



## Topic: Digitalisation

Digitalisation is transforming all aspects of our lives. The complexity of the subject and its rapid development make it hard to take a clear stance on any of its facets. Can digital technologies contribute to overcoming poverty? There is hope that they could: Weather apps enable smallholders to increase yields; cargo drones get vital medicine to people in remote areas; mobile payment systems allow people to create businesses; and 3D printers provide medical equipment. Along with many opportunities, however, there are huge challenges: jobs are lost; massive resource consumption has a devastating effect on the environment; access (or lack thereof) to the Internet exacerbates social inequalities. In this brochure, we want to explore the subject of digitalisation from various angles and provide input for a discussion.

**Photo** Mobile phones are the most important digital means of communication for smallholders in Kenya, who also use the M-Pesa app for cashless payments that do not require them to have a bank account.

### Contents

#### Practical exercises

- 3 Education for all?
- 4 Industry 4.0
- 6 Energy footprint
- 7 Resource efficiency
- 8 Precious resources
- 10 Workers' rights
- 12 Disposal and recycling
- 14 Preventing disasters
- 16 Robots vs. humans
- 17 Big data
- 18 Digital global nutrition
- 19 Fair digitalisation
- 20 Theological reflection

#### Brot für die Welt in focus

- 22 Learning with VR  
(Virtual Reality)
- 23 Further resources

# Approaches in the field of global learning



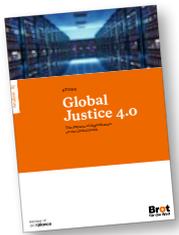
This brochure explores various aspects of digitalisation. Very often there is no right or wrong and mostly there are no simple solutions when it comes to digitalisation. The processes of transformation associated with digitalisation are relevant to all topics of the guiding framework on global development (Orientierungsrahmen für den Lernbereich Globale Entwicklung) of the conference of ministers for education and cultural affairs (Kultusministerkonferenz), but we can also discuss digitalisation as it relates to specific topics, such as “the preservation and use of natural resources & energy transition”; “opportunities and risks involved in technological progress” or “globalisation of economy and work”. In doing so, we intend to help strengthen various key skills and competences. We encourage students to raise critical questions and develop and assume a position of their own.



## How to use this material

Pages 3 through 21 can be directly used in class and help facilitate an initial exploration of the subject of digitalisation. We include recommendations for further reading and offer various digital study materials.

For their own preparation, teachers may also consult our material on justice titled “Global Justice 4.0” with suggestions on how to make sure that digital transformation is fair. We will publish a condensed version with many illustrations in early 2020. This will be available to download at [www.brot-fuer-die-welt.de/themen/digitalisierung](http://www.brot-fuer-die-welt.de/themen/digitalisierung)



The study is available at <https://shop.brot-fuer-die-welt.de/entwicklungspolitik/Wirtschaft/gerechtigkeit-4-0-auswirkungen-der-digitalisierung-auf-den-globalen-sueden.html>

**Poster** “Digital fair. Digital unfair.” In the Global South, many people do not have access to the internet. In sub-Saharan Africa, this applies to three out of four persons. In order to prevent a further increase of the gap between the rich and the poor, Brot für die Welt campaigns for a fair digitalisation.

## Digitalisation/digitisation

The term “digitisation” actually refers to the process of converting analogue information into a digital format. Digitalisation also includes having computers perform tasks that were previously done by humans. When we talk about digitalisation today, however, we mainly talk about the introduction and use of digital technologies.

*From: Enzyklopaedie der Wirtschaftsinformatik*

## Suggestions for the classroom

- Working in a large group or in small groups, you can use the table below and find more examples with your students.
- You can use the material linked to below (material in German) to help raise awareness about positions of privilege. Learning about life realities of various actors in the global value chain, students start to recognise and reflect on injustices, privileges and discrimination.

Area of life	Digital tool	Opportunities	Risks	Analogue alternative
Travel	Google Maps	directions available everywhere	being lost (when battery is dead)	street atlas
Communication	email/chat	fast way to communicate	data theft	writing a letter
...	...	...	...	...

