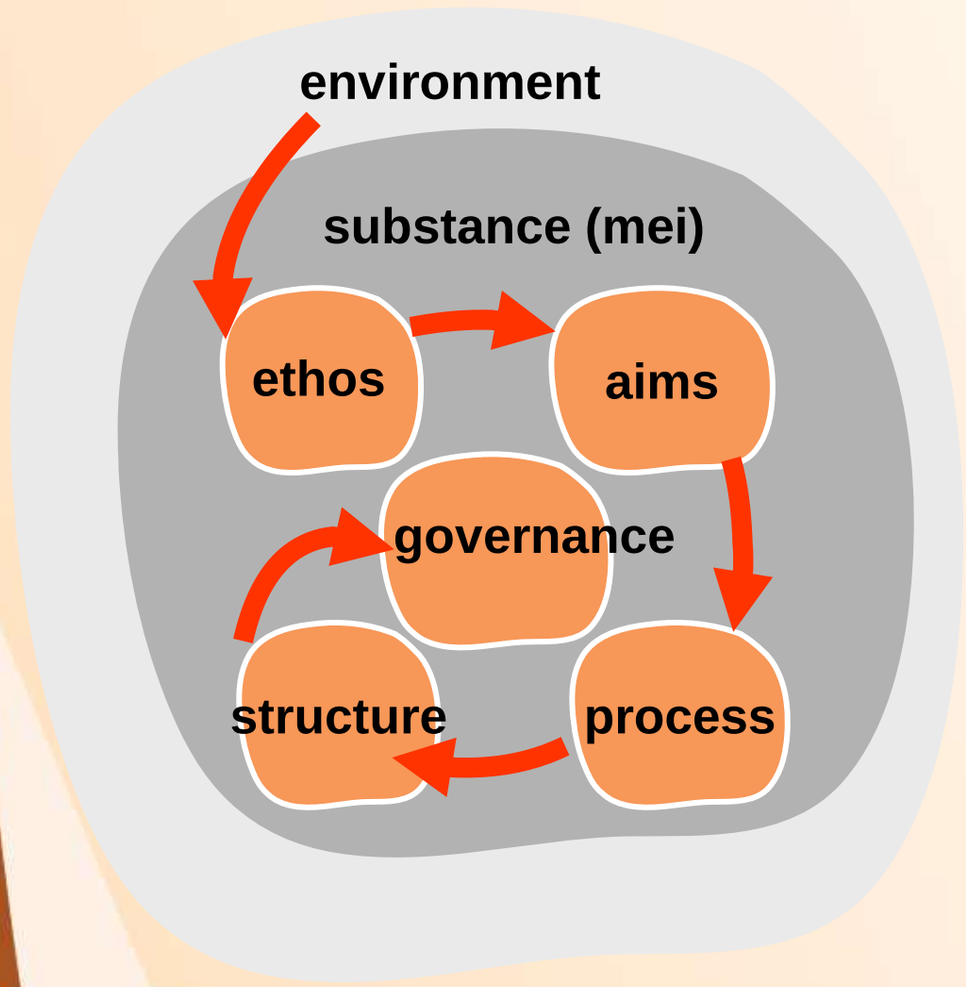


As already referred to in *Slide 517*, the change in a system is an interplay of the seven forces of system organisation, namely its (1) ethos, (2) aims, (3) processes, (4) structures, (5) governance and (6) substance, as well as their interaction with other systems in the (7) outer and inner environment .

These forces also influence each other and give rise to *(what Biomatrix Theory refers to as)* a

- **CLOCKWISE Change *(illustrated by the orange arrows)* and**
- **COUNTER-CLOCKWISE Change *(illustrated by the black arrows) .***

clockwise versus counter-clockwise change *(continued)*



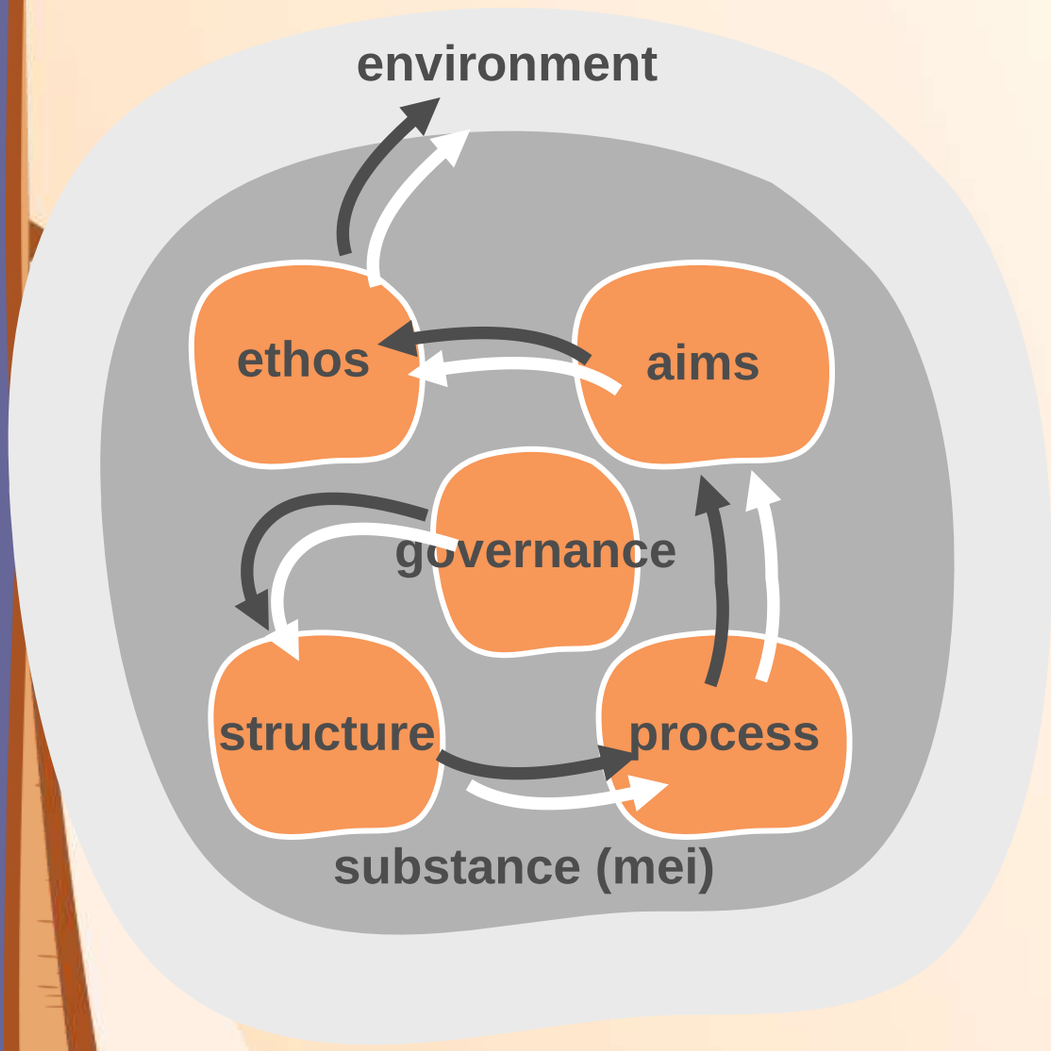
Clockwise Change

An ideal design is created in a clockwise manner. This means that the design process proceeds as follows:

- **choosing the desired ethos and aims,**
- **under consideration of environmental conditions**
- **then designing the process with which to achieve the intended aim *(under consideration of available resources and processing by-products)***
- **and the structure that channels the process *(based on available resources and consideration of impacts)***
- **then determining the governance *(i.e. regulatory structures, procedures and criteria)* that will ensure that the process achieves the intended aims and in accordance with the desired ethos.**

This clockwise change is illustrated by the direction of the orange impact arrows.

clockwise versus counter-clockwise change *(continued)*



Counter-clockwise Change

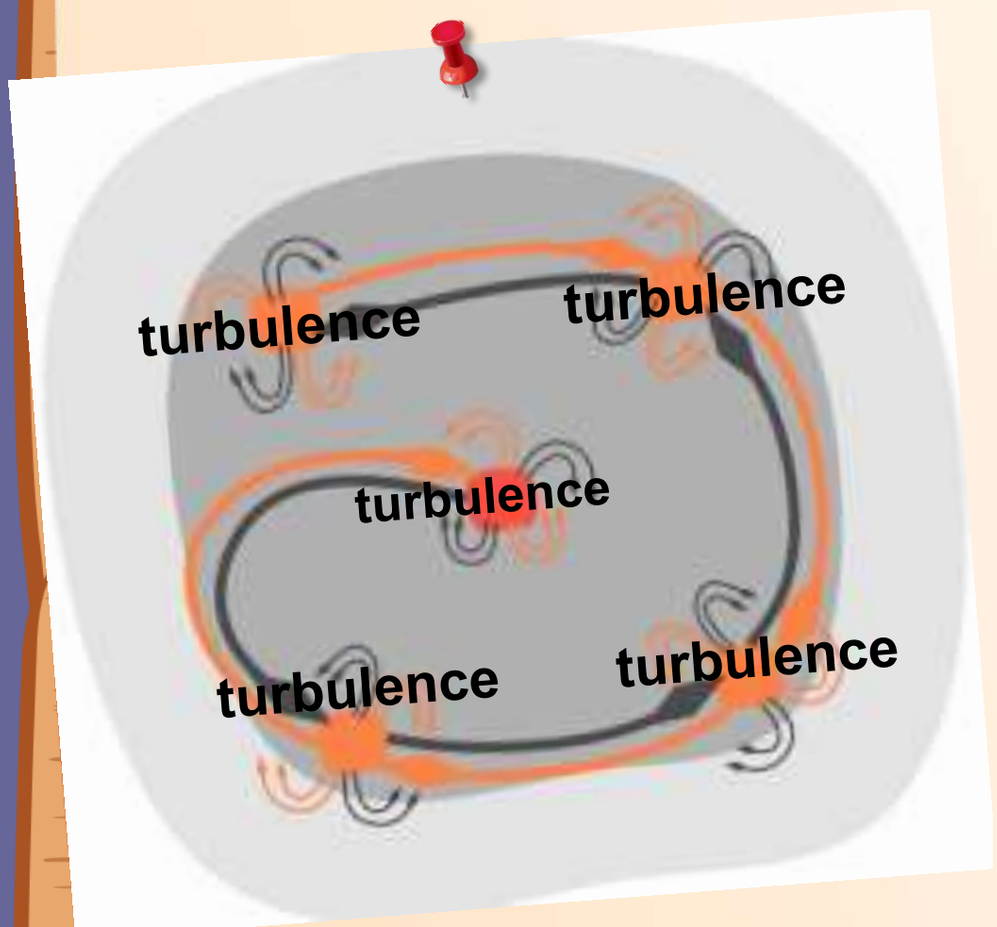
The counter-clockwise change maintains the system as it is. It represents the MOMENTUM of the system. The reason for it is that the

- **the current governance maintains the existing structure,**
- **which continues to channel the process in the same way and**
- **thereby reproduces current aims and**
- **reinforces the current ethos**
- **as well as maintaining current environmental relations.**

The counter-clockwise force of change drives a system into its current future, whereby in the case of

- **a problem-riddled system it increases its problems in future *(illustrated by the black arrows)* and**
- **a transformed system, it entrenches the system functioning as intended by the ideal design *(illustrated by the white arrows).***

The counter-clockwise change is indicated by the direction of the black and white impact arrows.



EMERGENCE

The actual change of a system EMERGES from the interaction of the MOMENTUM of a system through *counter-clockwise change* and from INTENTION through *clockwise change.*

Any intentional change that is introduced into an existing system that challenges its momentum will be resisted. The system will attempt to prevent the change from happening or amend it to fit into the status quo.

In the short term, the momentum will oppose the introduction of change and TURBULENCE will arise.

In the longer term the resistance lessens, partly because the change will change the direction of the momentum and this new direction will become familiar. Also, if the design was in harmony with the environment, the environment will reinforce the intended change .

Thus any system change is always an EMERGENCE between momentum and intention.

A: NO. This is a fallacious argument.

The collapse of a system *per se* does not mean that something better will follow.

On the contrary, *the revolution devours its own children*, as the saying goes. This means that the bad is often replaced by worse, *like falling from the frying pan into the fire.*

If a system collapses before a better one is already inherent in it *(i.e. has been designed and prepared for)*, the result will be increasing DISORDER.

order *versus* chaos *(continued)*

Q: Some say that deliberately introducing chaos will accelerate change?!?

A: This is another dangerous and destructive idea that some change managers advocate, hoping that by introducing deliberately more chaos *(or disruptive change), they* will force the system to change.

It is important to remember that systems can collapse rapidly, but they take a long time to be built up again in a similar or transformed way *(as any war situation demonstrates)*. Some systems never recover. A collapse typically involves suffering for the system and all or some of its members and even other stakeholders (*like the animals in a war*).

It is much smarter to start transforming the system before it collapses, by redesigning it, making an implementation plan and setting change in motion that introduces more and more of the designed ORDER into the current system. The gradual introduction of a new order *(according to the steps of the implementation plan)* nudges the system into a new direction towards a more desirable future and eventually transforms it.

***NOTE:* If the change management is well done *(e.g. by using a w/holistic methodology and involving stakeholders in design and planning iterations to generate their alignment and increase their motivation),* the transformation of a system is likely to succeed!**

And it does not need to be traumatic at all!

transformative change

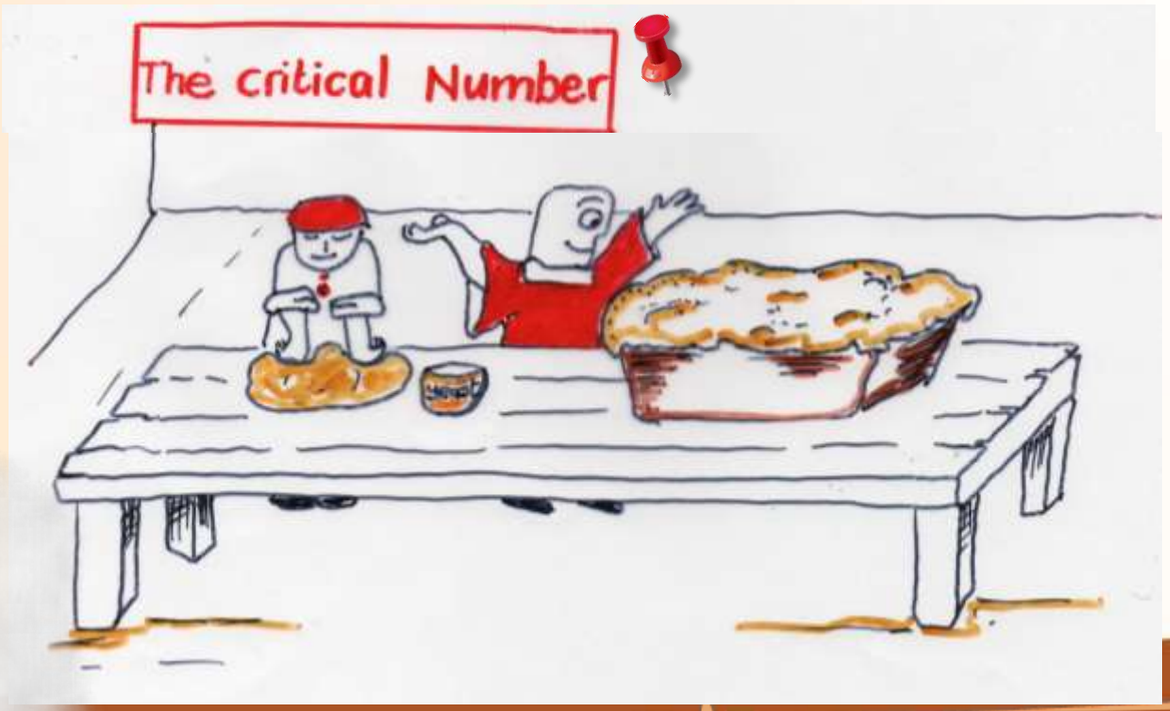
A: Order arising spontaneously from chaos? This is another misunderstood idea. Order does not arise from chaos, unless its seeds are already present within the seemingly chaotic system.

A better system can replace or arise from a declining system ONLY, if the new order is already inherent in the old order.

This could be because parts of the system begin to change and function differently, or that a new system exists in concept *(e.g. like an ideal design)* and starts to in-form *(i.e. put according form into)* the system during its decline.

This can be illustrated by the analogy of the yeast in the dough, which starts to work when the circumstances *(e.g. nutrients, temperature, etc.)*

The yeast in the dough also illustrates that it only takes a small amount of the right ingredients to change a system.



transformative change *(continued)*

OTHER TRANSFORMATION ANALOGIES ARE:

the caterpillar becoming a butterfly, which can only happen because the information is already in the DNA;

or

the phoenix rising from the ashes

after igniting itself,

which signifies that a system can renew itself in matter, based on its inherent spirit

(i.e. the "fire" of in-formation).

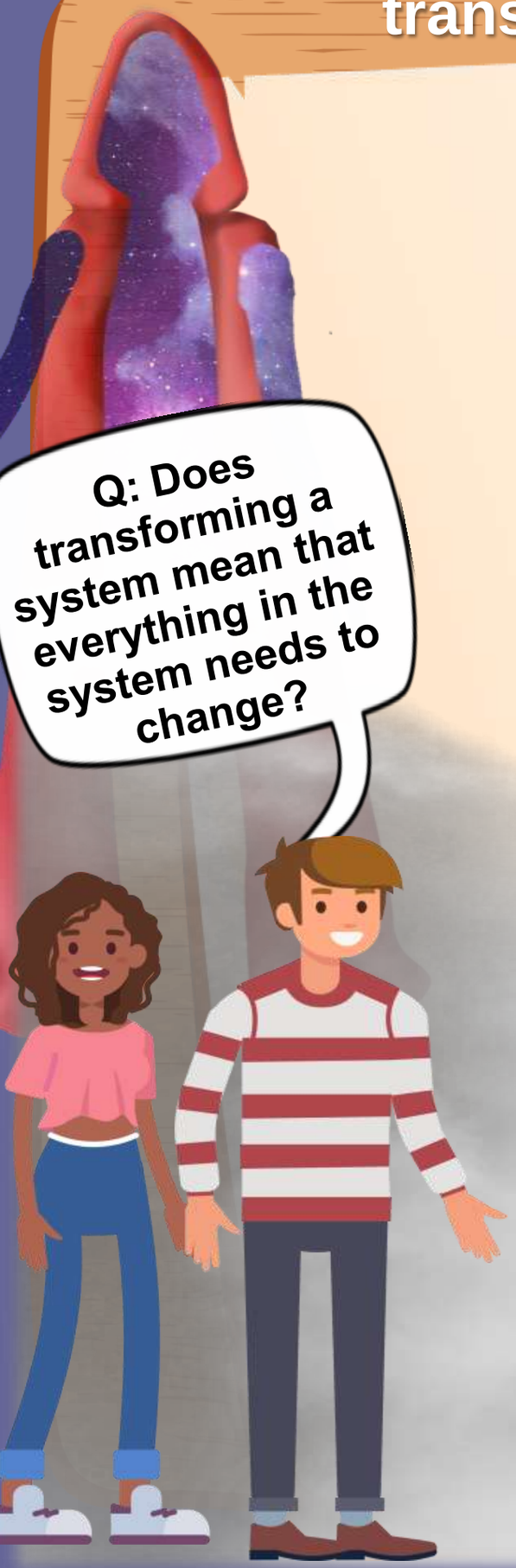
transformative change *(continued)*

A: Yes, the transformation from chaos to order *(or from a current to a new ideal design based system)* can seemingly occur spontaneously. It can appear to be so.

But actually, it is initiated be a few and then gradually builds up, until a critical mass is reached which then transforms the whole system – seemingly spontaneously.

This can be illustrated by the analogy of the HUNDREDTH MONKEY: On one island, a monkey discovers how to wash sand off his food. Other monkeys copied this. As the hundredths monkey washes her food, the monkeys on other islands begin to do likewise – spontaneously and without having learned it from others.

(the analogy suggests that a critical number can change the morphogenetic field of a species, which in-forms all members of the species.)



A: No, of course not!

The famous systems thinker Ackoff said: "*Imagine that the system has been destroyed last night. You are only left with all its resources. Now reorganise them based on an ideal design."* This means that the physical stuff and your knowledge remains, but they need to be deployed in different ways.

Thus, a transformation does not always imply eliminating the old system completely. By analogy, to transform a house one does not necessarily need to demolish it *(although sometimes it means just that.)*

One can also renovate and innovate *(e.g. by knocking down some walls, putting in extensions and new floors and upgrading the infrastructure).*

Likewise, the transformation of a social system *(be it the democracy, education, finance, energy or any other system)* could maintain some structures of the old system, albeit as inherent part of the design, besides adding new parts.

Or to use another analogy: as human beings we still have the reptilian brain which governs important functions in our body, although we have evolved limbic and cortical structures since.

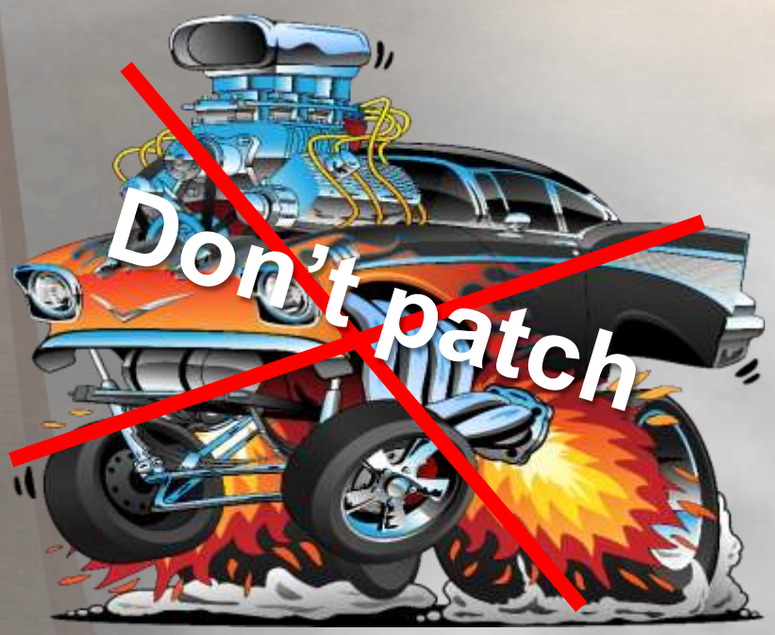
NOTE: One can even live in the house while changing it.

We certainly cannot put our democracy, health-care, education, or finance system on hold, while transforming it!

transforming a system *(continued)*

BEWARE: Don't patch

Remember Ackoff's warning that patched together systems perform sub-optimally *(like a patched up car).*



TOP DOWN *versus* BOTTOM UP change

Patching is a "bottom up" approach, whereby uncoordinated ad-hoc solutions are added to the system. Even if they sound nice in themselves, they do not "hang together" and only clutter and fragment the existing system and make it perform poorly.

By comparison, ideal design is ultimately a "top down" approach, whereby information is cascaded from the whole into its parts. At the same time, the design incorporates solutions that are provided "bottom up". However, these are selected and incorporated from the perspective of the whole system.

An ideal design considers how the system should ideally function in its entirety, while the implementation plan shows the steps involved in bringing about the transformation of the system and the change management plan suggests how the stakeholders will be guided through the design and implementation process.

By thinking through the change beforehand, much conflict, chaos and inefficiencies can be avoided and the turbulence and resistance arising from the momentum of the current system can be minimised.

The MOMENTUM of a system determines how long it takes to change it.

A system cannot change faster than its momentum allows. If it tries to do so, the survival of the system can be jeopardised, *analogous to a capsized tanker that changed its course too rapidly.*

One can calculate the time required for changing a system by making an implementation plan for the intended solution or design. Such a plan lists the action steps involved, the time required for each step and their sequence. By adding up the sequential steps one can estimate the time it takes for the change to be implemented.

Implementing change beyond the momentum of the system and without an implementation plan will NOT result in desirable change. It will merely increase disorder and create more problems. It can even collapse the system or parts thereof.

(See the previously mentioned case study of the problems that occurred as a result of an unplanned implementation of an Education and Health-Care System Design in the book Biomatrix: A Systems Approach to Organisational and Societal Change, page 459).

momentum of change

Once a change is initiated, it can create its own accelerating MOMENTUM.