## Practical exercise 1

Interactive whiteboard presentation



# Education for all?

In 2015, the UN General Assembly adopted this goal as Sustainable Development Goal 4 (SDG 4), which is to be achieved by 2030: **Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.** New technologies can help accomplish that goal. Sometimes, however, these new developments are contested and have adverse effects. The founders of the Bridge International Academies are trying to address the problem through digital innovation:



According to the Global Education Monitoring Report, some 617 million children remain illiterate. This is often due to a lack of teachers.

Bridge International Academies set up a private school model based on the use of tablets. Teachers at the private Bridge schools use the tablets to receive teaching material for each lesson, which they merely have to read out. This way, classes can be highly standardised, controlled and taught by untrained teachers. Many teachers' unions criticise the model; it's mostly parents who support it.

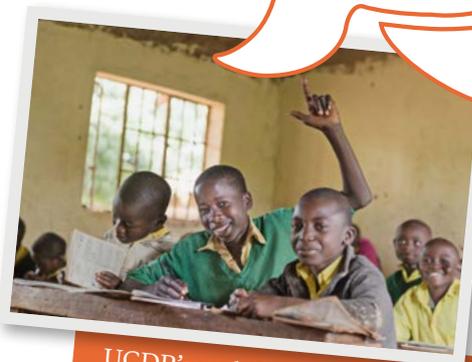
*The state has to check and follow closely what is being taught at schools.*

*Digitalisation can help everyone learn better.*

*It is good when every child learns the same material.*



OADEL's Aubin Waibena teaches a class on healthy eating in Togo



UCDP's mobile youth programme in Kenya allows Joel Kamau to attend school

## Assignment

### Interactive whiteboard presentation

You will find a PowerPoint presentation at [www.brot-fuer-die-welt.de/global-lernen](http://www.brot-fuer-die-welt.de/global-lernen). The presentation addresses upsides and downsides of the model mentioned above and invites your students to discuss them. You can use the slides for your class on this topic.



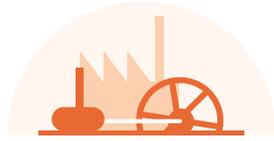
In the next class you could then address the issue of colonial continuities. Please find relevant material on this subject (in German) at [www.schulen-globales-lernen.de/bildungsmaterialien/fuer-gymnasien/](http://www.schulen-globales-lernen.de/bildungsmaterialien/fuer-gymnasien/)



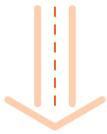
# Industry 4.0

Every technological innovation not only changes our personal environment but also transforms the economy and the world of work. The term “industrial change” refers to four general stages that saw great changes in the way production is organised.

## Industry 1.0



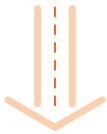
- late 18th century
- the first production plants with machines powered by water and steam
- factory work replaces work in the fields; people move to the cities



## Industry 2.0



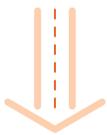
- late 19th century
- with the advent of electricity, conveyor belts and motors are introduced in factories
- telephones and telegrams make correspondence easier and change office work
- developments in transport make global production and trade easier



## Industry 3.0



- late 20th century
- automation through electronics and IT
- use of computers



## Industry 4.0



- early 21st century
- increasing digitalisation of analogue technologies
- use of cyber-physical systems (networked machines and robots communicate with each other)

Y	Y	A	R	K	T	Q	P	S	M	A	R	T	P	H	O	N	E
A	C	E	L	L	P	H	O	N	E	E	D	T	J	S	Q	B	A
Y	C	R	A	U	T	O	M	O	B	I	L	E	J	Y	K	E	W
U	R	A	D	I	O	T	E	C	H	N	O	L	O	G	Y	I	O
E	L	E	C	T	R	I	C	T	Y	P	E	W	R	I	T	E	R
M	C	L	O	U	D	C	O	M	P	U	T	I	N	G	X	T	L
Q	N	M	B	R	B	Q	J	C	O	M	P	U	T	E	R	U	D
U	F	N	D	V	B	S	T	E	A	M	E	N	G	I	N	E	W
E	I	P	O	W	E	R	E	D	A	I	R	C	R	A	F	T	I
M	I	F	L	Q	N	U	U	V	L	P	R	Q	G	V	U	D	D
A	M	W	P	E	I	B	B	D	D	I	P	Q	F	H	I	D	E
I	Z	Y	F	I	W	F	G	T	Q	G	A	S	L	A	M	P	W
L	Y	R	L	P	O	W	E	R	L	O	O	M	R	K	N	L	E
S	P	I	N	N	I	N	G	M	A	C	H	I	N	E	S	A	B
Y	V	I	D	E	O	S	T	R	E	A	M	I	N	G	D	Z	M

### Assignment 1

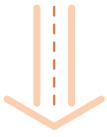
- > Describe what the four stages have in common.
- > Contrast the pros and cons of the innovations at each of the stages.
- > Find, for each stage, a quote by a person who was 80 and 18 years of age at the time. You could also try and visualise the quotes.

### Assignment 2

- > Find the 17 innovations hidden in the matrix above.
- > Mark the innovations using green for the first industrial revolution, blue for the second, yellow for the third and red for the fourth.

The matrix contains these words:

spinning machine, steam engine, power loom, gas lamp, automobile, powered aircraft, radio technology, electric typewriter, WorldWideWeb, DVD, computer, email, cell phone, video streaming, cloud computing, smartphone, app, Cloudcomputing, Smartphone, App



## Industry 5.0

Not every innovation is successful.  
Some statements on future developments have long been proven wrong.



The Internet is just a passing fad.

Bill Gates, Microsoft founder,  
early 1990s



Facebook is merely a directory  
on the Web.

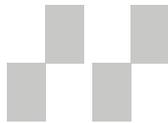
Rupert Murdoch,  
Media entrepreneur, 2008



There's no chance that the iPhone is going to get  
any significant market share. No chance.

Steve Ballmer, CEO Microsoft, 2007

I am sure we will have  
solved the technological  
problems in ten years'  
time and will see the use of  
**robots in care work** by then,  
if not earlier.



Dr. Daniel Sonntag  
German Research Center for  
Artificial Intelligence, 2019  
[www.die-debatte.org/kuenstliche-intelligenz-pflege](http://www.die-debatte.org/kuenstliche-intelligenz-pflege)

*What's a utopia?*  
The term comes from ancient Greek and can be roughly translated as "nowhere". Utopia refers to some condition that does not (yet) exist, but that is desirable. The purpose of creating utopias is to find ways to overcome today's ills and build a better world: World peace is a utopia to put an end to war, for example. A negative utopia is called a dystopia – i.e., a pessimistic outlook and vision of the future we endeavour to prevent with today's actions.

### Assignment

- Discuss whether or not Dr. Sonntag's statement will also turn out to be a wrong assessment, similar to the other statements mentioned above.
- Work in groups of 3 to 5 and come up with a utopia of digitalisation for 2070. Address these questions: What would need to happen for your utopia to become reality? Identify what milestones we would have to reach by 2030, 2040, 2050 and 2060 respectively.

## Practical exercise 3

Handout



# Energy footprint of digital data

If the Internet were a country, it would be the sixth largest power consumer on the planet. People in Germany spend 108 minutes a day online on average, half of that time on their mobile devices, such as smartphones. While in 2010 around two billion people worldwide had access to the Internet, by 2017 that number had already increased to almost 3.7 billion. More than 54% of households globally have Internet access. With 7.7 billion cell phone contracts, there are more mobile users than people on the planet. In 2018, about 33 zettabytes of data were stored. Statistics indicate that in 2025 the amount of data generated will increase to 175 zettabytes.