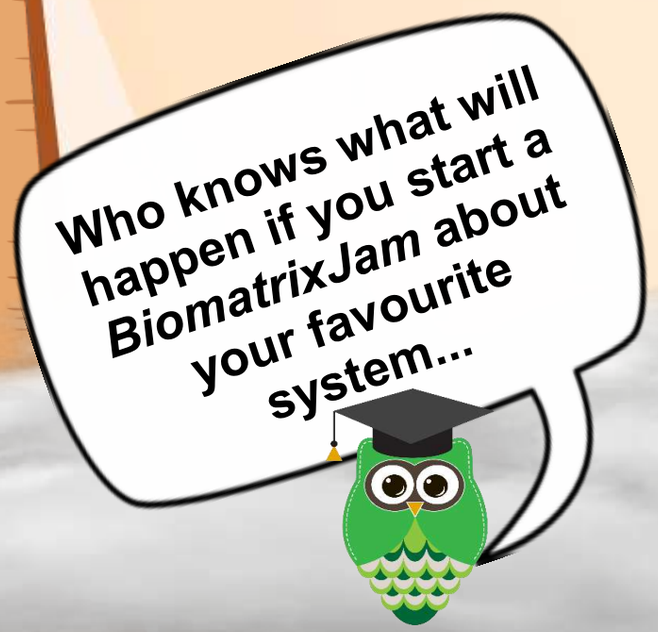
We are familiar with information going viral, spiralling out in an unforeseen manner. In the information age this has no apparent bounds.

Going viral also holds the potential for direct participation in politics – i.e. a direct democracy *(See also the Biomatrix Curriculum in W/Holistic Participatory Democracy)*

The design iteration phase aims to spiral the design out into ever widening stakeholder circles. Thereby stakeholders get aligned and create a new collective conceptual reality of how things can be, which eventually becomes the new physical reality.

Our favourite change management case study is the previously mentioned *Redesign of Paris.* *(See Step 7 of the Change Methodology.)* Yes, the example is nearly half a century old, but we still have not lived up to its potential.

***The BiomatrixJamming and Design Conferencing* is a digitalised version of it.**



reducing resistance to change

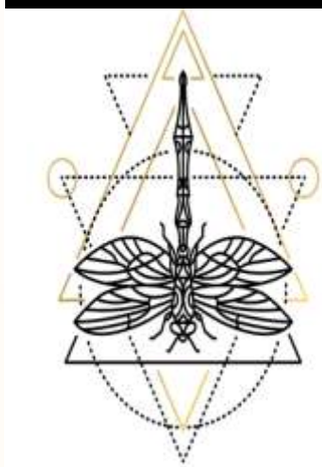
In transforming any social system, it is useful to remember:

Transforming a system does not have to be a traumatic process: **Although systems typically resist change in the short-term because they fear change, they nevertheless change in the long-term *(often quite radically)* because of the necessity of adapting to their changing environment. Ideal design smoothes the change, besides giving it the desired direction.**

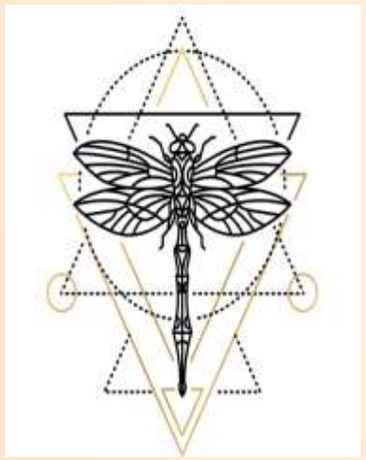
If we don't know the problems we cannot find solutions: **Complex problem are always co-produced by other systems. These co-producers must be found and their contribution understood. And they need to be persuaded to participate in co-designing and implementing a change towards a more desirable *(win / win based)* future.**

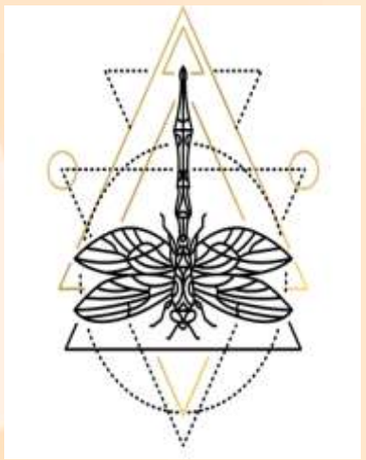
One cannot transform a perfect system: **The more problems a system has, the more opportunities for change it has, as each problem gives rise to new possibilities *(derived from w/holistic brainstorming).***

What we cannot imagine, we cannot create: **To know *(in appropriate detail)* if and how the new system can work, requires an ideal design of it. A w/holistic design ensures that all changes that will be made to the system will be coherent and aligned with the design.**



reducing resistance to change *(continued)*





What we do not plan, we cannot implement! **The purpose of an implementation plan is that it provides certainty that the design can be implemented. The reason for this is that the planning has thought through all action steps in detail, considered their resource and time requirements and allocated responsibility. Therefore the change process is feasible and the design is implementable *(in principle and provided the responsinle stakeholders cooperate)*!**

A change in conceptual reality in-forms physical reality: **Through having co-designed a new conceptual reality of the system *(i.e. through participating in an ideal design)* the stakeholders become familiar with the new system and how it should function. Through implementation planning they understand their specific contribution to co-producing the manifestation of the transformed system.**
By having thought through the change in conceptual reality, its feasibility has been established and its manifestation in physical reality has been experienced as being possible. The change has already happened in the mind, is familiar and will not be experienced as being traumatic anymore.

Participation crates synergies: **If the design and planning process is participatory, stakeholders are able to contribute their concerns and ideas. They also learn about and consider concerns and ideas of the other stakeholders *(and sub-systems),* which become the foundation for developing synergistic and win / win solutions.**

reducing resistance to change *(continued)*

Participation aligns and motivates: **As stakeholders participate in the design process, they co-create the design and align around the shared design.**

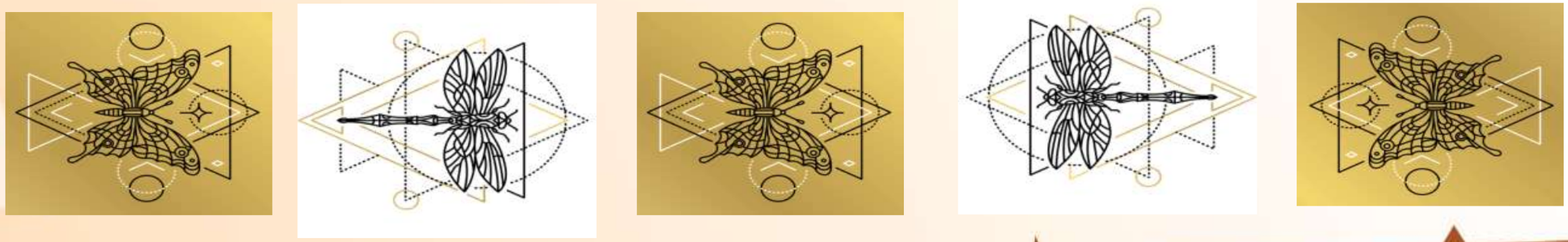
By participating in implementation planning, they become motivated to implement their share of the change and thereby co-produce a system transformation.

Change takes on its own momentum: **If people interact around a shared aim and get others involved also, they generate momentum. Synergies arise and surprising things can begin to happen, seemingly spontaneously!**

At the same time, the change can appear chaotic, as the force of intention clashes with the force of momentum. Thus change is always unpredictable, even if it has been carefully planned.

A transformation is complete when the intended change becomes the momentum. **The turbulence from introducing intended change into a system and arousing its resistance gets less with time.**

When the system begins to function according to the design, the intention has become the momentum that drives the system automatically into the desired future of the design. The ideal future has become a current future.



PART 7.2
W/Holistic Leadership

We call leaders who understand and operate from a w/holistic worldview w/holistic leaders or *W/Holiparts.*

We also distinguish between

- **CONTEXT leaders and**
- **CONTENT leaders**

Q: What is the difference between leadership and management?

A: There is indeed a difference:

- **MANAGEMENT** maintains the current system and strives to achieve its aims as efficiently and effectively as possible.
- **LEADERSHIP** initiates transformative change in the own system and also initiates change beyond the boundaries of the own system, because the leader identifies with and takes responsibility for the larger whole *(i.e. the containing or overarching whole).*

Therefore lobbyists, who by definition act in the interest of a specific stakeholder, are not leaders!

Why not choose to become a LEADER in your system of concern?

w/holistic leadership: W/Holiparts

A: To initiate change in a system requires that someone associated with or concerned about a system assumes LEADERSHIP for it beyond what s/he is mandated to do by the (sub)system s/he represents.

W/Holistic leadership implies that the leader thinks w/holistically, on the one hand and on the other hand identifies with and acts from the perspective of the larger *(i.e. containing or overarching)* whole which includes the part to which the leader belongs, as well as other parts.

Unfortunately, most of the numerous so called leaders that exist throughout the world are locked into reductionist and current logic thinking *(i.e. the thinking entrenched in the current economic, cultural and political systems).*

As a result they merely recreate the existing systems *(in a more of the same manner),* or patch them up with ineffective solutions. Thereby having little impact on solving the complex problems in our societal and planetary systems.

Sometimes they make them even worse. *For example, a solution such as locking people up during a pandemic may save some people from dying of the disease, but it also leads to an economic disaster and many more people dying from poverty*. Thus it solves one problem and creates many more and even bigger problems somewhere else. The politicians who enforce such pandemic measures are reductionist in the extreme. They lack w/holistic thinking and therefore the proportionality derived from a larger perspective.

To transform a system requires leaders who think and act from a different worldview, namely w/holism. We need w/holistic leaders in all social systems who can transform such systems.

We call such leaders W/Holiparts.

w/holistic leadership: W/Holiparts *(continued)*

A: A W/Holipart is a w/holistic leader.

And as the word itself expresses, a w/holipart identifies with both, the whole and its parts.

Although a w/holipart is part of a system, s/he nevertheless identifies with the whole *(i.e. the containing or overarching whole).* And in doing so, s/he automatically has to consider all other parts of that whole also.

The challenge of the w/holipart is to balance the concerns and interest of the part s/he represents with that of the other sub-systems and that of the containing whole in in a win/win manner and in the short, as well as long-term.

To do so, the w/holipart must have some knowledge of w/holistic theory and methodology in order to lead his / her system to participate in the co-design of its containing whole.

A w/holipart should also be able to inspire and motivate stakeholders to align with and implement the new design.

There are some w/holiparts who are concerned with providing the context for change and others with its content.

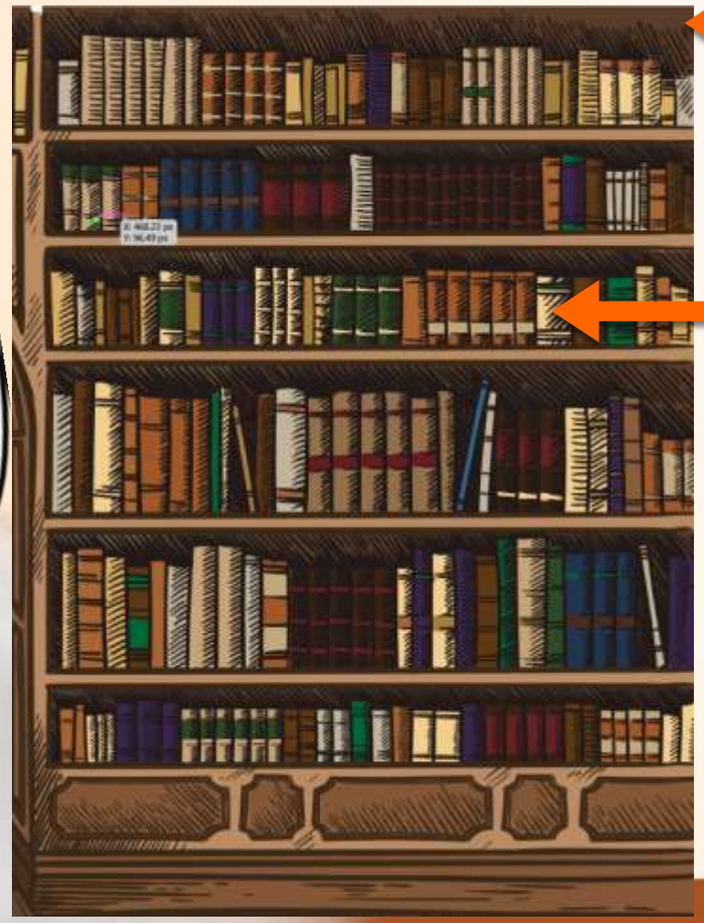
w/holistic leadership: types of w/holiparts

Q: Are you saying that there are context and content leaders?

A: Yes, we distinguish two types of wholiparts *(or w/holistic leaders),* namely

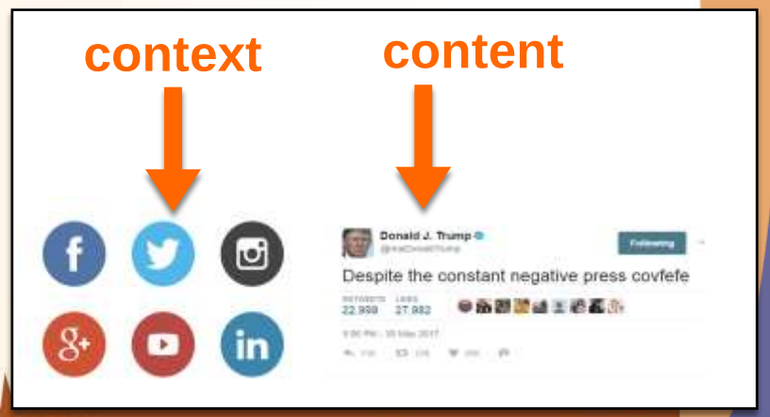
- **CONTEXT w/holiparts**
- **CONTENT w/holiparts**

To redesign a system, one needs both types.



context

content



Remember the difference? Are you a bookshelf or a book, a platform or a user?

CONTEXT W/Holiparts are the change FACILITATORS.

As the word implies, *Context W/Holiparts* need to hold the context of a system transformation. They are the change facilitators and change managers.

They need to encourage the participation of all parts of the system and their stakeholders and ensure that the outcome is a sustainable and coherent design of the whole system and its sub-systems, according to w/holistic design principles.

The *Context W/Holiparts* are not concerned with the content of the change *per se*, other than pointing out content that does not seem to adhere to the w/holistic design ethos and generic w/holistic organising principles.

They do not side with any specific stakeholder view, but ensure that all views are heard and that there is no dominance by some stakeholders *(like a lobby)* or the ignoring of others.

They should be neutral in terms of the content of the change and strive for balance and encourage the search for win / win solutions.

If they have strong views on how the system should ideally look like, they cannot be good context facilitators. They should rather join the design team as a *Content W/Holipart*.

Knowledge needed by the *Context W/Holiparts:*

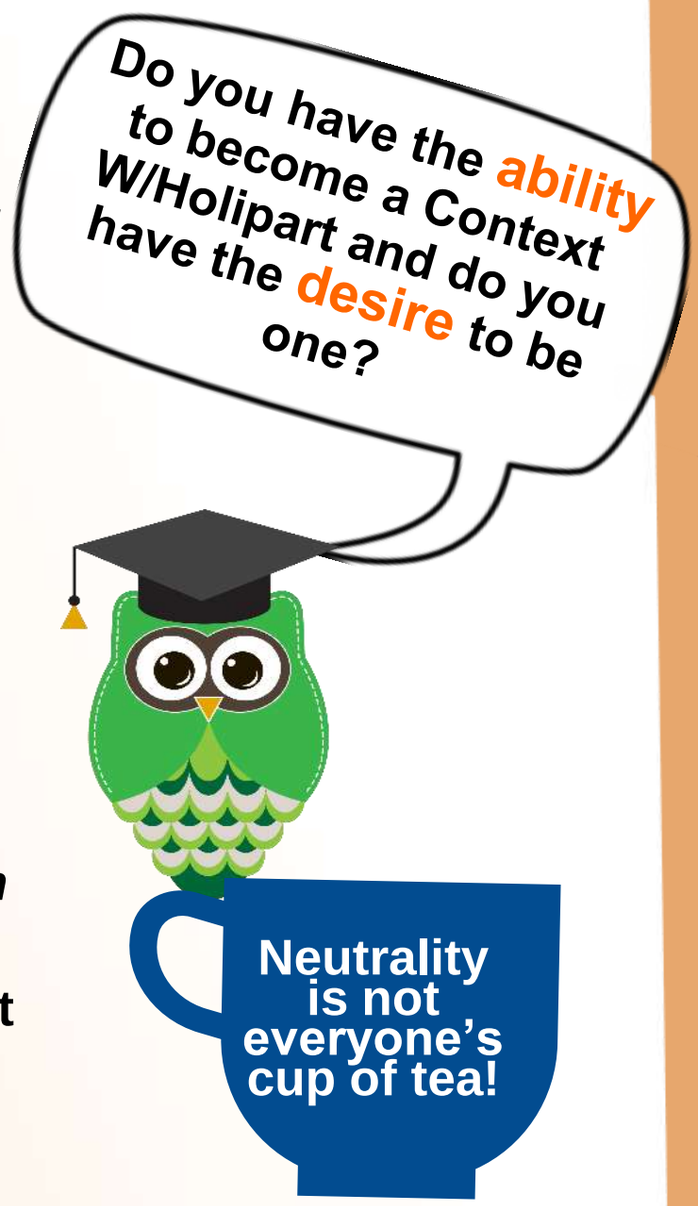
A *Context W/Holipart* is concerned with applying *Biomatrix Theory* and *Biomatrix Methodology* correctly *(e.g. ensuring that all categories of stakeholders are represented, that the right framework is used, that w/holistic organisig principles are considered in the design and that information is classified appropriately).*

This implies having a working knowledge of w/holistic theory, methodology, change management and tools like *Biomatrix Jamming* and *Conferencing*.

To acquire this knowledge, the *Context W/Holiparts* will need to do the relevant *Biomatrix System Design Courses.*

A *Context W/Holipart* does not require detailed content knowledge of the system which is to be transformed, as this will be contributed by the *Content W/Holiparts*. *For example, the same Context W/Holipart can facilitate the transformation of an education, finance or electricity system without being an educationist, banker or electrical engineer.*

However, they do need sufficient understanding of the content knowledge to able to guide reflection on it in terms of the generic w/holistic organising principles and to make sure that the design adheres to them.



w/holistic leadership: CONTENT W/Holiparts

CONTENT W/Holiparts are the stakeholder representatives.

They participate in the redesign of their system and the solving of its problems based on their unique function-specific knowledge *(like the experts you met during your journey)*.

On the one hand, the *Content W/Holiparts* know the functioning and interests of their sub-system and some solutions to its problems. They ensure that the interests of their sub-system are considered in the (re)design of the whole. *(Of course, this is what all stakeholders and even lobbies do and per se does not require w/holistic leadership).*

On the other hand, they are ALSO willing and able to consider the interests of and solutions for the containing whole and its other parts and their stakeholders.

And most importantly: the *Content W/Holiparts* are willing to consider changes to their sub-system in the interest of the larger whole.

They participate in a win / win manner, instead of aiming to maximise their self-interest.

They follow the w/holistic ethos of optimising the whole (not the part) and agreeing to fair rewards for all stakeholders. Thy also subscribe to the value of minimising negative impacts.

w/holistic leadership: CONTENT W/Holiparts *(continued)*

Knowledge needed by the *Content W/Holiparts:*

In order to make a meaningful contribution to a design, the content w/holiparts must have thorough function-specific knowledge of their own sub-system, as well as sufficient knowledge of the containing *whole (i.e. the whole value / supply chain)* and some knowledge concerning the other sub-systems.

They need to have an open mind for possible alternative designs and be able to assess their impacts on their own sub-system and its stakeholders, as well as on the stakeholders of the whole system.

They should also be able to find creative win / win solutions for the benefit of all sub-systems, as well as solutions for eliminating or at least minimising undesirable impacts on planetary and other systems. *(Maybe this can be summarised as having a sense of proportion.)*

Unlike the *Context W/Holiparts*, the *Content W/Holiparts* do not need detailed knowledge of w/holistic theory and methodology, other than being aligned with a generic w/holistic ethos and a willingness to learn about and apply a relevant systemic organising principle when prompted and guided by the w/holistic facilitator to do so.

w/holistic leadership: CONTENT W/Holiparts *(continued)*

Q: We understand that *Context W/Holiparts* are the change facilitators and that their leadership implies inspiring the cooperation of all stakeholders.

But what is the leadership of the *Content W/Holiparts* about? Can you give us a concrete example?

A: Remember the electricity supply chain and that in a sustainable world the renewable energy producers must be increasingly phased into the energy supply chain and the non-renewable ones phased out.

This requires a change in strategies and some new solutions in some sub-industries, such as the coal industry changing its business model from continuous to complementary production *(i.e. stepping up production when the sun does not shine or the wind does not blow....).*

To pull through such changes *(which may not be liked by a self-serving industry)* requires powerful INDUSTRY LEADERSHIP.

Alternatively *(or additionally),* this change can also be achieved through appropriate industry regulation *(i.e. that is based on the governance aspect of the ideal industry design).*

Q: And **WHO** should do all this redesigning of our cultural, economic and political systems... Who are those context and content leaders?

A: **WHO?** Unless we want to be reset by some elites who make designs and decisions on our behalf *(which will definitely not be w/holistic and probably not for our benefit)*, we have to get going ourselves.

A few *(or even only one)* members of a system can appoint themselves as *Context Leaders* and encourage some stakeholders to participate in a redesign of the system as *Content Leaders*.

Once a design *(or alternative designs)* and according implementation plan(s) exist, the leaders can facilitate a widening public discourse on the design(s) – ά la the redesign of Paris!

And then they can approach their politicians to demand implementation, *analogous to the lobbyists (albeit openly and without financial reinforcement!).*

Someone has to start the process!

If not YOU, who?
If not NOW, when?

Of course the current power structures are likely to refuse implementing a transformation design, or more likely actively resist it *(at least initially).*

Eventually, however, if a critical mass of the population supports a design, it will come into being.

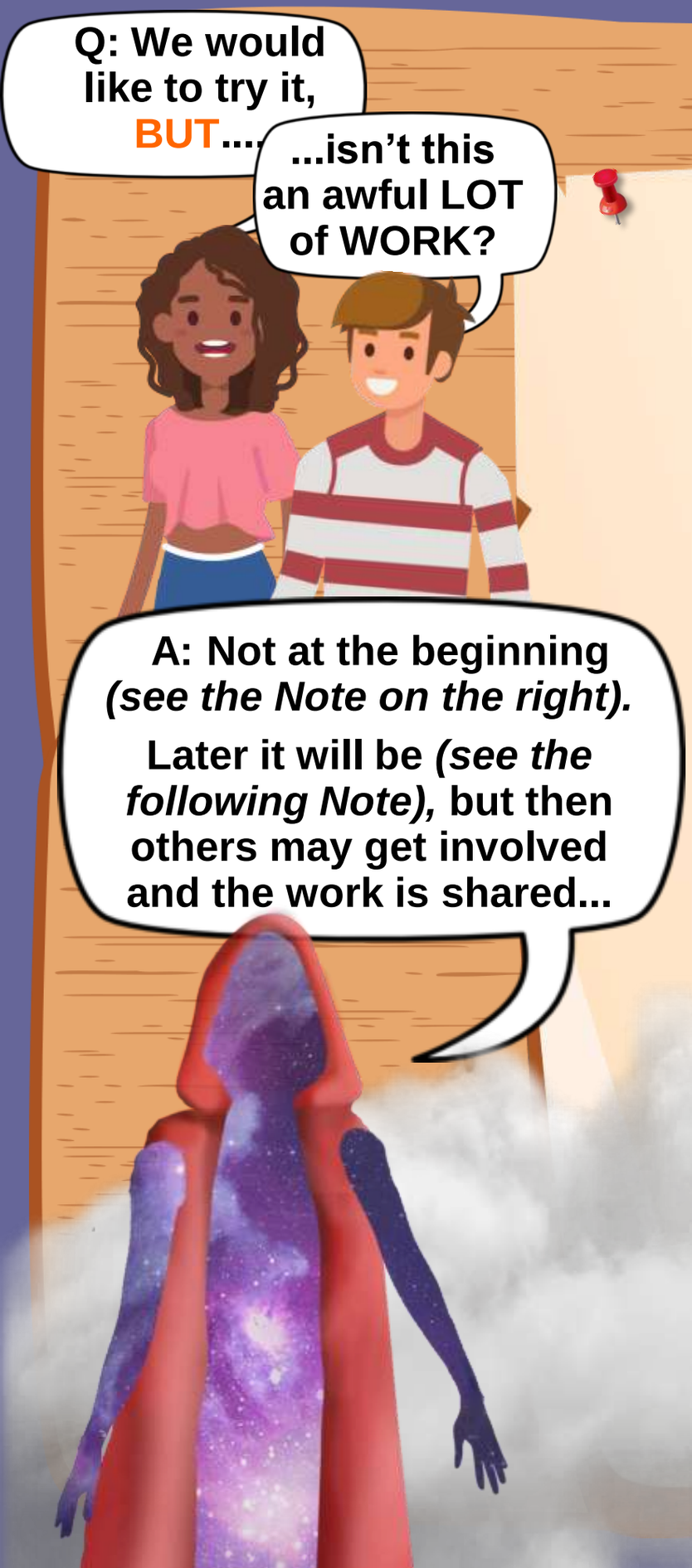
Q: And **HOW** could **WE** ourselves do this?