Power consumption is not limited to consumer electronics, such as laptops and smartphones, but power is also needed to transfer data to computer centres. On top of that, operating and cooling the servers also requires power. Whenever data is stored on a cloud rather than a computer, data traffic and thus power consumption increases. You can save a lot of energy by directly entering links into your browser or using bookmarks to activate them.

Video streaming is also ever more popular and accounts for almost 80% of overall digital data traffic. Young people between 14 and 29, in particular, prefer watching movies online rather than on TV. One gigabyte of data traffic requires 0.006 kilowatt hours. An hour of full HD video streaming equals about 3 gigabyte of data traffic. Add to that the power needed to run the laptop, computer or TV.

### Assignment

→ Mark all figures mentioned in the text and think of creative ways to visualise them.

### → Additional media (in German):

<https://utopia.de/ratgeber/streaming-dienste-klima-netflix-co2/>



**Special assignment**  
Have you ever streamed a movie or series online? When doing so, how many gigabytes are being consumed? How much power is roughly being consumed in a month

- by your class
- by your school
- by the city you live in

based on your own streaming footprint?

## Practical exercise 4

Handout



# Resource efficiency through digital innovation

Energy consumption increases due to new possibilities in information and communication technologies. At the same time, many digital innovations are environmentally friendly and help save energy. “Smart grids” render energy systems more efficient and thus less costly. Energy companies’ investments into digital technologies have increased by about 20% annually since 2014. Moreover, digitalisation can help optimise energy and material input in communication, industry, transport and building technology.



The building of the Protestant Agency for Diakonia and Development in Berlin, which also houses Brot für die Welt, received a gold certificate from the German Sustainable Building Council (DGNB). The building’s seven floors accommodate 750 workplaces. It was built in line with an overall ecological concept, including among many other things: sustainable building material; thermo-active ceilings that serve as a cooling system during summer and a heating system during winter; mechanical ventilation systems with heat recovery; use of rain water.

Large windows and glass elements in office walls let in a lot of daylight; sensors regulate lighting within the building. Instead of conventional personal computers, the agency uses thin clients that require only 50% of the power for both production and use. The roof hosts an efficient photovoltaic system with 650 square meters of solar panels and a maximum capacity of 64 kilowatt-peak. The generated power covers a large part of the power requirements for the building. Power and heat consumption has been cut by more than 50% in the new building compared to the agency’s previous facilities. Primary energy demand is less than 70 kilowatt hours per square meter per year.

### Assignment

- Research how digital innovations can help save resources. Find at least one example for each area listed in the table below and create your own table.
- Develop ideas on how to make your school building and the day-to-day life there more environmentally friendly and sustainable.

Communication	Industry	Transport	Building technology
<i>video broadcasting allows people to attend international conferences without air travel</i>			



## The impacts of resource extraction

The debate around digitalisation and the hopes and possibilities associated with it often ignores an essential issue: the increasing demand for resources. Increasing quantities of lithium, cobalt, copper, gold, rare earths and many more resources are needed to produce digital devices, such as laptops, mobile phones or electric cars. A smartphone alone contains about 60 raw materials, including about 30 metals. These resources are mainly mined in countries of the Global South, and their extraction often involves major environmental degradation and human rights violations.



**Congo** The heavier coltan is separated from the overburden by adding huge amounts water.



**Chile** The ponds for lithium extraction in the salt flat Salar de Atacama encompass 1,700 hectares, the size of 2,500 football pitches.



**Tanzania** Highly poisonous mined ore is ground into ore dust and a sodium cyanide solution is used to leach gold from the ore.

**Conflict resources**  
Conflict resources are resources whose exploitation and trade helps finance armed groups in a context of conflict. Conflict resources fuel or perpetuate violent conflicts and are accompanied by serious human rights violations. According to the definition, gold, columbite-tantalite (coltan), tin and tungsten constitute conflict resources.



### → Additional material:

The “raw materials kit” (Handy-Rohstoffkoffer) helps explore nine raw materials used in mobile phones (German):

[www.handy-aktion.de/materialien](http://www.handy-aktion.de/materialien)

The Minecraft mini game “MineHandy” addresses ecological and social challenges along the value chain of cell phones (German).