A: **HOW?** You could start by studying this curriculum and facilitate some jamming around the system of your concern *(like the education system, or indeed, the democracy system!)*

You could do it as a school project, or as a Master or PhD thesis, or with your management team, government department or through an NPO or NGO, or with a bunch of friends...

Come on, start the ball rolling. Take your system of concern and following the steps of the methodology, redesign it ...
(No need to think of implementation at this stage, just of learning about the methodology ....)
And surprise yourself with the results of your increased knowledge about your system of concern...
And be surprised at the momentum your project can generate....

NOTE: "lots of work"



NOTE: **Of course, changing a system takes effort. The bigger the system is the bigger will be the effort to change it.**

CONSIDER THIS:

Before one can build a house one needs to have an idea and then a plan. The idea and plan are the conceptual reality of the system. It in-forms *(i.e. determines the form of)* the house in physical reality *(i.e. how the brick and mortar structure will look like).*

Likewise, before we can change any system, we need an idea, a design, a vision of it and a plan of how the change can be implemented.

How much effort is it to (1) imagine the house, (2) get stakeholders *(e.g. the spouse and kids)* involved in brainstorming and co-creating a shared vision of it, (3) do some rough sketches, (4) have a building plan drawn up and (5) build it? Changing any social system involves the same phases.

The effort gets bigger with each phase. Nevertheless, phases 1-4 *(which deal with creating the conceptual reality of a system)* are relatively cheap. Even the most spectacular buildings started with a sketch on a piece of paper and more detailed plans thereafter.

In the information age the conceptual reality of any system can be co-produced by interested, motivated and knowledgeable persons in online interaction. The online *Biomatrix Jamming and Design Conferencing Approach* can be used for this. It requires mostly time and dedication.

NOTE: "lots of work" *(continued)*

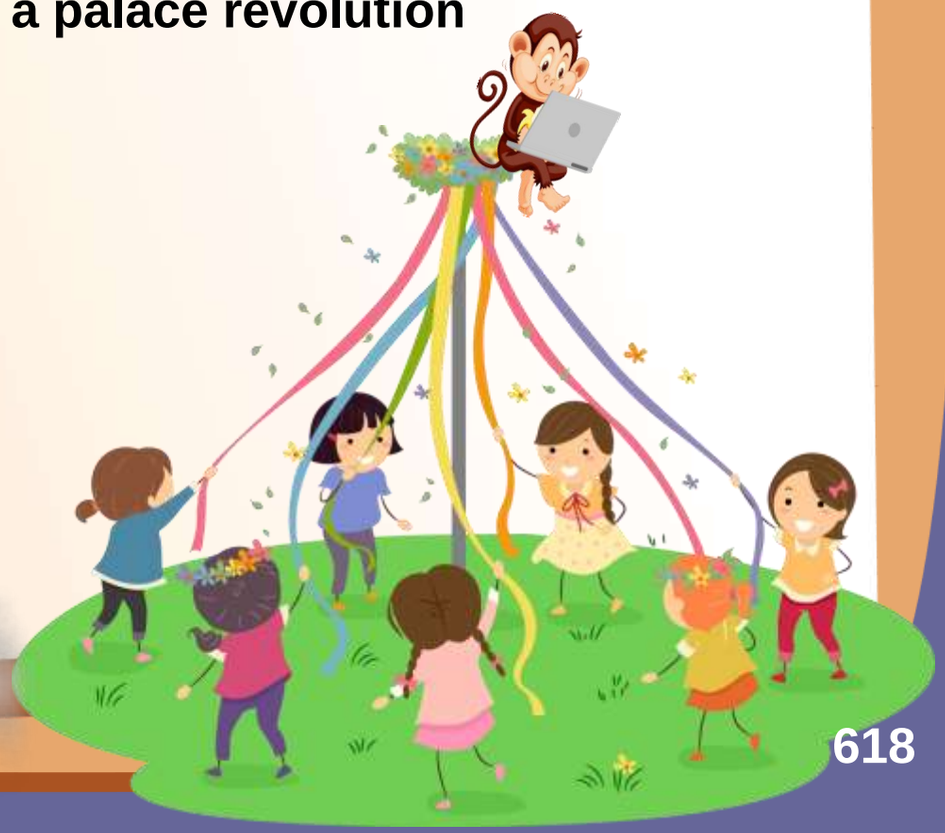
The really big costs start with phase 5, the implementation of the design. However, by the time this starts, some momentum has been generated through phases 1-4 from which all sorts of initiatives could arise! *(Remember the redesign of Paris and the Hundred Monkeys!)*

AND ANOTHER CONSIDERATION:

To use the *Biomatrix Methodology* to create public policy designs is neither more difficult, complex, or expensive, than the current way of producing a public policy proposal.

Also, current policy designers know how to facilitate policy design. They merely lack a w/holistic worldview! With a little study of *Biomatrix Theory and Methodology* they can acquire this and become w/holistic facilitators even within their current systems!

A new worldview can give rise to a palace revolution



NOTE: changing parts vs. wholes

YES

To redesign a whole system can be a lot more work than to change one part of it.

For example, to redesign the whole education system (even if it is done on the level of overarching strategy) could involve much more work than issuing a new policy for schools.

NO

Some policies need to consider the whole system anyway, before they can be finalised.

For example, designing the long-term energy strategy for a country could involve considering many renewable and non-renewable energy options before choosing an appropriate one.

To explore this from a w/holistic perspective instead, would not be more work.

NOTE: changing parts vs. wholes *(continued)*

AND MOST IMPORTANLY, remember the power of transformation: Using the analogy of disease, there are thousands of diseases and according treatments, but only a few strategies for creating health! As health increases, ALL disease dissolves! The same applies to the transformation of other systems!

AND SOME MORE CONSIDERATIONS:

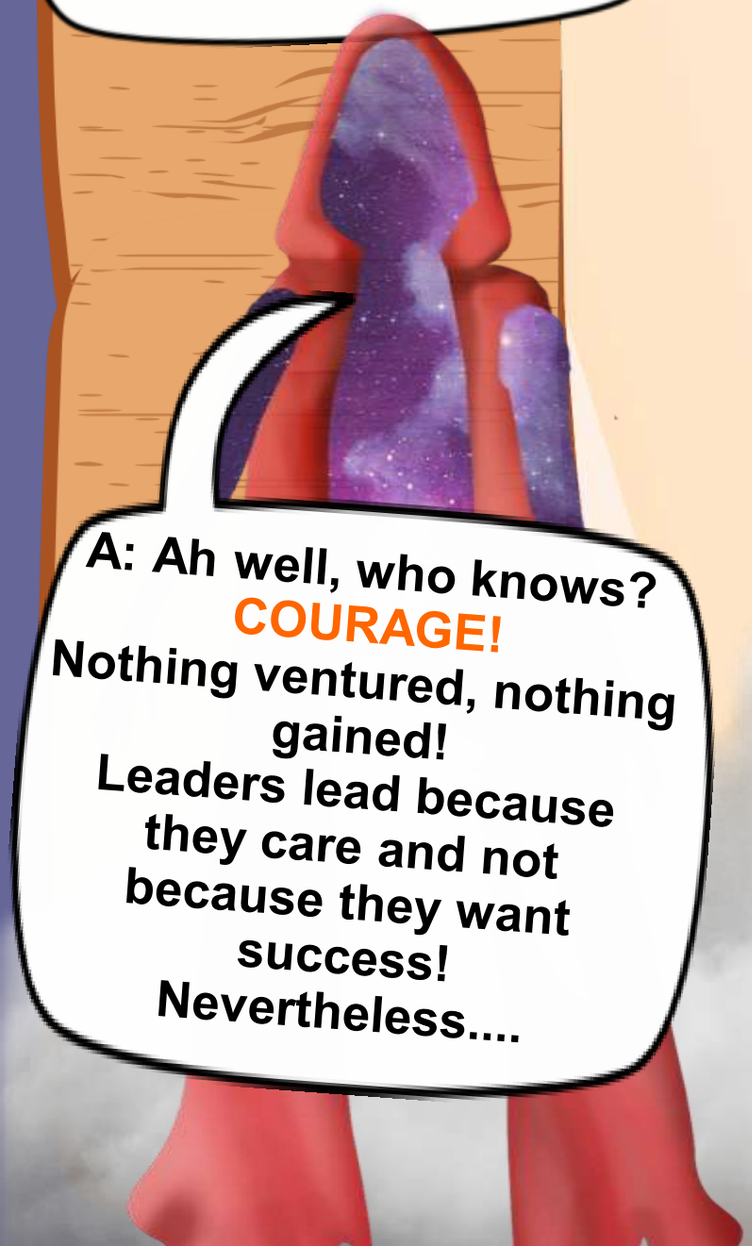
Conventional public policy designs are based on reductionist thinking in reaction to a problem and often involve "quick-fix" solutions.

Each solution may take relatively little effort. However, their effect is typically to produce more problems *(i.e. they make the mess bigger)*. Thus, more interventions are required and ultimately, the cumulative effort of problem solving is not much less *(or even more)* effort than that of - a priori - dissolving all related problems at the same time through a system redesign and transformation.

A w/holistic design is a frame of reference and not a detailed prescription of how each sub-system needs to function. On the contrary, the design guides through being a broad overarching vision on the one hand and provides limits to undesirable and excessive behaviour on the other hand. It is also a shared frame of reference and coordinates the self-governance, creativity and initiative of all sub-systems.

NOTE: "success" of change management

Q: Can we kids really be **successful** in changing systems and solving their problems?



A: Ah well, who knows?
COURAGE!
Nothing ventured, nothing gained!
Leaders lead because they care and not because they want success!
Nevertheless....

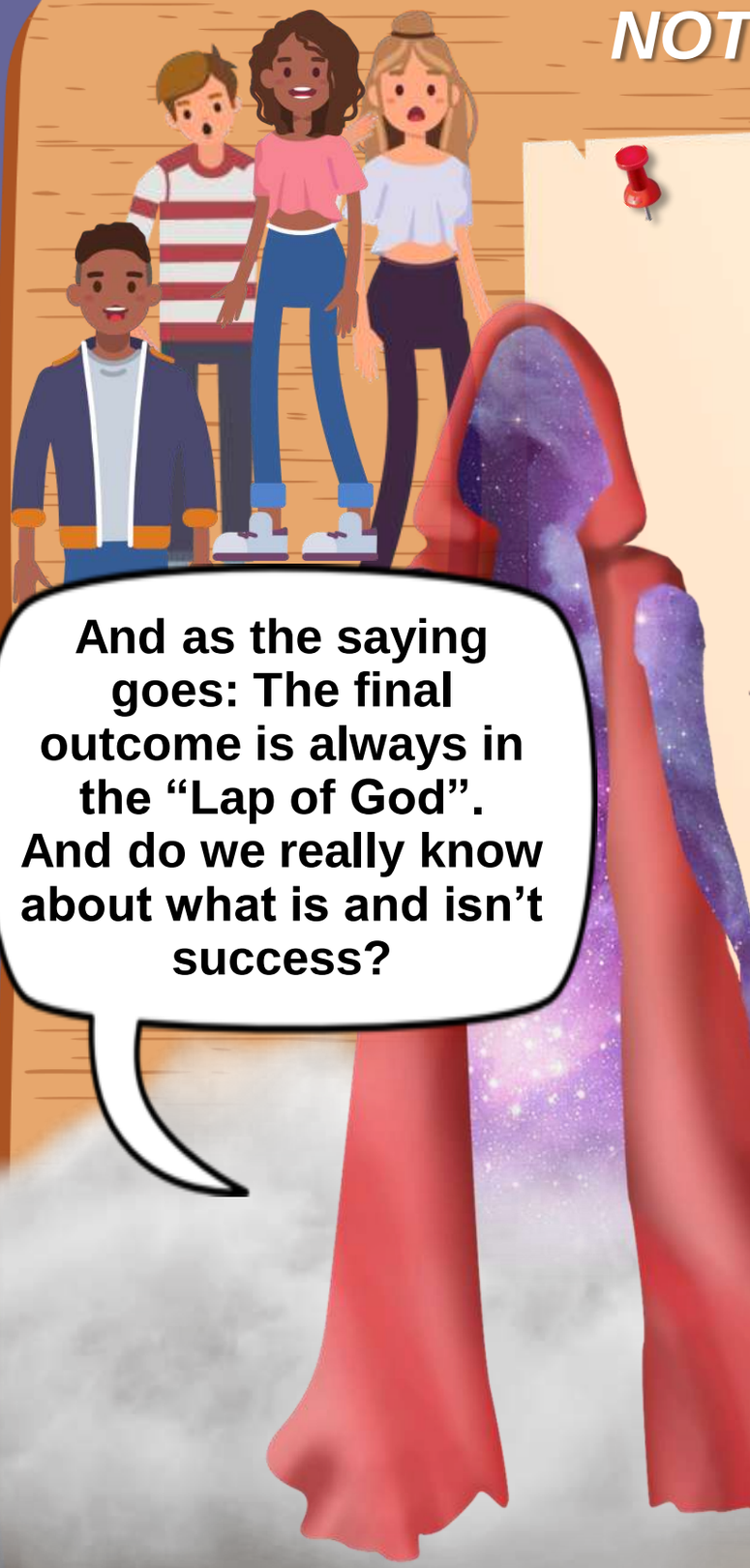
One of the biggest problems humanity currently faces is that we do not have ideal, information-age appropriate DESIGNS for our social systems *(ranging from the finance, education, healthcare and etc. system to the democracy system)*.

We have lots of analyses of what is wrong with our systems and heaps of uncoordinated partial solutions for improving them, but we have not yet managed to integrate those solutions into coherent and desirable transformative designs that are based on a different logic of functioning then the current systems. And before we don't have designs, we cannot transform systems in physical reality.

Thus, initiating the redesign of your social system of concern, or contributing to such a design, and /or communicating it, is in itself a SUCCESS, even if you will not see its immediate or exact manifestation in physical reality.

Sooner or later, others will jump on the bandwagon and use, add to or replicate your efforts and even deviate from them. Yet others will resist your effort and even start working actively against it *(after all, the current systems serve some members of society very well and they don't want to cut off the branch they sit on).* Nevertheless, any active resistance implies interacting with your ideas and thereby you will influence *(and even might change)* their mindset. This too, is SUCCESS! *(We have experienced that some of the biggest critics of w/holistic thinking have become their staunchest supporters, because suddenly "the w/holistic penny dropped".)*

NOTE: “success” of change management *(continued)*



... and some more successes:

The map is not the territory. Yet, if we do not have some map, we are hopelessly lost. Ideal system design is mapmaking. And that is SUCCESS!

We need a collective shift in thinking, from focusing on the problems created by reductionist thinking to solutions induced by w/holistic thinking. Any small shift is SUCCESS!

You get a lot of ideas in the course of this curriculum which you can use in other contexts. You will think broader, become more creative, produce better solutions, learn to interact with the world in a different way and ...
... all this is definitely huge personal SUCCESS!

EXERCISE

REFLECT

COMMIT

PART 7.3
Change Management Structures and Procedures

Overview

Understanding the institutional context

Change management structures and procedures

Generating agreement to change

overview

A system needs to be redesigned by the COLLECTIVE effort of its members and other stakeholders. However, leaders can initiate and facilitate this. To do so, they need to understand the

- **institutional context within which change management has to take place, both the legacy of the industrial age and the continuing technological advance of the in-formation age**
- **organising power of information and its possible impact on the technological and organisational progress of the in-formation age**
- **potential of informal change management, by initiating thinking about change and educating about it**
- **setting up of formal change management structures and procedures that channel the participation of stakeholders in the transformation of their system**
- **facilitation of each step of a w/holistic change methodology *(such as the methodology discussed in Part 6 of this curriculum).***

A group of **individuals can have influence** and can change some things. But to be REALLY effective, they need to know what they are up against *(i.e. institutionalised power)* and how to organise themselves *(i.e. use organising power).*

This implies setting up a change management **structure** and **procedure** *(based on the steps of the change methodology)* that enable stakeholders to COLLECTIVELY participate in redesigning their system.

Why do we have to bother with organisational structures and such-like?

Concerned individuals can **informally** set the ball rolling by stimulating ideas and even making an initial ideal design for a system and facilitating design iterations to generate support and alignment.

However before a design can be implemented, a **collective effort** of a critical mass of the members of the system and other stakeholders is required and the initiative must be **formalised.**

The use of information technologies and the proposed organisation support structures can facilitate this.

Remember the RIVERBED analogy:
The content of change will flow according to how the change management structures and procedures are set up.

understanding the institutional context of the

- industrial age

- in-formation age

understanding the institutional context

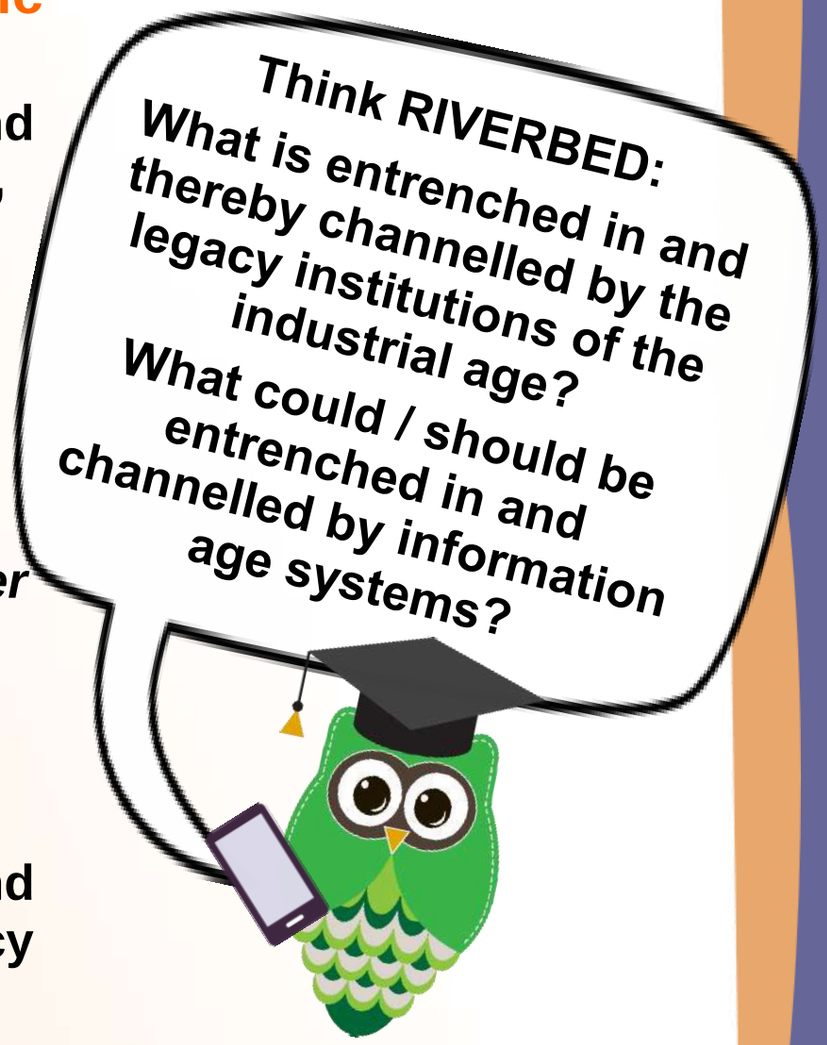
The shift from one age to another ALWAYS involves a transformation in worldview. The shift from the industrial to the information age involves a shift from reductionist to w/holistic thinking.

The institutions of one age entrench the thinking of that age and perpetuate it until transformed through a new worldview. Thus, the institutions of the industrial age perpetuate reductionist thinking and behaviour until the systems are redesigned and transformed through w/holistic thinking and entrench it.

This entrenchment represents structure. It channels activities *(be they mental or physical)* in a particular manner and into a specific direction. The structure also resists any activities that fall outside its limits. *By analogy, the flow of the water in a river can only occur within the structure of the riverbed.*

Thereby structure represents PASSIVE POWER. It is the power of allowing things to happen in a specific way and preventing them to happen in any other way. This is why structural power is usually hidden and therefore overlooked and passively accepted. Some traditions and especially bureaucracy in societal systems are examples of such structures.

To change systems, it is important to understand their existing institutionalised structure and what shaped it.



understanding the institutional context *(continued)*

Any (re)design of a societal system occurs within a larger context that needs to be understood.

Often, the participants in a design process are captives of their existing system in the sense that they *"cannot think outside the box"* of the current system and are therefore inclined to reproduce it or change it according to the thinking that is entrenched in and therefore perpetuated by it.

Therefore during a (re)design process, the change managers and facilitators need to introduce the following broad contextual perspectives into the design process:

- **The current cultural, economic and political systems are still largely legacy systems of the industrial age and embody the forces that shaped this age. They incorporate outdated thinking and institutionalised power that resists new and fundamental approaches to societal change. *(They represent the previously discussed COUNTER-CLOCKWISE CHANGE.)***
- **The advancing in-formation age offers new technological and organisational possibilities that are derived from the nature of information. Different phases of this age offer different threats and opportunities for societal systems and need to be taken into consideration in their (re)design. *(Design represents CLOCKWISE CHANGE.)***

(See the following Notice Boards for more explanations.)

understanding the industrial age

The rapid change during the *INDUSTRIAL AGE* was largely due to the following powerful forces:

- **Firstly, an energy driven *TECHNOLOGICAL ADVANCE*, which evolved societies from the steam-, electricity- to the atomic phase of the industrial age.**
- **Secondly, industrialisation was possible due to the *OGANISATIONAL ADVANCE* of**
  - **the invention of the production line, which dissects work into different functions and each function into its smallest units of action. Each unit is performed most efficiently by a specialist who is measured and rewarded according to *(mostly quantitatively evaluated)* output and**
  - **the coordination of all functions through a top down control hierarchy which centralises power in a few hands.**

Both are an outflow of REDUCTIONIST THINKING, which is still the universal paradigm of managing and organising our systems.

understanding the industrial age *(continued)*

Reductionism and its technological and organisational developments have shaped Western *(and by now also a global)* civilisation.

For example, the global economy is still largely powered by the non-renewable energy sources that evolved during the industrial age. They are a major source of humanity's current problems, including wars and environmental deterioration.

Likewise, the industrial age ways of organising are still entrenched in and perpetuated by current political, economic and cultural institutions, such as democracy, science and education *(including management education).*

Because of this, humanity's complex problems persist and become increasingly threatening.

EXERCISE

What about a little reflection? How do our current cultural, economic and political systems (such as the current education, electricity, finance, health-care and democracy system) still reflect the technologies, organisation and worldview of the industrial age?

the nature of information

There is a fundamental difference between the nature *(or characteristics)* of physical and information *(or conceptual)* reality, which explains their difference in organisation:

- "Things" in PHYSICAL REALITY are governed by scarcity and win / lose *(i.e. either you or I have the thing; also, the resources of the planet are finite).* This gives rise to an organisation based on competition for scarce resources.
- By comparison, the information that comprises CONCEPTUAL REALITY is characterised by abundance and *win / win (i.e. I don't lose the information I share with you; besides, information is potentially infinite).* Information is also synergistic *(i.e. new information arises during the sharing of information).* This demands that our systems need to be organised for *CONNECTIVITY*, *INTERACTION* and *PARTICIPATION* in generating information and for *SHARING* it.
- Another important aspect of information is its field-like *(and seemingly formless)* nature: Information fields merge with each other, overlap, synergise, have no clearly discernible boundaries, attract, resonate and have in-forming power *(i.e. are a force that shapes the form of physical reality).* This is of relevance in selecting an appropriate ethos for the system that is being redesigned, as it will in-form the system *(i.e. determine its form, function and development - "you become what you think").*
- Information is also involved in the phenomenon of consciousness, which is the basis of self-referral, self-reflection and learning. This implies that systems need to be designed to be conscious *(i.e. to be self-reflective, as opposed to being reflexive, which means responding automatically to an external stimulus.)*

understanding the information age

This fundamental difference between physical and conceptual reality implies a RADICAL shift in social organisation. By incorporating information into technologies, the machines of the industrial age become automats and humans become part of and controlled by the technology, instead of controlling it.