[www.handyaktion-nrw.de/materialien](http://www.handyaktion-nrw.de/materialien)

The “mobile phone kit” (Handy-Koffer) from the association KATE e.V. provides teaching material that can be used for classroom projects (German):

[www.kate-berlin.de/handy.html](http://www.kate-berlin.de/handy.html)

“Sklavenarbeit für unseren Fortschritt” (45 min, suitable for students from 12 years of age) is a film on the topic:

[www.ezef.de/filme](http://www.ezef.de/filme)

### Assignment

- Find examples of environmental and human rights violations that go along with resource exploitation; you may consult the Südwind Institut’s fact sheets: [www.suedwind-institut.de](http://www.suedwind-institut.de)
- Discuss whether the definition of conflict resources is sufficient and if not, what other resources should be included and why.
- Learn about two mining case examples: platinum from South Africa and iron ore from Brazil at [lieferketten-gesetz.de/fallbeispiele](http://lieferketten-gesetz.de/fallbeispiele) and discuss what problems could be resolved through a supply chain law.

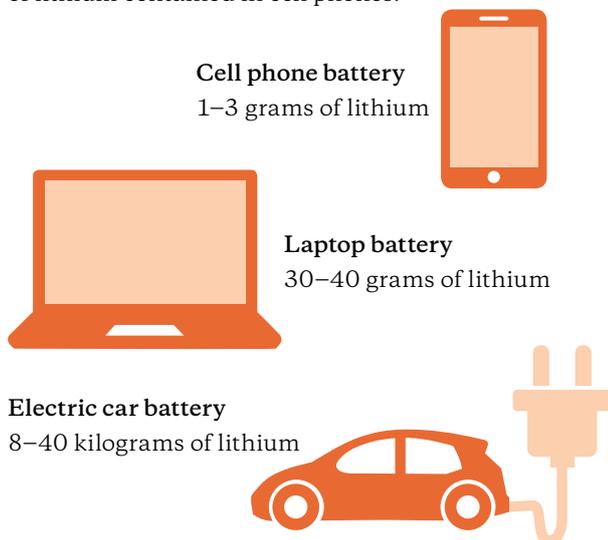
## Case example

### Lithium exploitation in Argentina

- 64% of the world’s lithium reserves are located in the salt lakes of the area known as the Lithium Triangle around the borders of Bolivia, Chile and Argentina.
- In Argentina, lithium resources are located in a very arid region of the highland Andes that is home to biodiverse and sensitive ecosystems and indigenous peoples.
- Lithium exploitation requires water, and thus water reserves are drying up due to lithium extraction:

### How much lithium is used in consumer electronics?

Batteries in electric cars contain 10,000 times the amount of lithium contained in cell phones.



Source: British Geology Survey 2016:  
<http://www.bgs.ac.uk/downloads/start.cfm?id=3100>

### Assignment 1

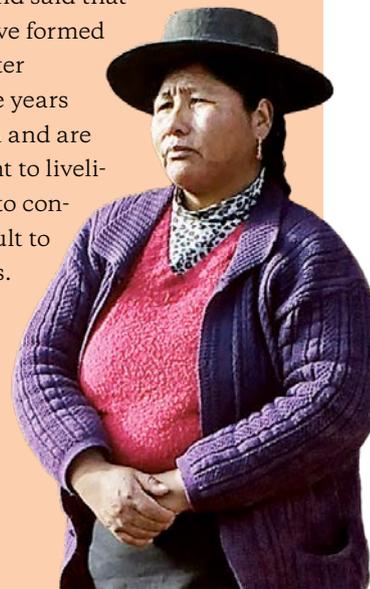
- Discuss Elva Guzman’s case example and identify the impacts of lithium exploitation. For your research you can also use the brochure titled “Analyse 84: Das weiße Gold” (material in German) on the resource’s environmental and social impacts:  
Online at [info.brot-fuer-die-welt.de/blog/lithium-weisse-gold](http://info.brot-fuer-die-welt.de/blog/lithium-weisse-gold)  
or order a hard copy at [shop.brot-fuer-die-welt.de](http://shop.brot-fuer-die-welt.de) (art. no 129 502 890)
- Discuss what action needs to be taken to improve conditions around the extraction of lithium.