The technological advance associated with information technologies suggests the following phases of development of the information age:

- **digital phase which is driven by networking and connectivity, as well as the huge computing power of information technologies and the manipulation of big data.**
  Digitalisation has indeed fundamentally changed whole sectors of society, but sadly, without solving humanity's mounting problems - on the contrary.
  This phase also evolved a digital based AI and trans-humanism with the very real danger of totalitarian surveillance and control *(e.g. ultimately via chipping).*
- **biological phase which includes manipulating information in natural systems, such as genetic engineering, biology based AI and a gene manipulated trans-humanism with probably irreversible changes to the nature and functioning of humans and other forms of life**
- **consciousness phase which refers to the recognition and growing understanding of an underlying in-formation reality of the cosmos, advances in brain / mind research and quantum field technologies which could hold many solutions in many areas of life with less negative impacts than the previous phases.**

understanding the information age *(continued)*

We are still mostly in the digital phase, but have entered the biological phase of the in-formation age, while the transformative power of the consciousness phase is still largely located in the esoteric realm.

With each phase, there is a greater understanding of information and its in-forming power:

The digital phase is largely concerned with the processing of information, the outcomes of which in-form physical reality *(e.g. economic transformation into a platform economy, the internet of things)*

The biological phase works with manipulating the in-formation inherent in natural systems *(e.g. genetic manipulation, new materials development, geoengeneering)*

The consciousness phase is likely to harness the in-forming power of consciousness *(i.e. the human mind)* to directly change our physical reality *(e.g. mind over matter, quantum field manipulation?).*

***NOTE:* The concept of the fourth industrial revolution refers to a fusion of the technological advances from each of those phases.**

EXERCISE

What about some imagining? Enter the field of your intuition and write down your ideas of how the digital, biological and consciousness phase of the information age did and could change systems *(such as education, health-care, finance, housing, public infrastructure and democracy, or a personal system like your work, family, nutrition exercise, or any other system of your concern)*? Then REFLECT on what you learned from this exercise.

Q: And what did you learn from those exercises?

A: I realise now that by understanding the bigger picture across the different ages, I have suddenly much more fundamental and radical ideas of how systems can be transformed...

C: Indeed, the bigger picture can be very revealing and show us new opportunities.

It also shows us how our thinking has been shaped by the legacy systems of previous ages and how we are still stuck in their outdated paradigm.

A: I realised how entrenched those systems are and how their structures *(and the members working in them)* will resist any change that they think will disempower them...

A: It really hit me how by using information technologies *(like online jamming)*, we have a powerful tool to brainstorm new ideas and by-pass the institutional power and get momentum going before they notice and ....

change management structures and procedures

change management structures and procedures

To redesign and transform a system requires

- **Firstly, a methodology with which to generate the design and implementation plans. In Part 6 we have discussed a nine step w/holistic change methodology *(i.e. the Biomatrix Change Methodology).***

  In the following Figure the steps of that methodology are represented by the dark orange boxes, whereby the implementation phase occurs in the course of the ongoing governance / management of the system *(i.e. through the plan, implement, evaluate and (re)plan cycle).*

- **Secondly, it needs structures and procedures to manage and facilitate the application of the methodology.**

In the following Figure the structures which enact the change are represented by the grey and black boxes, whereby the

- medium grey boxes refer to different groups and teams which generate the change

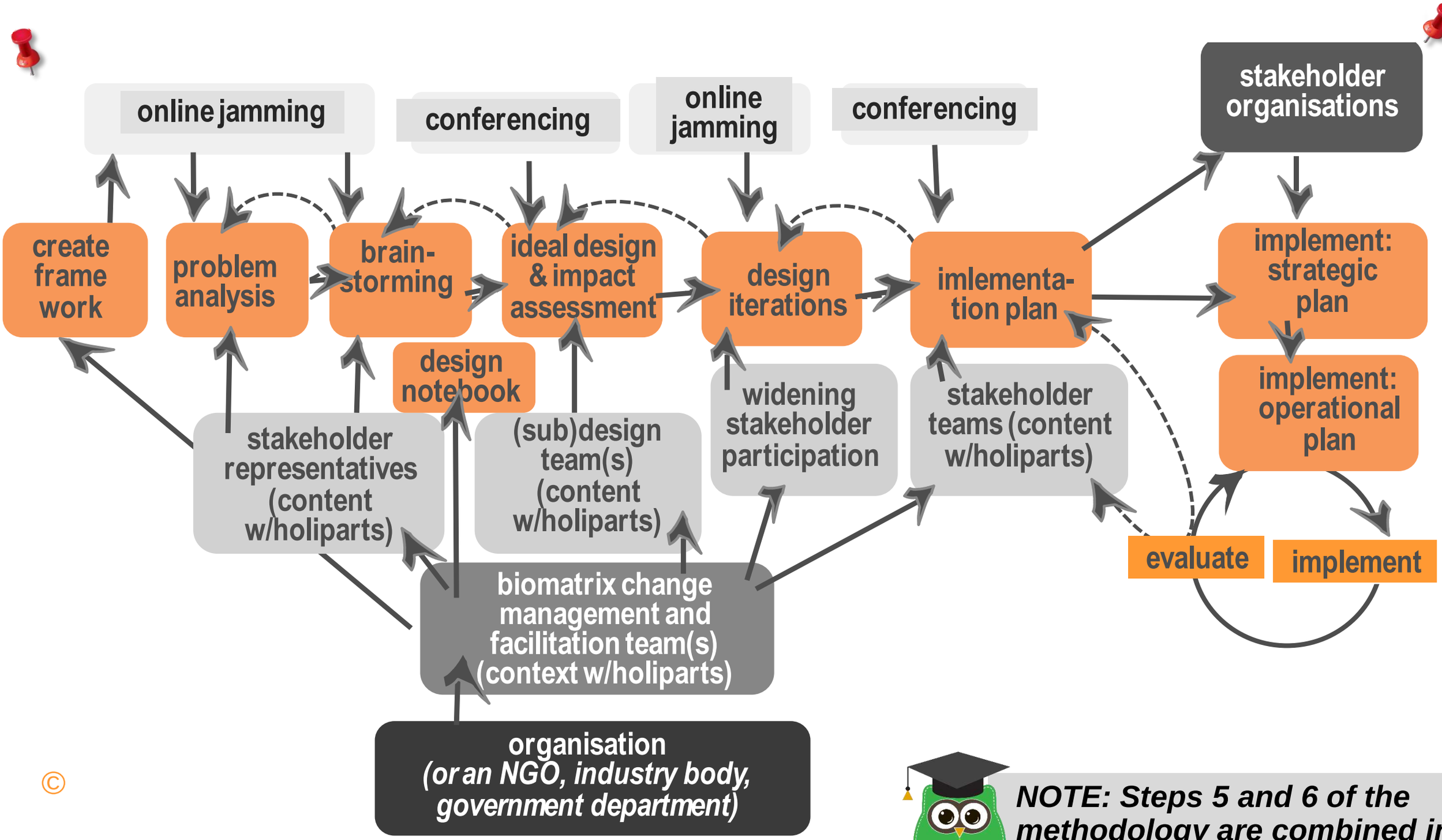
- light grey boxes represent the online structures *(i.e. the jamming and conferencing platform)* and

- black boxes refer to the organisation that manages the change, as well as the stakeholder organisation which need to implement their share of the designed change

***NOTE: CHANGE MANAGEMENT* is concerned with creating the context of the change, like setting up the structures and providing the resources for the change.**

***CHANGE FACILITATION* is concerned with guiding the participants in creating the content of *(i.e. Ideas for)* the change.**

change management structures and procedures *(continued)*



NOTE: Steps 5 and 6 of the methodology are combined in one orange box.

C: This Figure looks awfully complex!

A: Not really, once you have read the text and looked at the arrows. Nevertheless, let me try to summarise:

The above FIGURE shows

(1) "what" needs to be done *(represented by the orange boxes),* namely the different steps that need to be taken, starting with determining the framework and ending with implementation

(2) "who" should do each step *(represented by the grey boxes)*, namely the different acting structures , such as organisations, teams, groups and individuals, as well as support structures, such as online jamming.

What is still missing is a third point, namely the "how" is each step facilitated *(i.e. with what method).* This is shown in column (3) of the following TABLE (while columns *1 and 2 are a repetition of the information in the above Figure)*:

change management structures and procedures *(continued)*

(1) WHAT (step of the methodology)	(2) WHO (facilitators and participants)	(3) HOW (method)
1. identify framework of inquiry	steering committee, design team, experts YOU (as context w/holipart)	facilitated workshop
2. describing current situation	experts, stakeholders, online community YOU and online stakeholder community	questionnaires jamming templates
3.collecting and brainstorming solutions	experts, stakeholders, online community YOU and online stakeholder community	questionnaires, jamming templates
4. compile design notebooks	design team, researchers familiar with statistics and other data of the (sub)systems YOU and enthusiastic content w/holiparts	research, cut and paste, discussions with stakeholders
5. creating an ideal design	design team and sub-design teams YOU and enthusiastic content w/holiparts	facilitated workshops, design conference templates
6. impact assessmet		
7. design iteration	stakeholders, public discourse YOU and online stakeholder community	facilitated workshops, jamming templates
8. implementation plan	sub-design teams YOU and enthusiastic content w/holiparts	facilitated workshop
9. implementing the design	responsible systems YOU and enthusiastic content w/holiparts keep iterating in order to get the stakeholders of your system to change.	strategic performance management (plan, implement, evaluate, re-plan cycle)

generating agreement to change

Q: Understanding now what is involved in changing a system and how long it could take, makes us wonder how we will ever persuade a system and all its participants to agree to and participate in a transformation!?!

A: Indeed, how can one get the members of a system to agree to change it? This can occur formally or informally.

Formally, one would need the governor of the system *(e.g. top management of an organisation, or the government of a society)* to **agree** to transform the system they are responsible for, beyond the entrenched change processes *(such as the regular strategic planning).*

Informally, any individual or group of persons can create a design of the system of their concern and put energy into facilitating design iterations to influence stakeholders and thereby generate a momentum for change.

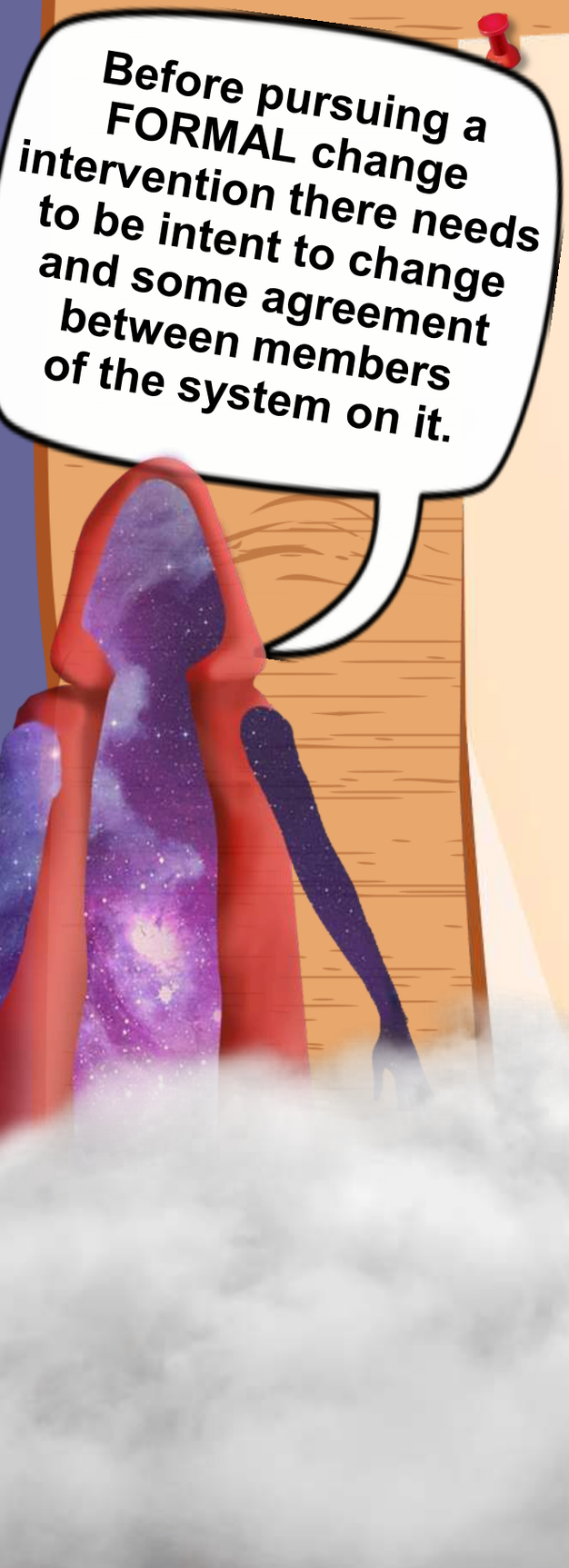
In praxis, the two processes can run parallel or alternate and interact with each other.

(The following Notice Boards explore this further.)

NOTE: W/Holism emphasises self-governance.

Systems that are forced to change against their will are not likely to change optimally, or sustain the change. They may even resist and boycott it.

generating agreement to change



Ideally, a system agrees VOLUNTARILY and FORMALLY to transform itself *(i.e. via its official governing representative).*

This is however rarely the case, because the most powerful members of a system usually benefit by the status quo and are therefore not inclined to give it up.

Usually systems change only when they are FORCED to change because external pressure and internal demands for it increase *(e.g. through internal and external economic or political happenings, new technological developments that present opportunities or threats, a pandemic, war, protest, or revolution, amongst many other reasons).*

Ideally, once the system agrees to embark on a fundamental change, it does so based on an ideal design and a w/holistic change methodology *(such as proposed in this curriculum).*

But, if forced to change, it is more likely, that the management of the system will pursue a current future strategy and reform the system, rather than transforming it. Reforming a system, as we learned, is based on problem solving and more of the same type of solutions that were tried in the past. This approach will therefore not (dis)solve the current problems, but will perpetuate and even increase them.

If, however, some members of the system have already pursued an INFORMAL ideal design process and have started to create alignment with some of the stakeholders around it, they may have generated sufficient MOMENTUM to PERSUADE the current power structures in the system to take up this transformative initiative formally, rather than pursue a reformative approach, especially if there is also protest against the status quo. *(See also the later section on R/Evolutionary Strategy).*

generating agreement to change *(continued)*

History showed that there are also ways of generating change through the *"back-door",* like with the proverbial *"Trojan Horse".*

While this has not always been an ethical or desirable way, it can nevertheless serve as an analogy.

As an ethical way, we propose to use education as *a "Trojan Horse"* to promote change in a system.

More specifically, the *Biomatrix Education Programmes* teach w/holistic management and governance. They are designed to be delivered to a client system as an in-house education programme *(e.g. via a Corporate Academy or a School of Government)* to carefully selected course delegates *(i.e. to ensure representation of all parts of the system).*

The course participants learn about w/holistic system governance, management, design and change and apply this knowledge in template-driven exercises to their own (sub)system as a case study. In teamwork they integrate the assignments into an ideal design for their shared containing system.

This typically creates a change in thinking throughout all parts of the system and prepares them for change. And more often than not, management agrees to build on the outcomes of the education programme and to continue with a formal change initiative that involves also members who were not part of the education programme.

formal change management: change facilitation

Who should facilitate a w/holistic transformation?

The traditional answer is that it needs consultants with knowledge of w/holistic design and change management.

An advantage of the *Biomatrix Education Programme* ais also that it produces consultants. The graduates of the programme become a CADRE of IN-HOUSE consultants and change managers who can manage the change process and facilitate the ideal redesign of their organisation *(or government department, or of a policy design)* and assist in its implementation.

Thus, the *Biomatrix Education Programme* acts like a scaffolding in support of rebuilding the system by

- **equipping some members of the system with the knowledge of how to change an entity system *(e.g. an organisation, or a government department)* and an activity system *(e.g. a function, or industry as a value / supply chain)***
- **generating the first draft of an ideal design for the system *(i.e. produced by the course participants through their template-driven assignments which use their own system as the case study)***
- **producing graduates that have a practical experience of all steps of the methodology, having done them during the education programme. Since the education programme also involves teamwork, they also gained experience in team facilitation. Thus they will be able to manage and facilitate an actual change intervention in their system as internal consultants.**

PART 7.4
W/Holistic Societal Change MANAGEMENT

Societies will not (dis)solve their complex problems, unless the current democracy model is transformed and there is a more intelligent *(i.e. w/holistic)*, honest and free public discourse.

And we, the people, will need to get more active in expressing our discontent with the current societal systems by voicing our disagreement *(e.g. through peaceful protest)*, *besides* actively participating in the redesign of our societal systems *(i.e. in the system of our concern in which we have some expertise)*.

Information technologies make all this easier.

Transforming Democracy

Transforming Public Discourse

Revolutionary Change *versus* Evolutionary Change

Digital R/Evolution

“Nothing less, but the refashioning of the world, is at stake.” (Novalis)

TO RESET OR BE RESET? That is the question! (With compliments of William Shakespeare)

transforming democracy

The governance of a system is concerned with the question *"Who plans and makes the decisions about the system and how?"*

In an organisation it is the top management and in a society it is the government who is ultimately responsible for its governance.

Organisational and societal governance models evolve in the course of time, whereby the current models are largely legacy systems of the industrial age.

Concerning societal governance, the current model used by a majority of nations is REPRESENTATIVE DEMOCRACY, which occurs in some variations *(whereby the variations seem major from the perspective of reductionist thinking and minor, from a w/holistic perspective).*

It is based on the principle that elected representatives make decisions on behalf of all citizens, who have no direct influence on formulating policy and making decisions about it *(except in some countries which allow citizens a direct choice between some policy options, albeit not necessarily direct inputs to policy design).*

Unfortunately, lobbies of powerful organisations often *(or usually?)* do have a direct influence via the executive, by proposing policy that advances their own interest, at the expense of the general public.

Like many other societal systems, the current democracy model is problem riddled and needs an information age relevant redesign and transformation.

transforming democracy *(continued)*

We believe that the ideal democracy model for the information age is a *W/HOLISTIC PARTICIPATORY DEMOCRACY* and we propose such a model based on *Biomatrix Theory*.

While maintaining the fundamental separation of powers *(i.e. into legislative, executive and judiciary)*, it also separates the governance of the various societal functions and industries *(i.e. activity system governance)* from that of society as a coherent whole *(i.e. entity system governance)* and proposes an according distinction between different governance structures and procedures.

It also distinguishes between the voice and vote of citizens:

- **Citizens *(as unique experts in and stakeholders of different functional systems)* must have a VOICE for giving DIRECT and function-specific inputs to policy designs based on their personal experience and subject expertise. We propose stakeholder forums to facilitate tis.**
- **Citizens *(as equal members of society)* must have a VOTE to DIRECTLY select between different policy designs, policy options and other issues of strategic importance by means of a referendum or plebiscite, besides VOTING representatives for decision-making in the ongoing governance of public systems.**

BIOMATRIX ADVERTORIAL

For more detail see the *Biomatrix Cartoon Curriculum in W/Holistic Participatory Democracy.*

Q: Does this mean we need to replace the current model of representative democracy?

A: Definitely YES!

Like all the other societal systems that are a legacy of the industrial age and have become increasingly problem riddled, the current democracy model needs to be transformed to become information-age relevant.

In essence, a transformed democracy model must facilitate the maximum, albeit coordinated, self-governance of systems *(because self-governance is a core principle of w/holism).*

On the one hand, *Biomatrix Theory* provides the generic w/holistic organising principles that can guide such governance, as well as giving rise to a practical methodology for problem dissolving, system redesign and policy design in general *(as described in this curriculum).*

On the other hand, the information technologies offer a platform for allowing citizens to provide direct input to governance. They make coordinated self-governance on a large scale possible.

(Our proposed democracy model is discussed in detail in the Biomatrix Cartoon Curriculum in W/Holistic Democracy.)

transforming public discourse

A democracy is not possible without a public discourse.

The public discourse of a society is mostly conducted through its media *(i.e. mainstream, alternative and social media).*

The media are therefore regarded as a fourth power, besides the legislative, executive and judiciary arm of governance.

Freedom of speech and free media are regarded as the cornerstones of a public discourse and therefore a working democracy.

They are also absolutely necessary for complex problem (dis)solving. We cannot solve a problem that we do not know in all its different perspectives, or are misinformed about.

The current wave of fake news, gap news, propaganda and even lies in mainstream and alternative media, as well as the increasing censorship of alternative and social media, the branding, denouncing and cancelling of persons with alternative views in the main media, are anathema to democracy and herald totalitarianism!

transforming public discourse *(continued)*

BIOMATRIX ADVERTORIAL

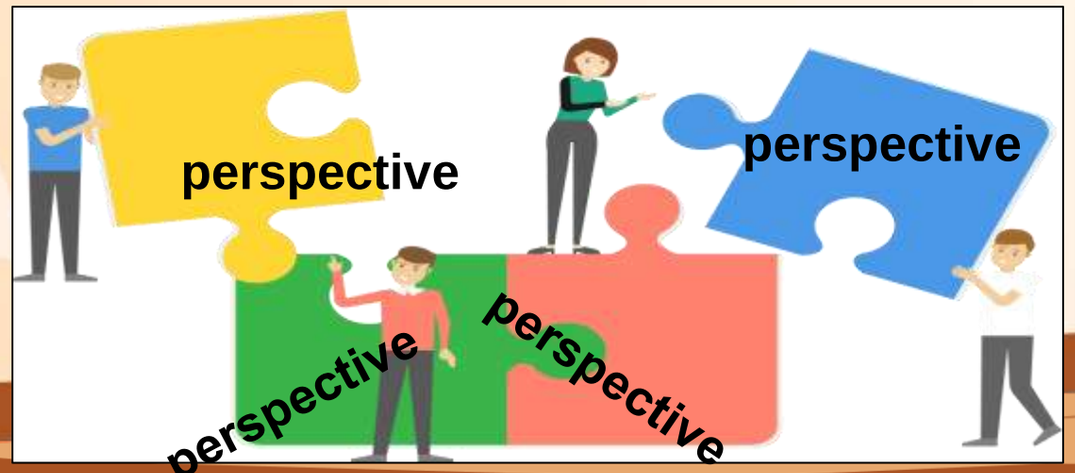
For more information see the *(soon to appear)* Biomatrix Cartoon Curriculum in W/Holistic Public Discourse.

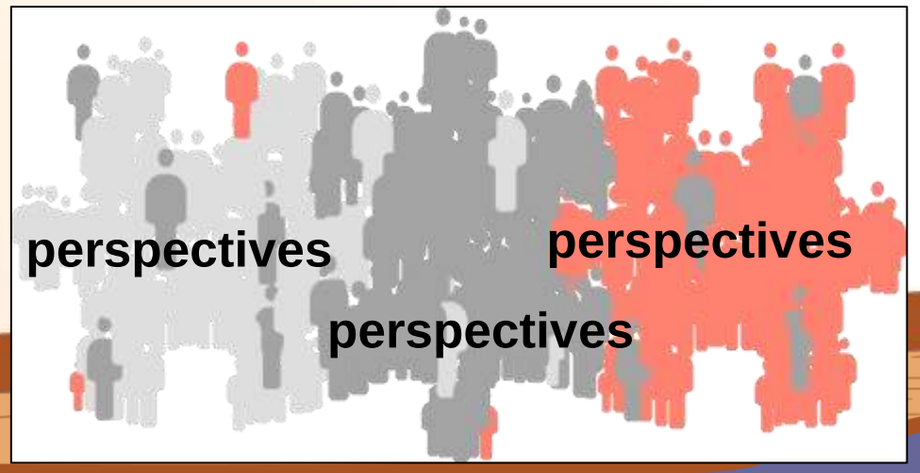
Besides the just mentioned problems of the current public discourse, it is also flawed in principle, if viewed from a w/holistic perspective. The reason is that it is reductionist, which manifests as an endless flow of largely a-contextual bits / bytes of information which do not generate understanding or meaning. Being mostly negative news *(especially in the mainstream media),* it perpetuates current future thinking, besides fuelling fear and confusion and preventing logical and rational thought, let alone creative thought.

Another problem resulting from reductionist thinking is that the different arguments in a public discourse relate to different dimensions and levels *(see the Biomatrix Spatial Framework)* and while they are valid within this context, they become false in another context. Discussions that run across levels and dimensions muddle arguments into meaninglessness *(see the typical debates on TV).*

By comparison, a w/holistic public discourse demands a continuous MULTI-DIMENSIONAL and MULTI-LEVEL exploration *(in time and space)*, of the elements of the issue that is being debated.

The frameworks we discussed in *Part 6.1* can also be used to facilitate a more intelligent public discourse.





Q: Does transforming our public discourse imply that we have to redesign and transform our media?

A: YES! YES! YES!

The current media scene is a major co-producer of the decline in democracy and the increase in totalitarian tendencies that we observe in many parts of the world.

A w/holistic participatory democracy is not possible without a transformation of the media, according to w/holistic principles.

This curriculum shows how we can make a design for transforming the media *(like any other societal system).*

It only needs a few dedicated journalists to initiate such a design.

In fact, this is probably one of the most urgent transformations that societies need!

And by the way, not only the mainstream media, but also the alternative ones would benefit by a w/holistic transformation!

Why not YOU?
Why not NOW?

Q: Do you really think that the media giants, or any other system *(from education to energy to democracy),* will take any notice of a few persons doing designs, let alone consider implementing such designs?

A: Of course they will not *(at least not initially).*

Entrenched power structures have never *(or maybe rarely)* volunteered to give up their elitist and privileged positions.

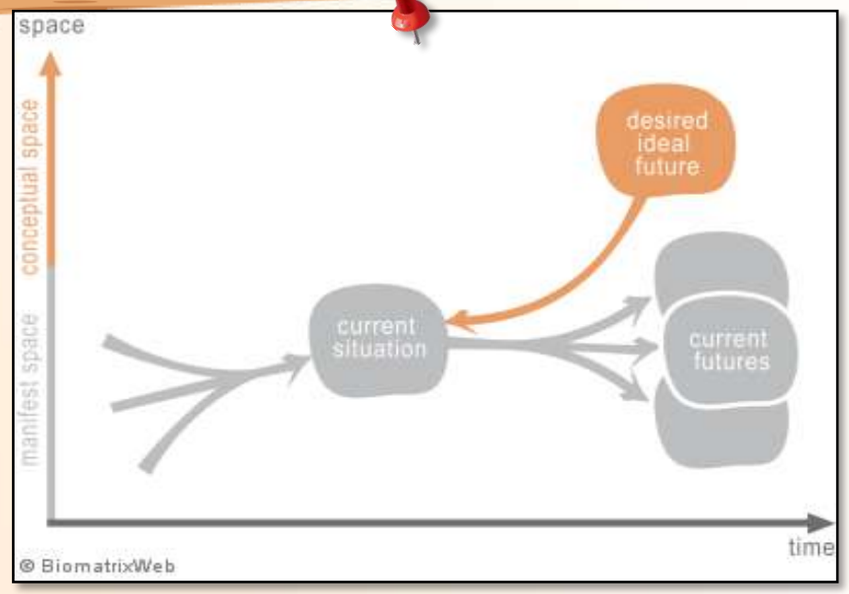
Nevertheless, in the course of history we observe that fundamental change DID happen and elites WERE disempowered.

Two forces are responsible for this, namely change brought about through revolution and change resulting from evolution.
Let us look at those two forces of change in more detail.

Even seemingly spontaneous revolutionary change takes a lot of preparation and continued organisation, *(as we learned from Lenin, Mao and others.)*

Welcome to the archetype of the warrior!

revolutionary versus evolutionary change



evolutionary change

revolutionary change

REVOLUTIONARY CHANGE

Revolutionary change is directed at getting rid of the CURRENT situation. It is backward looking, at what has been and continues to be. It is problem orientated and focused on what is not desirable and acceptable.
It is the realm of the

- **PROPHET who points out possible undesirable current futures; and**
- **PROTESTERS who object to the status quo and want it to change. *(And yes, there are also the traditional revolutionaries, who want to destroy the current system. From a w/holistic perspective, this is however not acceptable.)***

Be reminded:
Violence begets violence.
Thus BE PEACEFUL!

EVOLUTIONARY CHANGE

Evolutionary change is directed at creating a better and more IDEAL FUTURE. It is progressive and forward looking towards what can be and what is desirable.
It is the realm of the

- **VISIONARY *(and designer)* who describes how the ideal future should look like; and**
- **ENTREPRENEURS who change the physical reality of a system based on a vision of the ideal future.**

Be reminded:

WHAT CANNOT BE IMAGINED, CANNOT BE CREATED!

REMEMBER: **As we discussed previously, the actual future that will come into being is always an EMERGENCE from**

DEFAULT *(i.e. the momentum of the current future which keeps some things the same)* and

DESIGN *(i.e. a deliberately planned and implemented change that is derived from the idea of a more ideal future).*

Likewise, the actual future will be an emergence from the interaction of the revolutionary and evolutionary approach.

Let us explore now the different roles that are associated with revolutionary and evolutionary change.

revolutionary versus evolutionary change: *different roles*

PROPHET

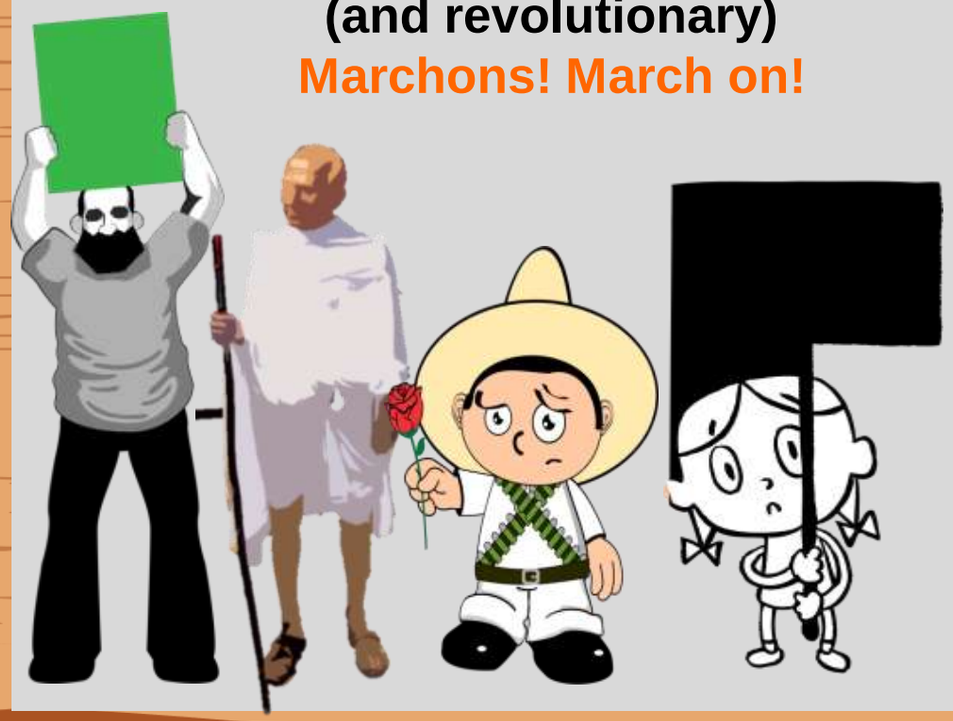
Repent and change, lest you arrive in hell!

VISIONARY

Behold the mountain!

PROTESTER
(and revolutionary)

Marchons! March on!



ENTREPRENEUR

Just do it!

PROPHET

REPENT AND CHANGE, LEST YOU ARRIVE IN HELL!

THE PROPHET POINTS OUT WHAT IS GOING ON IN THE CURRENT SITUATION, WHERE IT COMES FROM AND WHERE IT COULD LEAD TO, IF WE CARRY ON DOING WHAT WE ARE DOING NOW.

MANY OF THE UNDERGROUND ORGANISATIONS AND ALTERNATIVE MEDIA PLAY THIS ROLE, ESPECIALLY IF THE MAIN MEDIA AND SCIENCE BECOME POLITICISED AND THE PURSUIT OF TRUTH IS IN JEOPARDY.

THE PURPOSE OF PROPHECY IS TO AWAKEN THE PEOPLE AND INSPIRE THEM TO CHANGE, BEFORE IT IS TOO LATE.

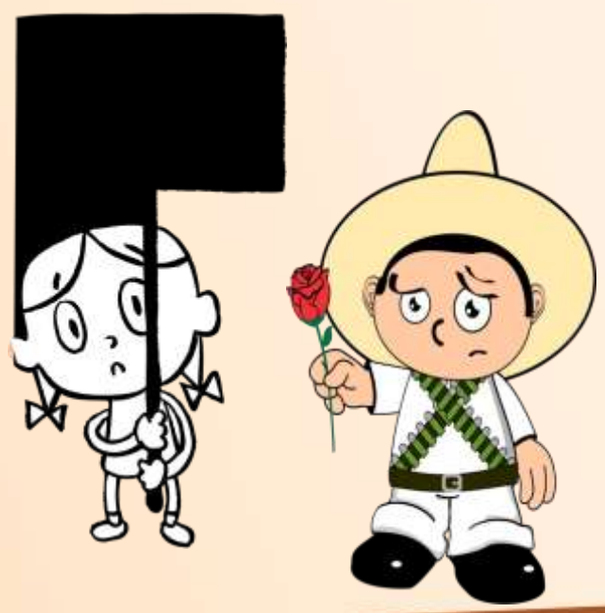
PROPHETS ARE THE CONSCIENCE OF THE PEOPLE!

PROTESTER

Marchons! March on!

**The protester acts against the unacceptable status quo,
either through peaceful means *(e.g. protests, resistance, disobedience and boycotts),*
or with violence *(which we abhor, as it benefits no one, except criminals and arms dealers!).***

**The purpose is to enforce change,
because the power structures and elites
who benefit by the status quo,
are not likely to change,
unless challenged to do so.**



***NOTE:* Information age protesters do not only march in the streets.**

They also MARCH ONLINE!

evolutionary change: the visionary

VISIONARY

Behold the mountain!

The visionary points out how a better future can look like.
(What can't be imagined can't be built.)

The purpose of the visionary is

to inspire,

give hope and

show what is possible and desirable.

From a w/holistic perspective, we distinguish between the

CONTEXT visionary

***(who points out how we can transform a system)* and**

CONTENT visionary

(who describe what the transformed system can look like).

evolutionary change: the entrepreneur

ENTREPRENEUR

Just do it!

**Entrepreneurs are implementers.
They make the transformation happen.
They are the doers, innovators, practical project planners, managers and functional experts,**

who co-produce the new systems, inspired by the vision of the design.

They need to be courageous, innovative, risk-taking and resilient, because they have to do what has not been done before and achieve outcomes that were not achieved before.

Q: We are confused:

You seem to use the words revolution *(as in revolutionary change)* and revolutionary *(as in revolutionary activity)* to mean different things?!?

A: Oh, the difficulty of ascribing meaning to a word!
Yes, you are right, when I reflected on what I told you,
I realised that I did convey two meanings:

First, I use the term *revolutionary change* in a "neutral" way to describe a change management approach that is focused on changing the current system. *(See the NOTE below.)*

This includes understanding the current situation and its inherent current futures *(i.e. the realm of the prophet)* and doing something about it, which ranges from peaceful protest to *(usually violent) revolutionary activity* as we know it from the Marxist / Leninist, Maoist and military Jihad traditions. *(More recently we observe violent revolutionary fervour also in movements like the Yellow Vests, ANTIFA and BLM).* Thus revolutionary activity conveys a second meaning of the word revolution.

Let me repeat: In both meanings, the term revolution is focused on the status quo and is based on current logic thinking. It therefore cannot – *per se* - lead to a transformed and more desirable future.

Violent attacks will merely call forth a violent defence response by the system, which calls forth more attacks, perpetuating an ongoing cycle of violence. Where and when did it start and by whom? Each side will blame the other and always has good arguments in doing so - derived from a current logic.

Thus always be peaceful in your revolutionary activities!

NOTE: The term revolution is derived from the Latin *revolvere* and means turning back, or turning around. *Analogous to the planets turning around the sun,* the revolutionary approach turns back on or around the current undesirable situation or system.

Q: Are you saying that we must become non-violent **REVOLUTIONARIES** in order to bring about change, including the change to a *w/holistic democracy*?

A: If we really want to change the world, we need **R/Evolutionary W/Holiparts.**
This means that we need both: ***Revolutionary W/Holiparts and Evolutionary W/Holiparts.***

Some of you must indeed assume a revolutionary stance and act as prophets *(who point out what is wrong and where things are going – the current alternative media do a good job of this)* and / or protest (*albeit peacefully)* against the status quo. If the current system does not feel a pressure to change it will not do so.

Others of you must assume an evolutionary stance and contribute as a visionary *(and ideal designer),* while yet others are needed to plan the implementation of the design and actually implement their part of it in their own context.

Each role is equally important to achieve the final outcome of a transformed society! And none is sufficient by itself!

Of course, you could play only one of the four roles, or all four *(e.g. at different times and in different contexts).*

Always stay **PEACEFUL!**
And *(if possible)* stay within the **LAW** *(although sometimes civil disobedience is called for)!*

C: You seem to get quite "preachy" about being non-violent and peaceful!

A: Yes, and we are not ashamed of it.

We keep emphasising the need for a **PEACEFUL** pursuit of those strategies, because **VIOLENCE BEGETS VIOLENCE** *(resulting in an escalating violence cycle).*

War serves no one *(except the seller of arms)* and hurts everyone!

After all, we are one human family. We share one planet, together with other life forms. If one part suffers, the whole suffers.

How to turn a cycle of violence into a cycle of peace?

By *"turning the second cheek"* *(Matthew 5:38-42)*

By not retaliating!

THINK!

What are the consequences of fighting each other? Of escalating the fighting? Of having another regional or even World War where multiple parties have nuclear arms and other means of mass destruction? March, protest and demand:

- PEACE between people, groups and nations, as well as between humanity and other species.
- STOP ALL WARS and disarm *(especially nuclear and other weapons of mass destruction)* and demilitarise.

Unless we achieve those aims there will be no future for humanity and many other forms of life!

MARCHON...march on...against armament...

Q: REFLECT:
Are you more of a
Revolutionary
W/Holipart
or
Evolutionary
W/Holipart?

A: I feel we must protest against injustice and war and march for peace!

A: I love DESIGN!

A: I like to explore problems and find solutions!

A: I don't like all this talk about revolution! People should all love and respect each other and live in peace and harmony! I stay at home and pray and meditate for peace!

C: Indeed, each person has different interests, is good at different things and is driven by different emotions and motivations.
The strength of one *(the one)*, complements the weakness of others.
Find out who you are and what your personal mission is.
You may also find the following *NOTE* on the psychological differences between the revolutionary and evolutionary stance interesting and helpful in affirming your preferences!

NOTE: psychological aspects of r/evolution

REVOLUTION	EVOLUTION
The EMOTION that drives revolutionary strategy is **PASSION** (*Latin for "suffering"*) about the problems of the status quo and the dismal prospect of the current futures.	The EMOTION that drives evolutionary strategy is **ENTHUSIASM** (*Greek for "God within"*) about imagining and creating a desirable future for all.
A useful MENTAL attitude of the revolutionary is: **DON'T BE NAIVE** about the nature of the problems, how they came about and who perpetrates them!	A useful MENTAL attitude of the evolutionary is: **"DARE TO BE NAÏVE"*** that a better future is possible and that we CAN and WILL co-create it! *(Note: Quote by Buckminster Fuller)*

Out beyond ideas of wrongdoing and rightdoing there is a field.
I'LL MEET YOU THERE.
(Rumi)

Remember the collective field of information...

... and that *(according to scientific studies)* we can change physical reality from this field through meditation and prayer!!!

From this we deduce that there are also *(shall we call them?)*
Field W/Holiparts,
who change the world through their spiritual praxis.

EXERCISES

EXERCISE 1:

- **Which role do you identify with the most? And why?**
- **And which role do you identify with the least? And why?**

EXERCISE 2:

How can

- **people in general and**
- **you specifically**

use each role to bring about change in society?

REFLECTION

Reflect on what you learned from this exercise.

Q: We have heard that the worldview of the revolutionary is DIALECTIC thinking.

Is this true and is it relevant?

A: Yes, it is true and relevant, although we do not discuss this here *(see the Advertorial).* However, let me give you a "TEASER":

Marxist / Leninist *(as well as Maoist)* revolutionary strategy involves dialectic thinking, formulated as *Three Laws of Dialectics.*

Applying those three laws is what revolutionary strategy is about. It is a very effective change management approach to overthrow an existing regime *(as we saw throughout the last century).*

At the same time it was observed, that this ideology does not produce desirable results for the people after the revolution.

Based on w/holistic thinking *(and our experience in a South African context)*, we suggest that if one of the three laws *(i.e. the law of the negation of the negation)* is transformed *(i.e. into the law of affirmation or vision),* revolutionary strategy becomes evolutionary strategy, which can be used to create an ideal future.

Thus, yes, knowing about dialectics and *R/Evolutionary Strategy* is very relevant indeed!

BIOMATRIX ADVERTORIAL

For more information on the application of dialectic thinking to societal transformation, see the *Biomatrix Cartoon Curriculum in W/Holistic Participatory Democracy.*

Q: We know that we asked you this question before, but we have learned a lot since then and your answer will make more and a different sense now:

What can a bunch of kids like us do to solve the problems of the world?

A: Remember your journey to different experts in the world and how disappointed you were that there are no solutions for the many global problems, or only part solutions that don't have sufficient impact?

Well, as we repeated and re-repeated: **what we cannot imagine, we cannot create.** If we don't have designs for how things could work differently, we can't create meaningful change *(merely perpetuate what we have, or create more of the same type of change and thereby make things even worse).*

I repeat: A bunch of W/HOLIPARTS, like you, could start a ***DIGITAL R/EVOLUTION*** that inspires society to RE-IMAGINE its systems.

(The idea of Biomatrix Jamming and Biomatrix Design Conferencing can assist in this.)

See also the following *NOTES* for some more inspiration!

NOTE: digital r/evolution

ONLINE JAMMING

DESIGN CONFERENCING

ONLINE DESIGN ITERATIONS

We said it before: You could become *W/Holistic Digital R/Evolutionaries :*

For example, had you known at the time of the *Occupy Wall Street* movement what you know now, you could have started a *Biomatrix Jam* that would have analysed the problems of the finance system in great detail, as well as captured existing solutions and brainstormed new ones and then spread this knowledge online. Thereby the relevance and power of the movement could have been increased.

You could have dissected the finance system into its sub-systems and worked together with experts *(maybe the father of one of you is a banker and could have helped you)* to redesign each. Then you could have integrated them into alternative ideal designs using *Biomatrix Design Conferencing*.

Then you could have continued with online *Biomatrix Design Iterations* that allow stakeholders to comment on and add to each of the alternative *designs (à la the Redesign of Paris).*

You could also have inspired artists to illustrate the problems, solutions and alternative designs through *Biomatrix Art Jamming*. That would have been cool! *(See the Music Art Jam on www.biomatrixweb.com in the gallery section)*

If you are in the IT branch, you could co-create with us a jamming app *(we can contribute the architecture for it, plus a great deal of design experience!).*

Had you done all this, you would have marched and designed online as a *W/Holistic Digital R/Evolutionary*. And who knows what could have happened?

NOTE: digital r/evolution *(continued)*

The *Occupy Wall Street* momentum has disappeared *(although now it would be more important than ever)*, and other protest movements have risen since (e.g. the *Yellow Vest, Friday for Future, Black Lives Matter and Anti C-Pandemic Measures movements).*

Why not complement the Yellow Vest Movement with a jam on redesigning democracy in general?

And why not engage the *Friday for Future Movement* in a jam for denuclearisation and demilitarisation? After all the military are a major contributor of CO2 emissions and a nuclear war would lead to unprecedented climate change, besides ending most *(if not all)* life on earth, long before any climate change could do so.

And why not extend the *Black Lives Matter* with a jam on human rights and human *(and also animal)* rights violations in general and globally? After all, All Lives *(Human and Non-Human)* Matter! *(We would prefer the slogan: Let all life live!)*

And why not do a jam on pandemics in general and how to deal with them in future and using the current as a case study? Surely, the prospect of repeated lock-downs with every pandemic is motivation enough?!? *(According to the current definition of pandemic, every annual flu season qualifies as one!)*

Or as another option: why not establish a w/holistic *(multi-dimensional and multi-level),* truthful and intelligible DATABANK or FACTSHEETS on any or all of those issues? *(See the discussions on databanks in the PS of this curriculum.)*

And, and, and ...

PART 8:
Summary

According to the dictionary, a SUMMARY is a brief statement or account of the main points of something.

EXERCISE

Do your own summary:

Take a few minutes and reflect what the three most important things are that you remember from engaging with this curriculum and WHY.

Q: Can you summarise.....and also briefly tell us again: How do we know which framework to use when?

A: If you deal with a personal problem *(like a marriage, or your work situation)* I would use both, the stakeholder and co-factor framework to identify the problem issues and who is involved in them.

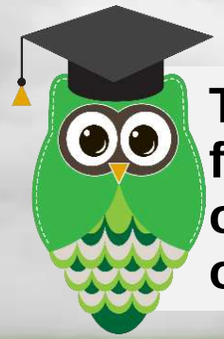
To deal with a big "mess" *(e.g. poverty, or a pandemic)*, you need to dissect it into its different activity systems and develop strategies in each of them with the aim to dissolve the mess.

If you deal with an activity system *(i.e. a function, or industry),* you need to identify its sub-systems and redesign them in a top down and bottom up iterative manner.

If you deal with the redesign of an entity *system (e.g. an organisation or government department),* you would use a three-dimensional matrix framework *(wich we have not discussed in this curriculum).*

In each case you need to do a problem analysis, then collect and brainstorm solutions, which you categorise and redistribute into (sub)system specific *Design Notebook(s).* Then you integrate the solutions into a design *(or alternative designs) using the framework of the seven organising forces,* assess the design impacts, align with stakeholders through design iterations, make an implementation plan for each design alternative then get stakeholders to Implement their share of the design.

SIMPLE!



The different frameworks do not exist in isolation from each other, but can be super-imposed on each other and combined in different ways in the course of analysing and redesigning a system.

Q; We have learned a lot of different things from you.

Nevertheless, could you please, summarise it all in a sentence or two?

A: OK. I will give you a brief summary of the curriculum in form of an INVITATION *(see the following NOTE).*

But I will need more than two sentences - after all we deal with complexity here!

NOTE: INVITATION

What is it about?

In order to dissolve the complex problems of the world we need a w/holistic transformation of our THINKING according to a comprehensive and coherent theory of w/holism *(like Biomatrix Theory).* We also need to know how to apply the theory in a practical methodology *(like the Biomatrix Change Management Methodology).*

Based on this new thinking and using the methodology, we need to transform our current cultural, economic and political systems based on a w/holistic ethos and w/holistic principles of system organisation *(derived from Biomatrix Theory and guided by Biomatrix Methodology).*

What is to be done?

How to start? First learn the theory and methodology. Then apply it by COMMITTING to start the process of redesigning your system of concern *(e.g. as a doctor the health care system, as a journalist the public media system, as a teacher the education system, as a banker the finance system, as an engineer the energy system, etc.),* or join others in doing so.

The process can start in your head, proceed to coffee sessions with your friends, during which you can plot the framework for your system of concern. In further coffee sessions you can start populating the various categories of the framework and then take it all online and ask others *(via your social networks)* to add their information to the jam.

Who knows, there may be enough momentum created to continue with the other steps of the methodology to produce an inspiring design, which can take on its own momentum.....