### Elva Guzman, farmer

“Our greatest worry is that they use up all the water. The government does nothing to protect the water resources, neither at national nor at regional level; but we rely on this water for our survival and our future. We need water for our animals. We already see the wetlands drying up. The river that used to be here has all but vanished. Another issue is the contamination of air and soil. The dust from the overburden causes itching, eye inflammation in humans and animals and lung problems in children.

The mining company Sales de Jujuy always endeavours to mislead us and keeps us uninformed. They also don’t tell us about the chemicals they are using. Once, an acid tank broke and the acid poured onto the street and gave off a vile smell. We requested information about the incident from Sales de Jujuy but they didn’t want to talk to us. The company’s attorney lied and said that nothing had happened. We have formed the Colectivo to defend the water resources. Since we started five years ago, we have taken legal action and are going to court to claim our right to livelihood protection and our right to consultation. Sadly, it’s very difficult to get support from other families. Most people around here only care about money, not about their livelihoods.



### Assignment 2

- Learn about the impacts of platinum mining in South Africa and iron ore mining in Brazil using the case examples presented at [lieferkettengesetz.de/fallbeispiele](http://lieferkettengesetz.de/fallbeispiele) (in German) and see if and how you could get involved in the initiative.
- Come up with and discuss more ways how we could curb resource extraction and/or make it more sustainable.
- Discuss actions you could organise as part of the campaign for a supply chain law. For suggestions visit [brot-fuer-die-welt.de/mitmachen-lieferkette](http://brot-fuer-die-welt.de/mitmachen-lieferkette) (in German)



## Practical exercise 6

Simulation and discussion



# Who is responsible? Labour rights in the smartphone industry

The smartphone is part and parcel of many people's day-to-day life in Germany, but rarely do we look at where and under what conditions smartphones are produced. Most smartphones are assembled in Asian countries. The major companies, such as Apple or Samsung, have Chinese suppliers like Foxconn or Pegatron who make and assemble their products. The working conditions in these factories have been harshly criticised for many years.

The UN Guiding Principles on Business and Human Rights demand that the responsibility to respect and protect human rights lies not only with states; also business enterprises are required to avoid causing human rights violations through their activities and must face legal liability when such adverse human rights impacts occur.

### Simulation and discussion

#### Getting started

→ Trace the "journey of a smartphone" using the supply chain map at [https://www2.weed-online.org/uploads/karte\\_diereiseineinssmpartphone.pdf](https://www2.weed-online.org/uploads/karte_diereiseineinssmpartphone.pdf). You may use an interactive white board or a beamer to present the map.

#### How to proceed?

→ In the simulation game, students are exploring the working conditions in the IT industry and develop their own positions on the issue of responsibility in the supply chain. Start by presenting a fictitious case and the stakeholders involved; then attribute roles and positions to the student groups that participate in the discussion. Groups have 15 minutes to familiarise themselves with the case and come up with arguments for the discussion. Each group sends a delegate to the fishbowl-type conference that is moderated by the teacher or students. The others observe the conference. Other group members who want to bring in their arguments can join the conference and replace the person currently representing their group. The aim of the conference is to develop suggestions on how to solve the problems posed in the case. The group representing the consumers observes the discussion and then makes a reasoned purchase decision. Subsequently, students jointly evaluate the simulation.

#### Questions for the evaluation

- How did you feel in your role?
- What were the goals you set out and what did you accomplish?
- With whom did you cooperate well or not so well?
- Which group had the most power and which group had the least power, and why?
- Whose grievances did you find most important?
- How realistic are the arguments and results of the discussion in your view?