A journey of a thousand miles begins with a single step. (Chinese Proverb)

NOTE: INVITATION *(continued)*

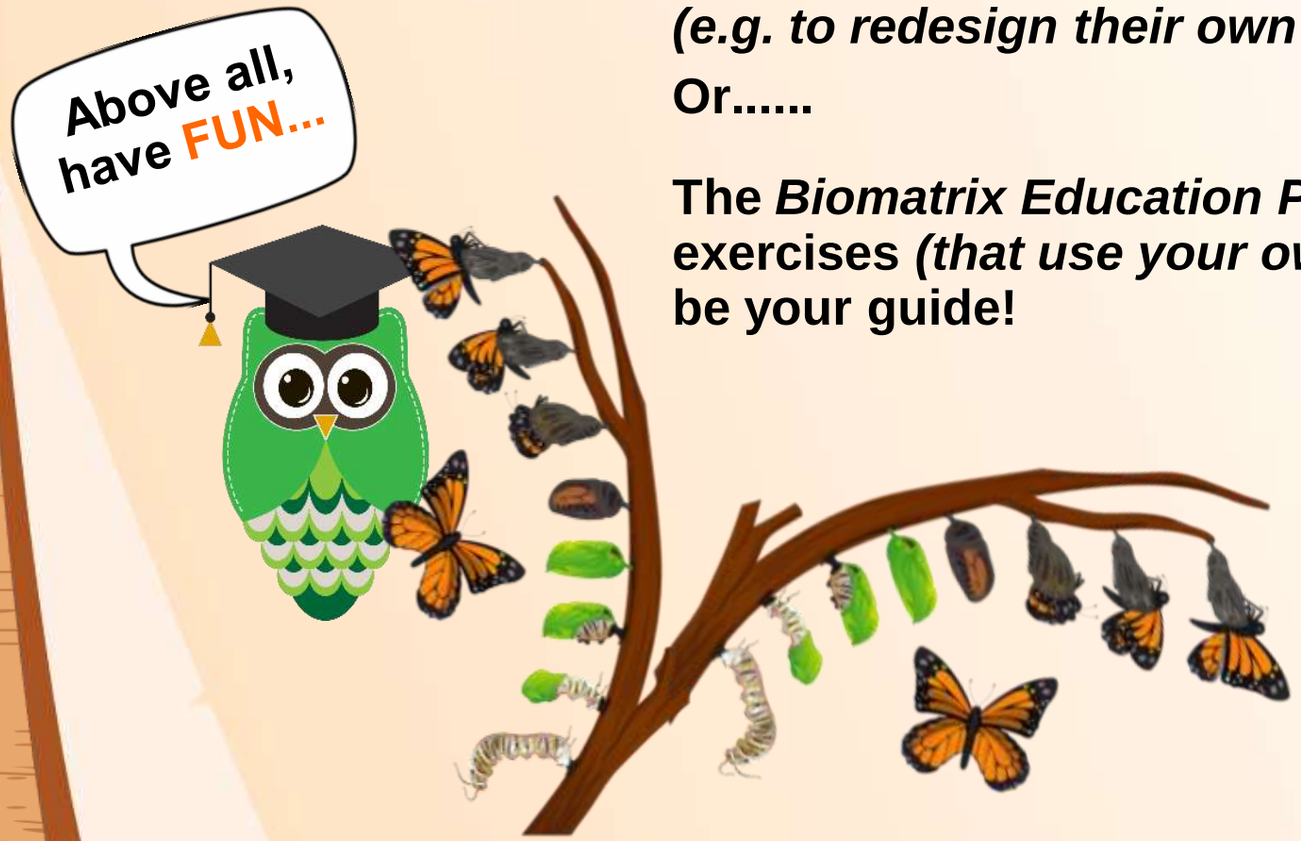
Or maybe you are the head of an organisation or government department and can LEAD the members of your system and other stakeholders in such an exercise, through all steps, including implementation in order to transform your shared system....

Or maybe you are a member of a corporate academy or a school of governance and can bring w/holistic education into the system, as a "*Trojan Horse*".....

Or maybe you can involve your children in a school project *(e.g. to redesign their own education system).....*

Or.....

The *Biomatrix Education Programme* with its template-driven exercises *(that use your own system as the case study)* can be your guide!



Q: And if you were to summarise *change management* in a few sentences.....?

A: As an individual you are powerless to change the entrenched systems of society in any significant way *(even if you are a head of state – see Donald Trump).*

As a mass of individuals you are only powerful enough to protest the status quo without being able to change it *(other than preventing a law or policy from being enforced on society).*

But if you ORGANISE yourselves *(by using our proposed change methodology)* and get together with *(even a few)* other stakeholders of your system of concern and expertise, or around a specific issue, you empower yourselves to change it *(and even more so, if you network and coordinate with other related initiatives).*

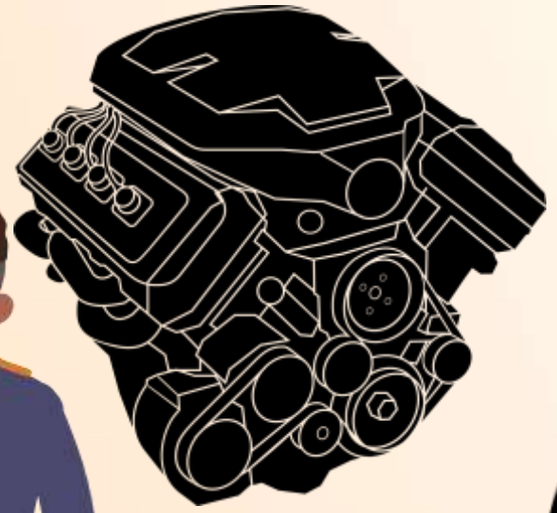
If this happens in each function and industry of society more or less simultaneously, a constructive momentum will develop and the effect will be transformative!

ORGANISING YOURSELVES IS KEY!

Each one of you getting involved with issues associated with your area of expertise!

Q: And of all the many theoretical concepts and methods which you taught us, can you tell us the **THREE most important** ones that we, as w/holiparts, need to know, in order to become *Effective Transformation Leaders?*

A: Of course, I can do that, provided you first tell me **which THREE parts** of a car are the most important ones, if you want to go for a drive!




traffic rules


SOLUTION
SOLUTION
SOLUTION
SOLUTION

W/HOLISM

BRAVO

You got it!

It is about WHOLES not parts!

... your question was still based on the reductionist worldview...

... but now you think w/holistically!

You need a WHOLE car, if you want to go for a drive and not its three most important PARTS!

CONGRATULATIONS!
You just now graduated and here is your *Biomatrix Certificate of W/Holistic Thinking.*

biomatrix certificate

biomatrix certificate

biomatrix certificate

biomatrix certificate

Thank you for watching!

"....did we capture your conscience....?"

The End

Our IDEAL:

Our END is your BEGINNING....

POST SCRIPT


As the kids return from their forest retreat with the futurist,
full of new knowledge and enthusiasm,
they encounter a fundamentally changed world...
....a world ravaged by a pandemic with the C (ἀ,β,γ,δ...) virus...

...everything looks unreal to them, like a landscape frozen in time...

The cities are empty, shops are closed and many seem to have closed down for good...

Pre-schools, schools and universities are closed...

There are no markets, sports events, concerts and festivals... All live culture is wiped out... Religious services have been suspended. Easter was cancelled and later Christmas...

The people are imprisoned in their own home... And when permitted to leave it, they float past each other, like icebergs in an alien sea... They are like zombies, frozen with fear, hidden behind hideous masks, not looking at each other. They are scared to touch or be touched...

Old people, mostly with previous health problems, die alone without the comfort of their loved ones... Children are made to feel guilty and fear that they could infect and thereby kill their parents and grandparents...

The media incessantly bombard the people with frightening pictures and statistics about ever new waves of infections...

PSST DON' TELL ...

The fear of death has begun to prevent living.

They decide to resume their journey *(as in Chapter 1)* and search for truth about the magnitude of the pandemic from both mainstream and alternative sources.... and they get increasingly confused...

Official statistics about infection *(with or without symptoms)* and death *(from and with the virus)* are unintelligible.
Yet already after a couple of months, a more thorough and detailed statistical analyses *(not widely discussed in the mainstream media)* suggested that mortality rates are similar to that of past annual flu seasons...
... and that the virus is mostly dangerous for old people with other serious medical conditions.

The pandemic is judged by incidence values derived from PCR tests *(which are apparently not suitable for diagnosis, nor are they standardised, besides giving rise to false positive cases).*
Yet most governments enforce testing, testing, testing...

And why did some countries forbid autopsies, in order to distinguish between death from and with the virus and thereby gain more insight into the severity of the disease?

There is no open scientific debate involving different experts with different views.
There is only one official narrative espoused by governments, advised by a few select virologists.
Opposing and critical voices are not heard in the public media and increasingly censored and cancelled.

Most of those identified as testing positive do not show any symptoms, some merely light ones and only a few develop heavy symptoms and even fewer die.
Thus, a growing number of scientists dispute the validity of the tests.

Pssst
Don't tell

Testing is a major co-factor of spreading the pandemic!

... they also search for truth about treatment and prevention ...

... and get even more confused...

Governments justify stringent lockdowns with the argument that they prevent the spreading of the disease and thereby the overloading and even collapse of the health-care system.
And while some countries showed an overload for a short period of time *(similar to that occurring during severe flu seasons),* other countries even reduced their number of hospitals and emergency beds, while staff remained in short-time work.

Conventional treatments with apparently successful results are ignored, suppressed, maligned and in some countries even forbidden...

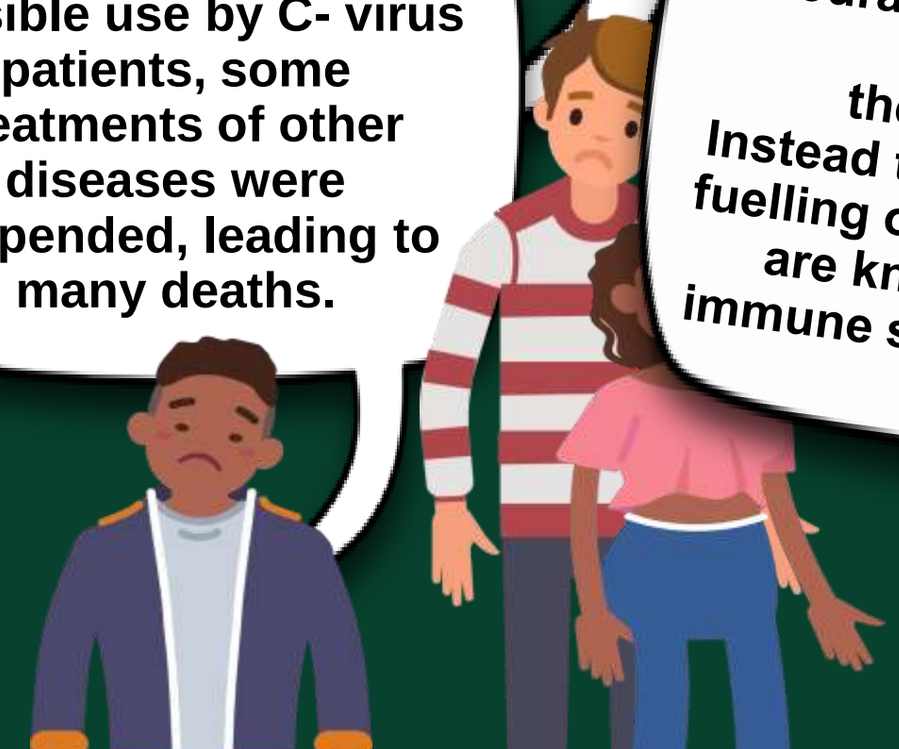
Through an unprecedented propaganda campaign, vaccination is hailed as the ONLY saviour in the pandemic ...
... and people are forced to voluntarily get vaccinated.

... while at the beginning of the pandemic the WHO suggested a hugely overdosed conventional treatment!

Voices doubting the need for vaccinating at all, or raising concern about the insufficiently tested vaccines and their potential long-term dangers, are silenced.
Reports of early side-effects are ameliorated and emerging scientific studies about side effects (as well as other aspects of the pandemic) are barely (if at all) mentioned in the mainstream media.

To keep medical facilities open for possible use by C- virus patients, some treatments of other diseases were suspended, leading to many deaths.

Throughout the pandemic, there was a lack of official information and encouragement about measures to strengthen the immune system.
Instead there was an incessant fuelling of fear and panic which are known to weaken the immune system and resistance to disease.



PSST DON' TELL ...
Is this really about health?

... they try to make sense of the measures taken to prevent the spread of the disease .... and they are shocked...

Governments issue stringent measures *(like masks, distancing and lock downs)* to curtail the pandemic, based on the advise of few officially recognised virologists.

The psychological consequences *(like depression, suicides and traumatised children),* will shape societies for years to come!

The growing criticism from a wide range of scientists about the effectiveness and proportionality of the measures is silenced ...
... while increasingly supported by scientific studies *(which are largely ignored).* Yet governments persist with the measures, contrary to this mounting scientific evidence.

The economic consequences of the lockdowns are disastrous. Unemployment and bankruptcies of small and middle sized businesses continue to soar.
Worldwide, 130 million more people face hunger and starvation *(additionally to the 690 million before the pandemic).*
At the same time, large corporations *(especially the pharmaceutical industry and platform corporations)* show unprecedented profits.

Psst
Don't tell ...

The cure has become worse than the disease!

689

... and they are especially perturbed to learn about the threat to democracy and the rhetoric of a *Great Reset*...

In many countries the rights of citizens *(as enshrined in the constitution)* have been drastically reduced and overruled through the pandemic related executive measures and even through new legislation...

Vaccination creates a two-class society, one with rights to return so a limited normality, the other being ecluded from participating in social life!

Worldwide, public protests against the measures are mounting. Governments increasingly restrict them. Police brutality is shocking and mainstream media reports about them are missing, or biased ...

And there is talk about using the pandemic to reset societies to a post-pandemic new world order!
What is implied by it???
And who decides how this new order should look like???

PSST DON' TELL ...

Yesterday's conspiracy theories have become today's mainstream agendas!

...in their desperation, the kids call on the futurist for guidance...

We are scared!

Is this about a pandemic or a reset to a new global social order?

We are confused!

HELP!

Q: What can we do?

A: Of course it is about a pandemic, albeit its degree of severity is disputed by different scientists.

What you can do about it, is spread “truth” about all aspects of the pandemic *(e.g. through establishing a w/holistic databank or various factsheets*) and thereby spread more clarity and confidence and reduce confusion and fear.

At the same time, the intention of a so-called GREAT RESET to a new global social order seems very real and is widely discussed in both, mainstream and alternative media.

Let me discuss this reset a bit further, before returning to the question of what YOU can do about it!

About changes in the order of societies:

As humanity moved from the hunting-gathering into the agrarian and then into the industrial age, huge changes occurred in terms of worldview, technology and social organisation. Likewise, there will be fundamental changes as we move further into the information age.

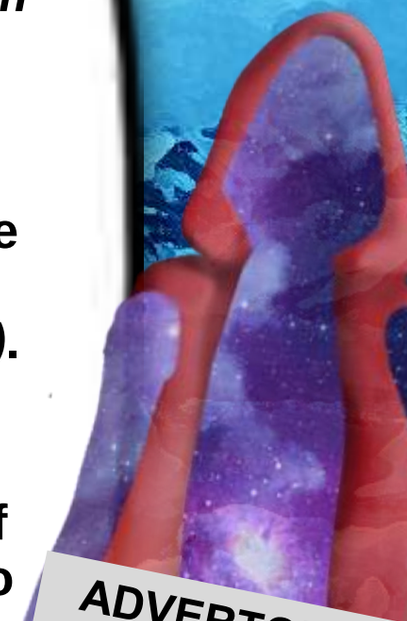
However, in the past, those changes evolved over long *(albeit with each age declining)* periods of time. They were not socially engineered, even if there were attempts of it in different regions of the world *(like communism "resetting" many countries in the last century).*

From this historical experience, one should therefore be wary of any deliberately planned and enforced reset, especially by global elitist decision-makers who are still steeped in the reductionist worldview, have the tools for a digital control dictatorship and use the pandemic as an excuse to establish increasing controls *(while continuing to benefit by it)*. They could unleash much damage, *analogous to the Sorcerer's Apprentice*.

To avoid irreversible negative human developments, a critical number of people *(including you)* have to organise themselves politically in order to shape their COLLECTIVE AFFAIRS.

(Self-organisation and self-governance are w/holistic principles!)

Amongst others, this could involve demanding a return to the pre-pandemic constitutional rights of all and rule of law in their society, while at the same time working towards establishing a *W/Holistic Participatory Democracy.*



Q: Why do you speak of the Sorcerer's Apprentice? And what do you mean by it?

A: The story of the Sorcerer's Apprentice symbolises that the application of limited knowledge for selfish purposes can unleash overwhelmingly disastrous and unstoppable developments.

If you don't know the story, why not read up Goethe's famous poem about the *Zauberlehrling,* or watch the Disney cartoon of it (https://youtu.be/9d0Ca5Z2L7g), or read the summary of the story on the following *Slide.*

NOTE: the Sorcerer's Apprentice

In short, the story is that the Sorcerer's Apprentice uses the absence of his Master to do some magic with his limited knowledge.

He orders a broom to carry water to fill his bath. The broom obeys, but carries on carrying water till the bath overflows and the house begins to be flooded.

Unfortunately the Apprentice lacks the knowledge to stop the malaise.

In desperation he chops up the broom with an axe. Now each splinter becomes a full broom, carrying water.

Fortunately, just before he drowns, the Master returns and establishes order again.

Q: Can you explain this magician's apprentice analogy in more detail?

A: In the context of the current pandemic, this story symbolises that the measures issued by governments were based on little knowledge and had *(and still have)* devastating economic, cultural, political, psychological and other health consequences.

Promoting *(and even enforcing)* a new generation vaccine that is not sufficiently tested *(at least not in terms of its long-term consequences*) and for which their producers have been exempted from being liable for damages, is another example of a magician's apprentice action.

And especially the trans-humanist developments could become further examples, unless stopped in time by **WISE MASTERS.**

Q: And who are those WISE MASTERS?

A: Now that we have labelled the global elites *(who apparently want to reset societies worldwide and want to use a pandemic to further this agenda)* as *Magician's Apprentices*, the question arises:

Who then are the masters that can save us from this dystopian digital totalitarian future and do a reset that serves humanity and the planet? A world leader wielding another ideology? No, that would be another apprentice. The aliens saving us from a global catastrophe? That is a pipedream!

Well? Can't you guess my answer by now? The mantra of the information age *(one that will advance us from the digital steam age)* is: **SELF-GOVERNANCE.**

Yes, indeed, **YOU are the *WISE MASTERS*!**
All of us individual members of society who are concerned and feel that it is our mission to spearhead the self-organisation of our system of concern *(i.e. in which we participate and have expertise in)*, are the only masters who can do it!

Each one of us, who is in tune with nature and our Self, has a w/holistic view of the world, subscribes to a life supporting ethos, is neutral *(i.e. willing to suspend personal opinions in favour of hearing that of all stakeholders)*, is willing to learn and has the courage to facilitate a collective participation in the redesign and transformation of our specific system, is such a *Wise Master*!

This curriculum shows us how to "RESET" *(or transform)* systems.
In the *Curriculum in W/Holistic Participatory Democracy* we discuss the larger picture of a societal
"RESET" into a self-governance based democracy ...

Q: But we are so scared that we are numb, depressed, overwhelmed ...

... how can we act?

A: Indeed, a year of incessant fear-mongering in all public media with gory pictures and alarmist *(and misinterpreted)* statistics and reporting, enforced mask wearing that takes our breath away and symbolises the curtailing of our free speech, locking us down as prisoners in our own homes, forbidding us to come close to each other and meet to celebrate religious, cultural and sports events, has thrown us all into DEEP FEAR – first of an invisible viral enemy, then a fear about the economic consequences and of the future in general.

Of course you are TRAUMATISED!

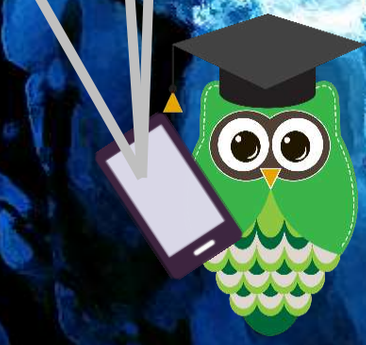
You need to deal with your fear and treat your trauma. There is lots of information about the “how to” on the internet. Start immediately to deal with this. It is part of becoming a wise master.
Breathe, meditate, pray ...
As to acting: above all, recapture logic and rational thinking. Once upon a time, science led us out of the dark ages of superstition and ignorance. Don’t allow incompetent politicians and selfish commercial agendas to throw you back into those times.

Let the SCIENTIFIC METHOD be your shield and the OPEN SCIENTIFIC DEBATE your strategy!

"The brave man is not he who does not feel afraid, but he who conquers that fear." *(Nelson Mandela)*

Feel the fear and do it anyway! *(Susan Jeffers)*

Unite behind the ~~science~~ scientific method and open scientific debate! (Paraphrasing Greta Thunberg)



Q: How can we use this SHIELD of science and logic in praxis?

A: The current C *(α̇,β,γ,δ)* pandemic was *(and continues to be)* characterised by a conglomerate of largely unrelated information about any of its aspects.

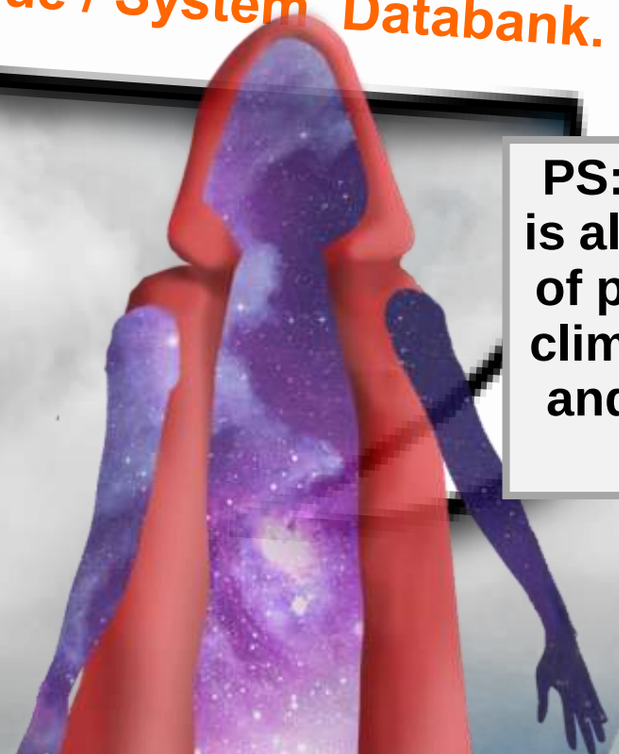
By *unrelated* we mean the reporting of a statistic or an apparent fact *(typically in an emotionally and morally alarmist manner)* without putting it into a larger context *(such as historical comparisons)* that could explain its meaning and relevance.

Since the beginning of the pandemic, there is statistical confusion *(if not manipulation)*, one-sided scientific evidence due to the suppression and maligning of alternative arguments of reputable scientists, a lack of distinction between scientific evidence and political opinion and - most importantly- no open multi-disciplinary scientific debate.

What is desperately needed is rational thinking and debate based on a more w/holistic TRUTH and a LARGER PICTURE of the pandemic in order to assess its associated risks and develop measures that are proportional to the risk.

This requires a collation of relevant information in form of a Public Issue / System Databank.

TRUTH CASTS OUT FEAR
Truth based on rational thinking dissolves fear that is fuelled by irrationality, emotionality and self-righteous morality.



PS: By the way, the same is also true for other issues of public concern, such as climate, energy, education, and above all, the finance system!

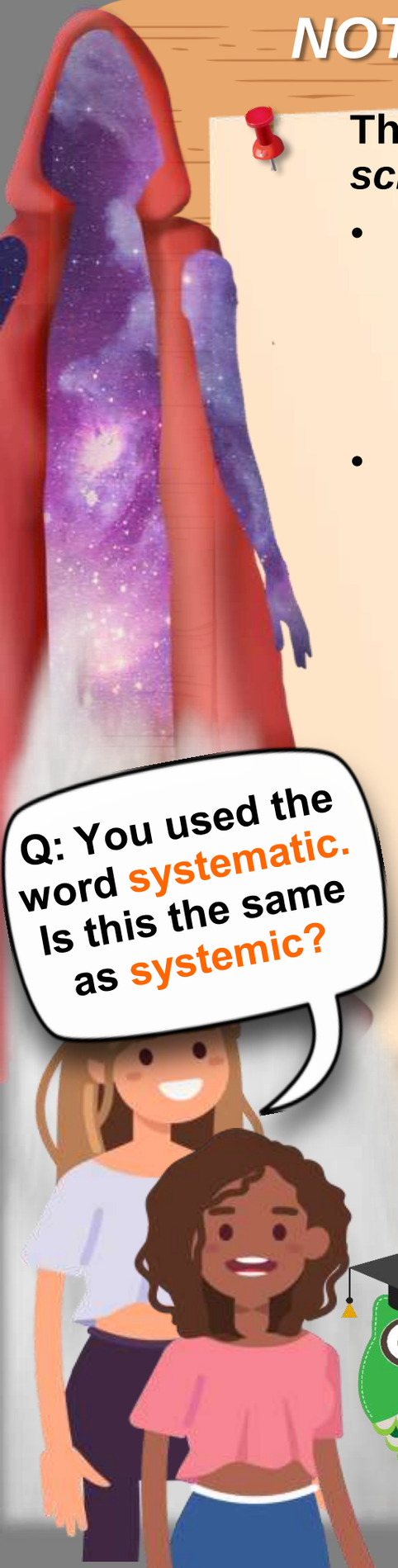
NOTE: about truth

A: Oh dear! TRUTH? The eternal philosophical question!

Without going into a lengthy philosophical discourse, let me merely give a few useful *(minimum)* guidelines for the purpose of compiling a w/holistic *Public Issue / System Databank:*

- **Truth is an IDEAL *(and as we learned, an ideal cannot be reached merely pursued and approximated).***
- **There is a personal and a collective truth. In a public discourse we need to pursue COLLECTIVE TRUTH *(ideally based on published research based on the scientific method, verified facts and deduction based on logic, etc.).***
- **SCIENTIFIC TRUTH *(as philosophy of science and Popper tell us)* cannot be proved. It merely prevails until disproved. That is why verifying research and a scientific discourse between different approaches and alternative views are so important.**
- **Concerning statistics, it is useful to quote ABSOLUTE as well as RELATIVE figures, guard against manipulations *(e.g. by investigating their source, processing method and underlying assumptions)* and use them in appropriate categories with relevant and historical comparisons, etc.**
- **In the case of evidence derived from mathematical modelling, the ASSUMPTIONS and STRUCTURE of the model need to be scrutinised, as they are of greater relevance than their output.**
- **NO, the OPINIONS of politicians, journalists, or even scientists are NOT a truth that should be believed, unless they quote reliable sources and verifiable arguments. If they don't, they merely do PROPAGANDA.**

NOTE: about truth *(continued)*



Then there is a REDUCTIONIST and W/HOLISTIC TRUTH *(even if some traditional scientists will disagree on this)*.

- **A reductionist truth relates to knowledge of a phenomenon *(typically within a specific scientific discipline),* that was established through analysis using the traditional scientific method *(i.e. looking into a phenomenon, ceteris paribus and with the aim of prediction and replication)* and was confirmed through peer reviews and published *(e.g. in a reputable scientific journal).***
- **A w/holistic truth is established by looking at a specific phenomenon within its larger environmental context *(i.e. from the perspective of different levels and dimensions)* and thereby across scientific disciplines. *For example, to discuss the gender issue, one has to clearly distinguish between the biological, physiological, psychological and societal levels and the different dimensions at each level.***

Thus a w/holistic truth about a system or issue is derived from multiple perspectives. It is an EMERGENT TRUTH about a larger whole that is co-produced by the partial "truths" of its contained parts and other systems it interacts with. Put a little simply, it is like the larger picture emerging from the tapestry of individual scientific studies, *analogous to the picture emerging from its pixels of colour.*

Establishing this emerging larger picture is the aim of a *Public Issue / System Databank.* Dare we call this picture a systematically established COMMON SENSE TRUTH?

A: The root of the word *(i.e. system)* is the same, namely an arrangement of things or phenomena. Otherwise their meaning is not the same: *SYSTEMATIC* means doing things in an orderly *(like step by step)* manner, while SYSTEMIC means adhering to the order of w/holism or systems thinking *(such as feed-back loops and interacting forces of organisation).* Any research, be it reductionist or w/holistic *(i.e. systemic)* should be conducted in a systematic manner.

NOTE: about truth *(continued)*

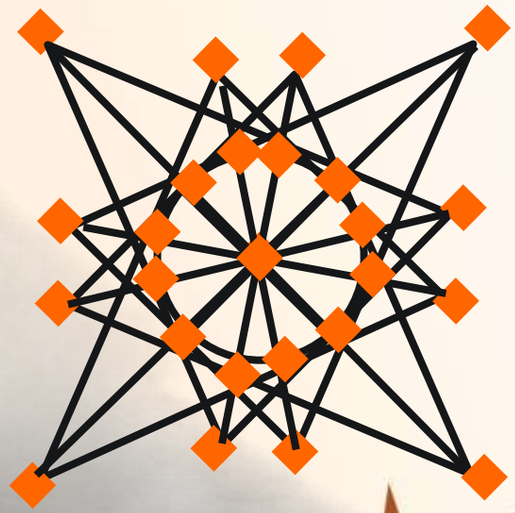
Throughout this curriculum, we spoke about PATTERNS and the use of FRAMEWORKS in our systemic inquiries. This requires also an understanding about the distinction between INDUCTION and DEDUCTION in generating "truth".

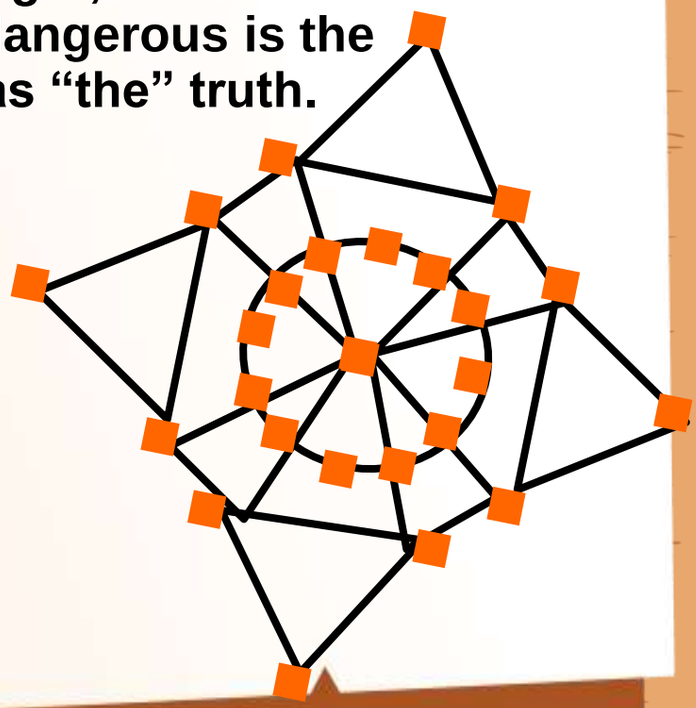
TRUTH from INDUCTION: Induction starts with the observation of phenomena. It is typically used for formulating a hypothesis for further exploration and its verification or falsification by applying the scientific method *(or plain rational thinking).*

One can identify different phenomena related to an issue or system to derive a large picture, *analogous to connecting isolated dots*.

Of course, one can group phenomena and connect them in different ways and thereby get different pictures *(or scenarios)* that convey a different meaning and understanding of the system and its context.

This is both an opportunity and a danger. It is an opportunity if I use the pictures as an exploratory tool. It is a danger, because the picture will be incomplete, and even more dangerous is the temptation to regard a preferred picture as "the" truth.





NOTE: about truth *(continued)*

EXERCISE:
Why not have some FUN with CONNECTING THE DOTS in different ways?

TRUTH from DEDUCTION: **Deduction starts with a scientifically established and recognised theory from which "truth" about a phenomenon can be derived.**

If one has a generic pattern that is universally applicable *(such as the Biomatrix Spatial Framework)* one can deduce truth from it *(such as that the truth about a social issue is multi-dimensional and spans different levels in the containing systems hierarchy of life).*

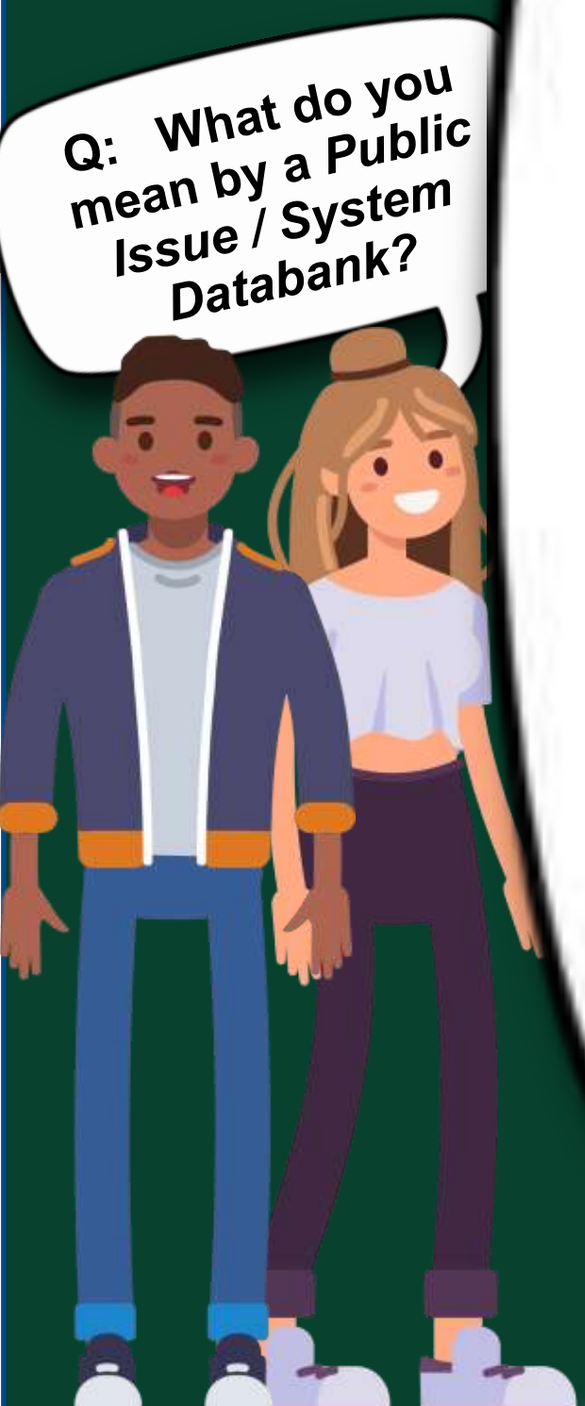
A generic framework prompts the researcher to search for and identify information about the issue in each of the categories prescribed by the framework. Thereby it inspires induction again, albeit in a systematic and *(if the framework is systemic)* also a systemic manner.

Through this interaction between deduction and induction a larger, collective truth emerges about the issue of investigation.

It is also likely that contradictory evidence is identified. This is however a contradiction within a specific category *(e.g. in a specific dimension at a specific level)* and not of the issue as a whole.

Such contradictions fuel a scientific debate, or in the context of political decision-making is the foundation of an intelligent public discourse.

Q: What do you mean by a Public Issue / System Databank?



A: To create a system design or make a decision about a policy issue, one needs relevant and comprehensive information.

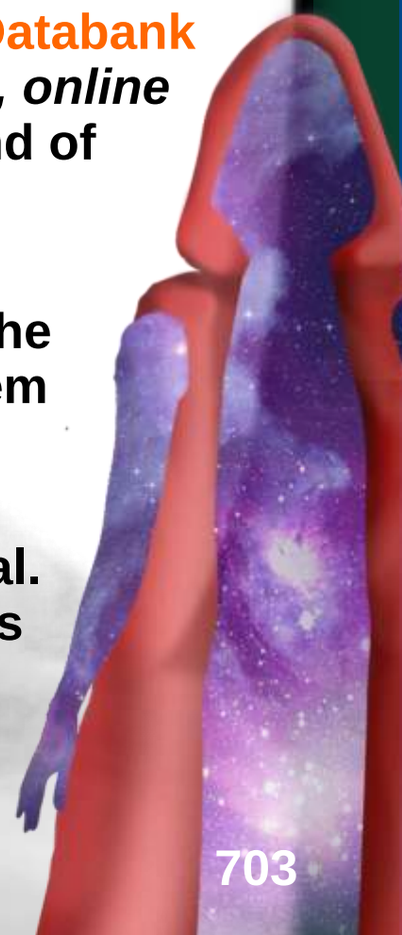
To create a w/holistic design one needs the w/holistic "truth" about its various aspects, this includes information about facts *(i.e. what is),* interpretations *(i.e. what are reasonable interpretations of and conclusions from the facts)* and normative statements *(i.e. what is desirable for which stakeholder).*

In the case of a system redesign one needs information about all aspects of its current organisation *(e.g. according to the seven forces of organisation)* of the system and its sub-systems, as well as their problems and possible solutions and if they exist, the alternative ideal designs for them. A Public System Databank *(such as the databank of the education, health-care, finance, or electricity system of a society)* should contain this kind of information *(similar to a Design Notebook).*

In the case of an issue *(e.g. a policy design)* one needs information about all its aspects in all dimensions and at all levels. A Public Issue Databank *(such as the databank for managing unemployment, a pandemic, online education, food-security or migration) should* contain this kind of information.

The difference between the two types of databanks is that the PUBLIC SYSTEM DATABANK is concerned with a specific system and its sub-systems. It is about a single function *(even if it is viewed from a multi-functional perspective*).

By comparison, an ISSUE DATABANK is a priori multi-functional. It therefore requires the participation of different functions in its establishment.



Q: Is a Public Issue / System Databank the same as the Design Notebook you talked about in Step 4 of the change methodology?

A: A **Public Issue / System Databank** is a permanent databank that is located within an official governing organisation *(e.g. the department of education or energy)* and is compiled and maintained by a *Stakeholder Forum. (See also the Biomatrix Curriculum in W/Holistic Participatory Democracy).*

By comparison, a **Design Notebook** is a temporary databank that is generated during a design process. Besides containing relevant information selected from existing other databanks, it also contains the information *(both current problems and proposed solutions)* submitted by the stakeholders for this specific (re)design.

After the design process is complete, there is no more need for the *Design Notebook (other than as a record for the sake of transparency)*. However, some *(or even all)* of the new data generated during the design process is added to the relevant *Public Issue / System Databank(s).*

Thus, there is no fundamental difference between the two types of information repositories in terms of content or categorisation.

Q: Surely, governments already have research institutes that compile such data and store them in a databank?

A: Indeed, there are many specialised databanks in government departments and research institutes of universities. These tend to be highly specialised and need experts to interpret them. They are not easily understandable for laypersons *(such as politicians).* Also, they are not conceived from a w/holistic perspective and are therefore partial and incomplete. They do not show a larger picture.

Besides being designed on the basis of multiple perspectives, the w/holistic databank of a system / issue allows the user to

- ZOOM IN to its sub-systems / sub-issues and within each into increasingly detailed knowledge about it, as well as a
- ZOOM OUT into increasing summaries that presents the whole system / issue in overview. Thereby, a larger "truth" of the system / issue emerges that can be seen "at a glance".

Both zooms are equally important and each is useful for a different purpose. *(See also the following NOTE.)*

"The feasibility of decision-making depends on detail. The proportionality of a decision requires the bigger picture."
(ED)

NOTE: more on public databanks

Design, as well as decision-making alternates between zooming into increasingly detailed knowledge and zooming out into summaries and overviews.

Besides presenting the information to allow a zooming in and out, a *Public System / Issue Databank* also needs to be formulated in a manner that makes it understandable to the educated general public.

While scientists can assist in zooming into the detail of their discipline and interpreting it, they are usually not as comfortable with zooming out and looking at the larger picture, beyond the boundaries of their discipline and especially not with exploring emergent knowledge from the interaction across disciplines. *By analogy, they are so involved with a specific tree that they fail to see the forest, let alone the forest as an eco-system that contains other species and systems it interacts with. Ideally, a Public System / Issue Databank facilitates the view of the forest and its trees as part of an eco-system so that their interaction can be explored and understood.*

Its most important purpose, however, is to provide an OVERVIEW of the different aspects of a system and its sub-systems or an issue and its sub-issues and the connection between them. After all, the detail can always be researched via the www.

To provide a w/holistic overview requires a w/holistic framework. The *Biomatrix Frameworks* discussed in *Step 1* of the *Change Methodology* also lend themselves as the architecture of a databank. Compiling such databanks is an important w/holistic skill, whereby the *Context W/Holiparts* can assist with the framework and the *Content W/Holiparts* with the appropriate processing of data and formulating of arguments. The latter intimately know the part they represent and can therefore assist with compiling the detailed knowledge for users to zoom into.

Once the people have a larger picture, they are able to contextualise and evaluate the isolated bits of information that are presented by the public media.

Without this, a meaningful public discourse is not possible and a w/holistic participatory democracy would not function.

A: Yes, Wikipedia is a public databank. It is an encyclopedia, which is a conglomerate of different subjects with the purpose of providing an overview of them.

By comparison, in a *Public System / Issue Databank* as proposed by us, the information is organised on the basis of a w/holistic framework for the purpose of informing design and decision-making about the system / issue. The framework ensures that all aspects of the system / issue are covered in sufficient detail and related to each other to also provide contextual understanding.

Of course, information from *Wikipedia* can be incorporated in a system / issue databank.

From an organisational perspective Wikipedia can serve as both a desirable, as well as undesirable role model:

On the one hand, it demonstrates the power of co-production of knowledge by interested stakeholders. This is what is desired in both, the creation of a *Design Notebook* and *Public System / Issue Databank.*

On the other hand, Wikipedia is increasingly criticised concerning its one-sided and non-transparent selection and editing of information, especially on issues relevant to current political, economic and cultural developments. It certainly violates the ethos of self-governance that should *(in our opinion)* guide public databanks.

NOTE: ethos of public databanks

We propose that the ideal design of a *Public Issue/System databank* and a *Design Notebook* should be based on the following ethos:

- **providing overviews of the different parts and aspects of the issue/ system so that a larger picture can emerge**
- **comprehensiveness in terms of sufficient detail, as well as in a w/holistic sense *(the Biomatrix Frameworks can assist in this. For example, assessing how "green" electric cars or windmills are, without looking at the whole supply chain, is not comprehensive.***
- **a scientific approach to ensure a distinction between scientific evidence, a different interpretation of the evidence and an opinion *(which could be based on a normative choice, or the pursuit of self-interest). We* could also speak of a "truthful" approach *(see previous NOTE on truth)***
- ***t*ransparency in terms of *CONTENT (i.e. the source of the fact or argument)*, as well as the orhganisational *CONTEXT (e.g. information about who financed the scientific study, or the organisation that promotes a specific normative position, or communicates it, etc., besides other hidden power structures)***
- **openness to diverse opinions, based on freedom of expression, albeit within the law, of course *(which would exclude promoting violence and racism, etc.)***
- **etc.**

Ideally, the same ethos should also guide a *Public Discourse* about any societal change or public policy design.

C: This discussion about public databanks and truth made us aware that we don't have a "larger picture" about the C-pandemic and its consequences, although we have been bombarded with information on a daily basis for more than a year. In fact, people seem more confused than ever!

A: Indeed! The pandemic of 2020 / 21 demonstrated clearly that an ongoing stream of data, which are not contextualised and combined into a larger picture, do not provide truthful information or create understanding. Instead they cause confusion and anxiety *(besides being a tool for propaganda).*

Presenting a w/holistic view of whatever we look at, is one of the greatest challenge we face in the digital phase of the in-formation age, which otherwise threatens to drown us in a sea of unrelated information and makes a more intelligent public discourse impossible.

So why not doing some exercises in creating more clarity?

KNOWLEDGE will make you be FREE. (Socrates)

If you want to contribute to creating some clarity about the C-pandemic issue, we suggest that you do one or both of the following exercises:

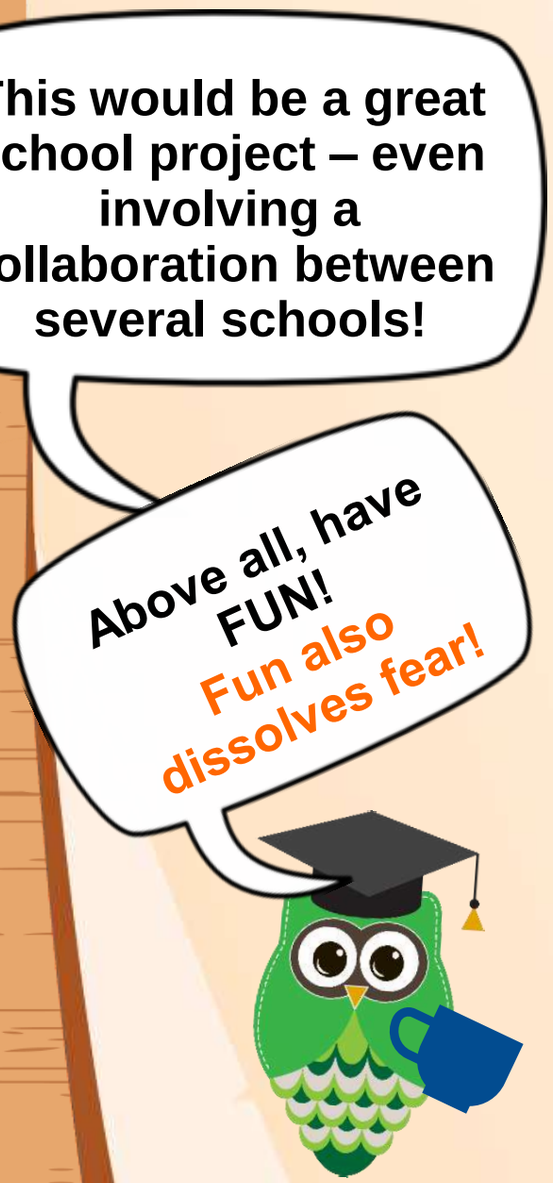
(1) Creating an *Ideal Pandemic Management Design* in order to begin dissolving the pandemic *mess*

(2) Establish a *Public Issue Databank* for the pandemic.

Both exercises *(if done thoroughly)* will take considerable time and effort and are best done through team work *(even as school or inter-school projects).*

(See the following NOTES for more detailed suggestions.)

EXERCISE : ideal design



EXERCISE: This exercise involves applying the steps of the *Biomatrix Change Methodology (as described in Part 6)* to contributing to creating an *Ideal Pandemic Management Design* and thereby contributing to dissolve the C-pandemic mess *(or a pandemic mess in general).*

Proceed as follows:

1. **Identify the different activity systems of the mess to determine the framework. We suggest that you adapt the HIV/AIDS framework for this. *(See the reproduction of the framework below.)***

   We also advise that there should be a dedicated team to work with each activity system, otherwise the task could be overwhelming.
2. **Then each team should follow the steps as explained in *PART 6: W/Holistic Change Methodology* to redesign its activity system.**

NOTE: Governments *(and the WHO)* will have guidelines for pandemic management. They will, however not be w/holistic. Nevertheless, it will be useful to study them and incorporate them into your design *(or comment on them on the basis of your design).*

REFLECTION: Then reflect on what you learned

(1) about the pandemic and its impact

(2) about the methodology

(3) about YOURSELF.