#### → Suggestion for further research:

After completing the simulation game described above, you could discuss the initiative for a supply chain law with your students and explore the impacts such a law would have on the conflict and the stakeholders involved.

[lieferkettengesetz.de](http://lieferkettengesetz.de)



# News!

## Fonefox and Avocado – Scuffle in court



**Factorania** –An employee was killed during an explosion in the factory of smartphone manufacturer Fonefox last Tuesday. His widow’s announcement that she would bring legal action against Fonefox and claim damages and support for her four children from the company received significant attention. Fonefox is accused of not having provided adequate safety precautions. The enterprise has been called out a number of times for the poor working conditions in its factories. Fonefox attorneys put the blame on the company’s client Avocado based in the American States.

The upcoming trial on the question of culpability will set a precedent. The inter-state working group AER (Alliance for Economic Rights) has invited all parties to a dialogue. Along with the management of Fonefox and Avocado, activists from the VerU network and government representatives of Factorania are expected to participate. The AER expects the trial to create important momentum for the human rights convention to regulate business operations that will soon enter into force and will be legally binding.

### Stakeholders and their roles

#### Fonefox management

- You don’t feel responsible for the accident because you have taken all possible safety precautions.
- Avocado is paying low prices for its orders and is demanding that you deliver its products fast, thus putting you under time pressure; this forces you to invest less in safety measures for your workers.
- You demand that Avocado be held liable for the damage that occurred.

#### Avocado management

- You were not aware of the lack of safety and poor working conditions at your supplier.
- Being only one of Fonefox’s clients, you are not responsible for their decisions.
- You are not willing to pay higher production prices to Fonefox because you fear that you would have to sell your smartphones at a much higher price and would lose customers who opt to buy less expensive phones.

#### Government representative of Factorania

- You do not accept any interference in your internal affairs by foreign jurisdiction.
- You are afraid to antagonise and upset Avocado if the company is held liable for the damage and afraid you would then lose an important foreign investor.

#### VerU network activists

- The VerU network for responsible business enterprises demands a law protecting human rights in supply chains.
- They demand that Avocado take responsibility for the conditions under which its smartphones are produced and thus is liable for the damages caused.
- The network threatens to use social media to make the case widely known and thus bring Avocado into disrepute.

#### Consumers

- You need a new smart phone. The price of an Avocado Phone8 is currently 6 times your monthly income as a student. But you think it’s the best and most popular phone around and so you have been saving up for some time to get one.
- You have heard of the case and the trial that will set a precedent. What is your stance on the matter?
- Under what conditions would you buy an Avocado Phone8? Find out about alternative options.

#### → Additional material:

Comprehensive simulation game titled “Tod in yPhone City” (material in German):

[www.epiz-berlin.de/publications](http://www.epiz-berlin.de/publications)

Film: “Death by Design – Die dunkle Seite der IT-Industrie” about the devastating effects of the IT industry (USA 2015, 73 minutes, suitable for students from 16 years of age)

[www.ezef.de/filme](http://www.ezef.de/filme)



## Where the electronic waste ends up

Social and ecological problems also arise at the end of the value chain of electronic devices. As new trends continue to emerge, electronic waste piles up: 44.7 million tons in 2017 according to the Global E-waste Monitor of that year. With 7.2 million tons, which amounts to 5.2 kg per capita, China is the largest producer of electronic waste. Germany generates 22.8 kg of electronic waste per capita. The rules are clear: Electronic waste must not be taken outside of the EU, but has to be disposed of in Europe. However, about 400,000 tons annually are exported from Germany illegally and end up in Ghana, Nigeria or China according to Environmental Action Germany (Deutsche Umwelthilfe, DUH). Ghana hosts one of the largest dumpsites. Around 250,000 tons of old computers and phones end up in Agbogbloshie, one of Accra’s districts.