NOTE: framework

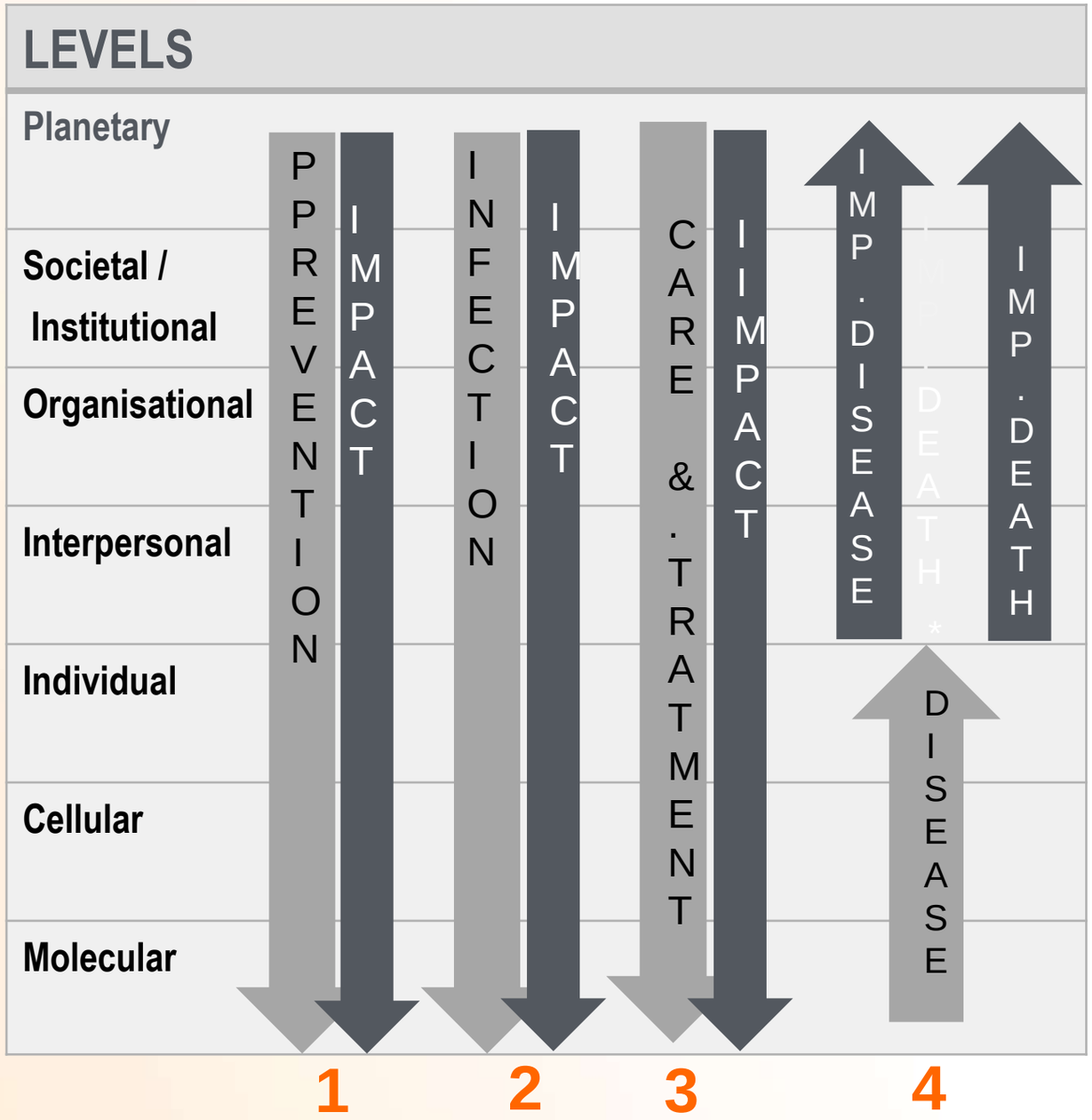
The following activity systems were identified in the HIV/AIDS pandemic:

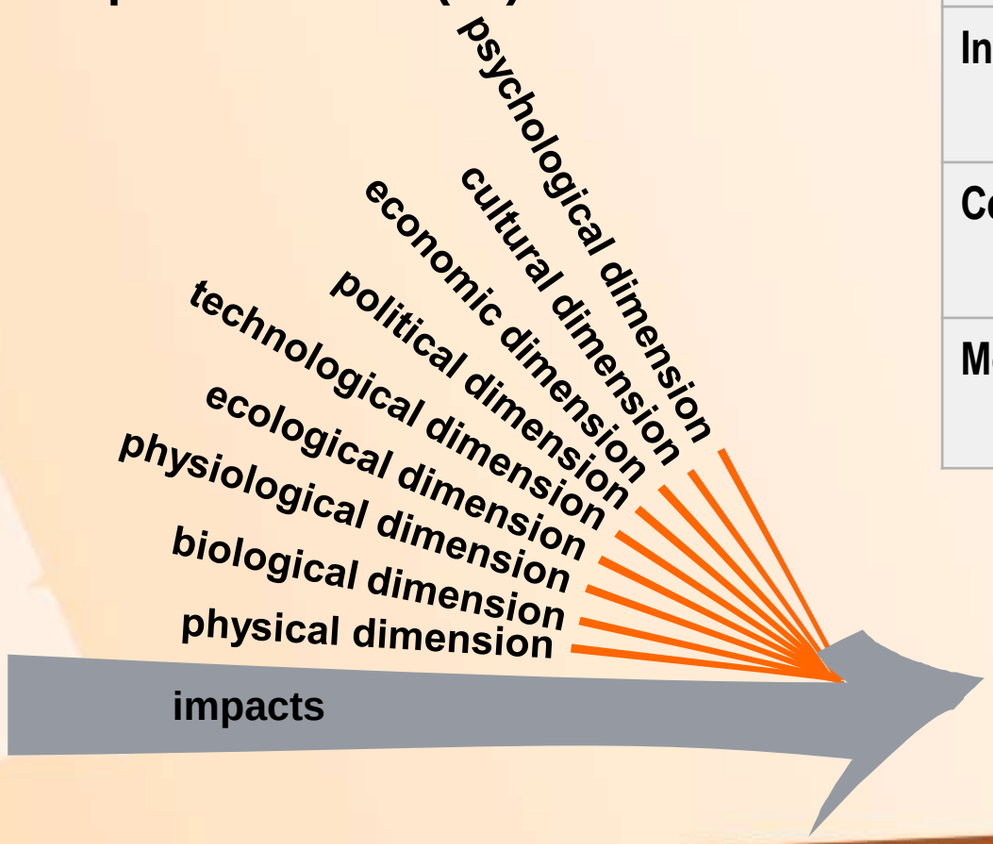
(1) PREVENTION: (1a) measures and (1b) their impact

(2) INFECTION: (2a) co-factors leading to infection and (2b) their possible impacts

(3) CARE AND TREATMENT: (3a) their management and (3b) their impacts

(4) DISEASE : (4a) its course and nature, (4b) the impact of the disease and (4c) the impact of death (4c).





Q: Are all the activity systems mentioned in the framework equally important in all types of pandemics?

A: Yes, they are equally important sub-systems of a pandemic mess in the sense that each needs to be considered and planned for, even if they manifest in different ways in different pandemics.

For example, considering the course of the disease *(i.e. activity system 4)*, it was mostly old people with serious other medical conditions who died in the C-pandemic, while HIV/AIDS killed mostly people in the reproductive age. This caused a large number of AIDS orphans and the decimation *(and subsequent shortages)* of the labour force in specific industries and labour categories, while the living HIV positives were discriminated and often excluded from opportunities.

By comparison, the catastrophic impacts of the C-pandemic on society are not from the number of diseased or deaths, but from the preventive measures *(i.e. activity system 1).* Those measures impacted and continue to impact negatively on all *(healthy and unhealthy)* citizens in all areas of personal and societal life, while the preventive measures for HIV/AIDS affected mostly interpersonal relations within the risk group.

EXERCISE: establishing an issue databank

Surprise yourself by the power of the larger picture of an issue!

And once you have established it, update it once in a while!

PS: You could later repeat this exercise and compile a databank for other urgent public issues.

EXERCISE:

We suggest that you *(as a team)* establish a *Public Issue Databank* on the C-pandemic.

Adapt the HIV/AIDS framework and use it as the structure *(or architecture)* for your databank. It will provide you with the headings *(e.g. prevention, infection, treatment, disease and death).*

Then you need to determine the sub-systems / issues within each *(e.g. practice hygiene, keep distance, isolate, vaccinate, etc. as sub-systems of prevention).*

Analyse each sub-system according to levels and dimensions *(as provided by the Biomatrix Spatial Framework*). These can provide the sub-sub headings.

Assemble relevant information in intelligible *Statistical Tables and Fact Sheets.* The emphasis is on INTELLIGIBLE! They should provide an overview, rather than unrelated details in order to facilitate understanding and contribute to a meaningful public discourse.

(See also the following NOTES.)

REFLECTION:

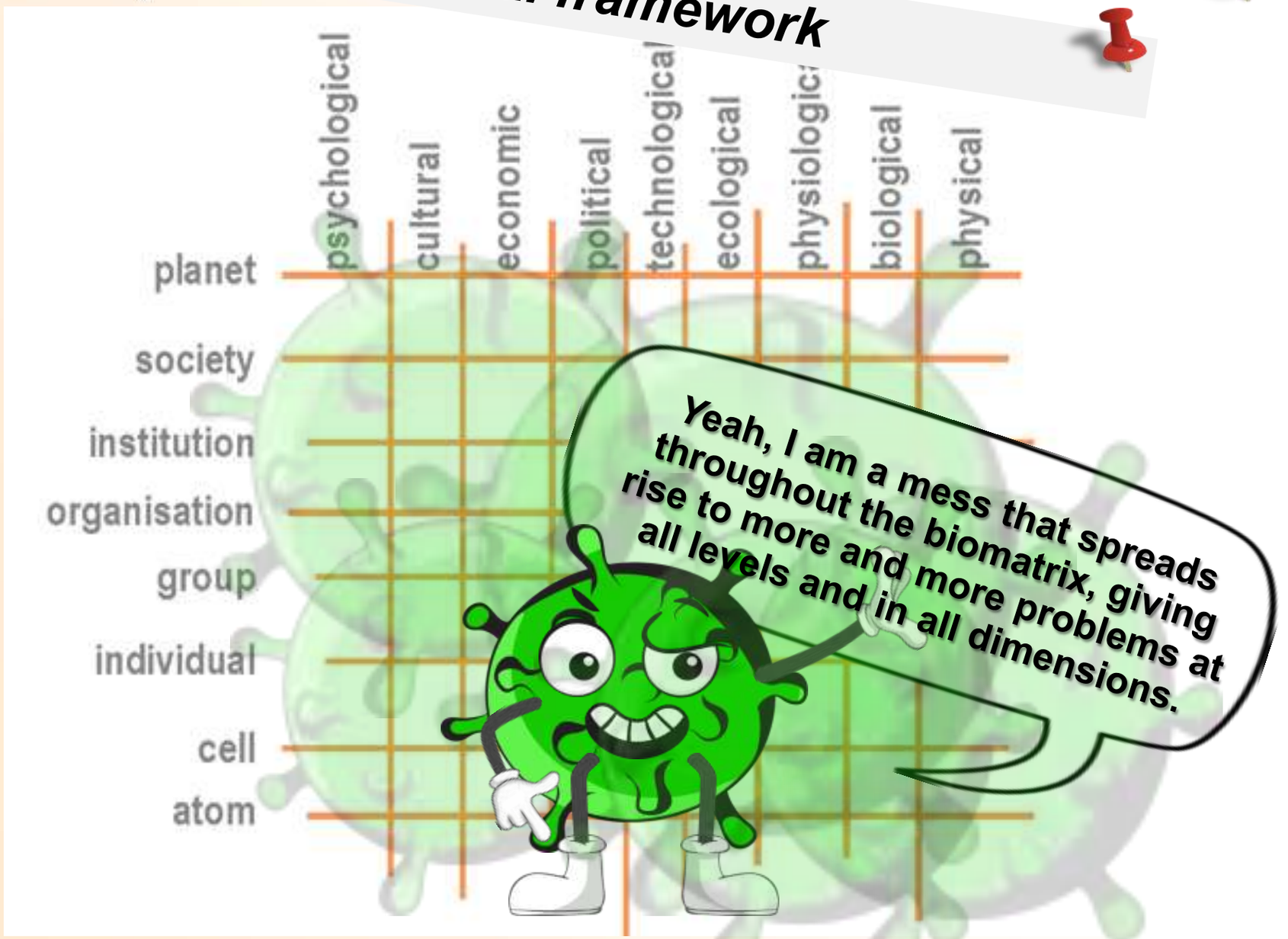
Then reflect on what you learned

(1) about the pandemic and its impact

(2) about databanks in general

(3) About YOURSELF.

biomatrix spatial framework



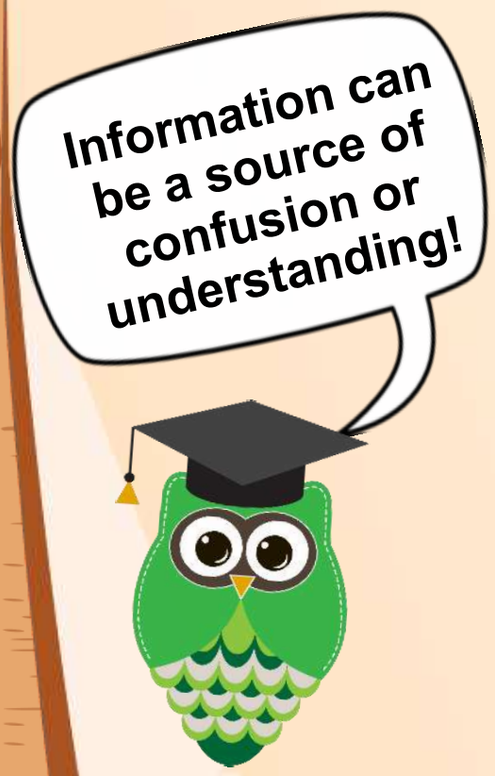
NOTE: **The whole pandemic is an issue that is multi-dimensional and multi-level; and so is each sub-issue *(e.g. prevention, infection, treatment, etc.)* and each sub-sub-issue *(e.g. lock-down, vaccination)* and its impacts.**

STATISTICAL TABLES

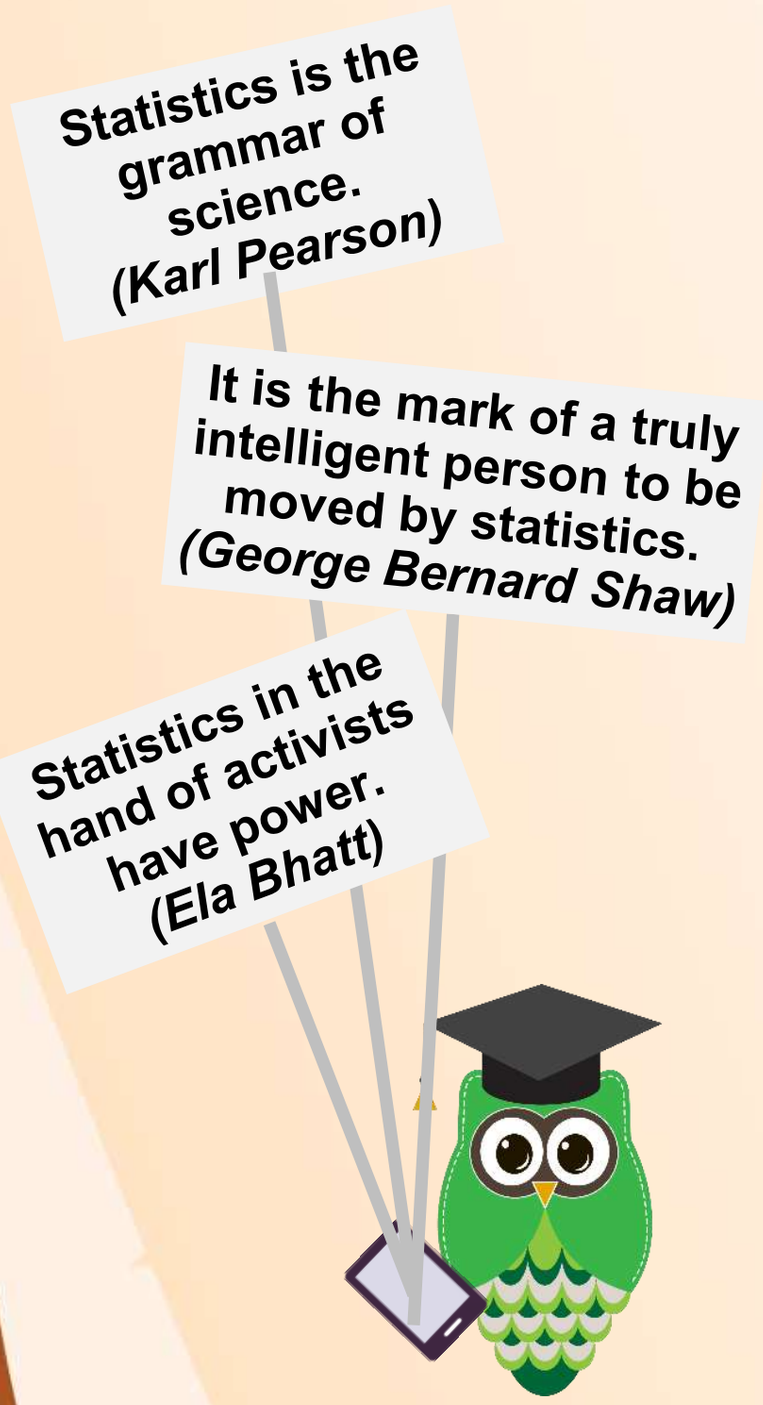
Since the beginning of the C-pandemic, all its aspects are characterised by profound statistical confusion. Some examples are:

If one compares the absolute number of deaths in the current period with that of a previous one, an increase could signal a dangerous situation. If however the total population has increased significantly over this period, the relative figures *(i.e. comparing the percentage of those who died in each period)* could show that there was no *(or little)* increase in the percentage, thereby signalling a non-threatening situation. Sadly, this statistical manipulation occurred in most countries of the EU, as well as other parts of the world.

The same manipulation can take place if one looks at age cohorts (e.g. in an ageing population, the cohort of older persons can grow more rapidly and would naturally show an increase in absolute deaths, while remaining the same in relative terms). Therefore it would be important to provide a Table *(for your country)* that shows the absolute number of persons in each age cohort for each year of the last decade and the percentage of those who died in each cohort each year. You can find such Tables on the www, *(albeit not from the official sources which should provide them)* and should incorporate them into your databank. They show clearly that the current pandemic is not worse than a bad influenza season.



NOTES: statistical tables *(continued)*



Then there are the statistical confusions arising from unclear categories. For example, where is the Table that shows for a regular period *(e.g. on a weekly or monthly basis)* the number *(in absolute figures)* of people that were tested *(column 1),* those who tested positive *(column 2),* have been admitted to hospital *(column 3)* and have died *(column 4)* during each period? More can be deduced from such a Table about the pandemic that from obscure statistics like incidence values.

Equally important to the statistics themselves are comments on how the figures are compiled. For example, a statistical misrepresentation of hospitalised persons is due to – in some cases - counting the same hospitalised patient again when moved from one ward to another.

NOTES on statistical tables and fact sheets *(continued)*

Facts are many, but the truth is one. *(Rabindranath Tagore)*

The facts fairly and honestly presented; truth will take care of itself. (William Allen White)

FACT SHEETS

Fact Sheets (or Evidence Tables) **describe the observed facts and scientific arguments around a specific issue in overview and in an organised way.**

Their purpose is to summarise the arguments and their scientific evidence of an issue, show contradictory evidence and / or interpretation and also allow a distinction between evidence based on science and a mere *(unfounded?)* opinion.

For example, there are different perspectives on and contradicting evidence of the effectiveness of preventive measures like masks, distancing, lock-downs and vaccination in preventing the spread and occurrence of the disease.

We suggest that you draw up a fact sheet on each of those issues *(as well as others)* as part of assembling your databank. We think that a four-columned structure would be useful, whereby

- ***Column 1*** **describes the argument supporting the issue *(e.g. why and how wearing a mask prevents spreading the disease)***
- ***Column 2*** **provides references for the argument, either scientific evidence *(such as books, articles and scientific publications)* or a reference to who promotes the argument as an unfounded opinion;**
- ***Column 3*** **lists the arguments against the measure *(i.e. why and how wearing a mask is not relevant to the spreading of the disease)***
- ***Column 4*** **provides references *(i.e. as in Column 2).***

Other fact sheets may have a different structure. For example, it could also be useful to list the official political arguments for prescribing the various measures in chronological order.

C: We are excited to contribute in some way to dissolving the current pandemic mess through an Ideal Pandemic Management Design and a Public Issue Databank, as you suggested.

Q: But will we not just merely add a lot of information to an already overloaded public?

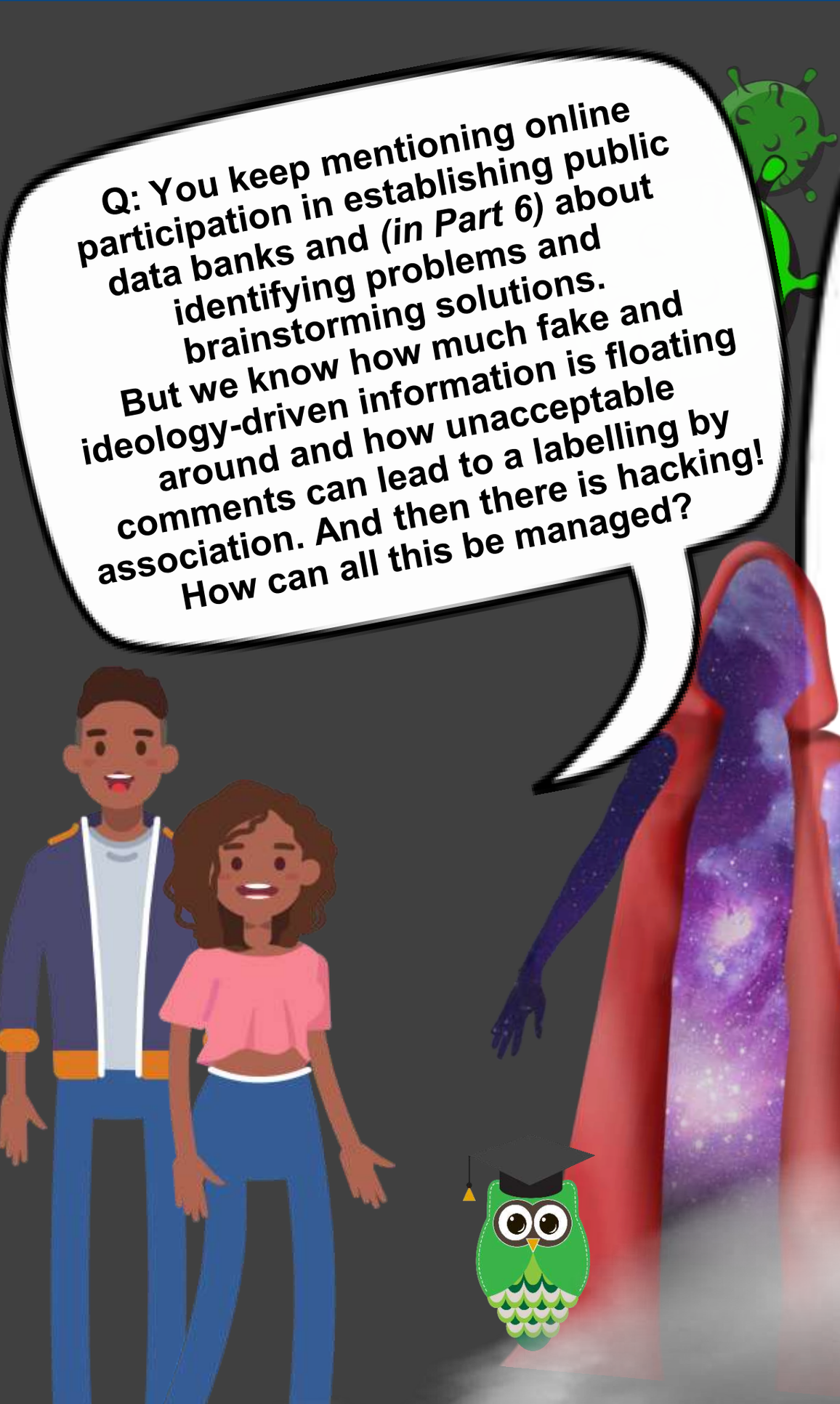
A: Ask yourself if you know the main pro and con arguments on any of the anti-pandemic measures and can provide the supporting evidence, even if you have followed both mainstream and alternative media for hours throughout the last year.

As to INFORMATION OVERLOAD: Providing a coherent overview with summaries about a system or issue does not lead to information overload. On the contrary, it removes it.

Overviews also show that all systems / issues consist of a limited range of arguments within each category of the overview. This reduces complexity, besides creating order. Thereby the system / issue become manageable. *(By comparison, the current public debates cross levels and dimensions, besides being an endless regurgitation of the same arguments in different words, thereby creating apparent complexity and real confusion.)*

NOTE: Once a w/holistic change methodology *(such as discussed in this curriculum)* is institutionalised and public databanks for each societal function, industry and important issue are established, the governance of a society will be able to move towards self-governance in a *W/Holistic Participatory Democracy.*

Q: You keep mentioning online participation in establishing public data banks and *(in Part 6)* about identifying problems and brainstorming solutions. But we know how much fake and ideology-driven information is floating around and how unacceptable comments can lead to a labelling by association. And then there is hacking! How can all this be managed?



A: Indeed, those are challenges. Unless the current ideological conflict between the allowed mainstream narrative and its critics *(who are increasingly censored, cancelled, labelled and persecuted)* is transcended, a participatory democracy is not possible.

Amongst others, this requires the establishing of intelligible databanks for each public function and industry *(e.g. as part of each Executive Department of a government and managed by a Stakeholder Forum)* in order to support an intelligent public discourse that explores a larger and inclusive truth.

Such databanks should be compiled and updated in a participatory as well as transparent manner. Like in the case of Wikipedia, gate keepers allow which information is entered and which not *(thereby preventing maligning inputs).* But, unlike Wikipedia, those gatekeepers must be publicly known and accountable to their stakeholders *(e.g. the according Stakeholder Forum.)*

They act on the basis of the ethos, aims and guiding rules of the databank. Complaints about Refusing to enter an item can be lodged with an ombudsman....
... besides other strategies.

Q: After learning so much about change theory and methodology and ideal designs, you suddenly seem to put a lot of emphasis on databanks. WHY?

A: In physical reality, the challenge is managing our physical resources sustainably.

In conceptual reality, the challenge is pursuit of truth to generate understanding about all areas of life.

Although we live at the beginning of an information age and there are huge and growing amounts of information available, we seem to become increasingly confused, besides being unable to distinguish between fact and fiction. The more knowledge we have, the more ignorant we seem to become. The manipulation of science on the one hand and the lack of overviews and contextual knowledge *(i.e. w/holistic thinking)* on the other hand, are major causes of this.

Databanks that are constructed on the basis of w/holistic frameworks can make a huge contribution in creating order in the current confusion and assist in our quest of understanding a larger and interconnected truth of things.

Chaos in conceptual reality manifests as chaos in physical reality. Increasing order in conceptual reality will in-form the physical reality to become more orderly also!

BRAVE NEW WORLD

The kids start compiling a databank on the C-pandemic and facilitating an ideal pandemic management design and thereby...

... begin to close the curtain to an ORWELLIAN Brave New World derived from the excesses of reductionist thinking that could lead us to a totalitarian trans-humanist global order governed by a medical-digital surveillance dictatorship...

... and open the curtain to a W/HOLISTIC Brave New World, based on a w/holistic worldview and self-governance...

... they also decide to work through the curriculum again, remembering *(from Slide 9)* that w/holistic thinking cannot be acquired in a linear manner but needs iterative learning...

Thank you for watching!