### Assignments

- Start an Internet search on Agbogbloshie to get a glimpse of the place. Based on your online search, write down associations the place evokes. The words that come to mind should start with one of the name’s letters.
- On the right you find parts of a journalist’s report on the major landfill in Agbogbloshie. Try to put the fragments in the correct order. As you put the report together, the coloured letters will form a term. Discuss whether this term could signify an alternative way to deal with electronic waste.

- I** Not only is the air being polluted, but also the soil and drinking water are being contaminated by waste oil and acids that end up leaking into the soil.
- L** Many broken electronic devices are illegally brought to Ghana, hidden in old cars. Whatever can be repaired is used in Ghana.
- S** Burning the waste creates toxic fumes that enter the body through the respiratory tract and the skin. This has severe effects on human health.
- E** If a device cannot be repaired, the data is retrieved and sold.

### What’s the term we are looking for?



- A** At the dumpsites, large magnets are used to detect iron and copper. To retrieve the copper contained in devices, the electronic waste is burned
- G** For people to live in Agbogbloshie, they need decent work that promotes sustainability.
- N** Despite the environmental and health problems resulting from it, the landfill sustains around 6,000 people.



You can find more exercises of this kind in the toolbox put together by Handyaktion Bayern:

[mission-einewelt.de/service-und-angebot/arbeitsmaterialien/entwicklungspolitische-kisten/handy/](http://mission-einewelt.de/service-und-angebot/arbeitsmaterialien/entwicklungspolitische-kisten/handy/)

Film: “Der Digitale Friedhof”, 16 minutes, suitable for students from the age of 14

[www.ezef.de/filme/der-digitale-friedhof/890](http://www.ezef.de/filme/der-digitale-friedhof/890)



## Environmental protection through recycling

Mobile phones and other electronic devices contain valuable resources. These resources are often mined at a huge cost for people and the environment. However, they can also be recycled from old devices. Unfortunately, not all devices are made available for recycling. In 2017, only 45.08% of devices were recycled. And yet, through recycling 17 metal resources can be recovered and re-used in the production cycle. Every smartphone contains about 150 milligrams of silver and 15 milligrams of gold.

### Primary mine



Germany is one of the world's largest importers of raw materials. According to OECD estimates, global demand for metals will triple by 2060 compared to 2011.

### Urban mine



According to current estimates, more than 124 million cell phones lie around unused in Germany alone, meaning the resources they contain also remain unused: approx. 1,116 tons of copper, 474 tons of cobalt, 18.6 tons of silver, 3.1 tons of gold and one ton of palladium.

### Assignment

- Find out where you can drop off your old mobiles in your neighbourhood and/or start a phone collection action at your school.
- Think of ways to promote recycling, taking into account bottle deposit return schemes, the Green Dot system and leasing schemes.

*Handy-Aktionen initiatives: ask questions, understand what's going on and take action!  
In many of Germany's regions, these initiatives started campaigns to collect old mobile phones.*

- Baden-Württemberg  
[www.handy-aktion.de](http://www.handy-aktion.de)
- Bavaria  
[www.handyaktion-bayern.de](http://www.handyaktion-bayern.de)
- North Rhine-Westphalia  
[www.handyaktion-nrw.de](http://www.handyaktion-nrw.de)
- Saarland  
[www.saarland.de/handy.htm](http://www.saarland.de/handy.htm)

### Action

Bring all your old mobile phones to class. How many grams of gold and silver do they contain altogether?



# Digitalisation and disaster management

Extreme events such as earthquakes or hurricanes are dangerous and may result in deaths or injuries. Often, they severely damage buildings, transport infrastructure or power supply systems. When an event has such devastating effects, we speak of a “natural disaster”.

A country’s disaster risk depends on two factors: exposure and vulnerability. Exposure indicates what share of a country’s population is exposed to the risk of extreme events. Vulnerability describes to what extent countries are prepared for extreme events to occur. Is there an early warning system in place? Do people have enough food and access to drinking water? Can governments and authorities respond swiftly and effectively? While they are

not able to avoid natural risks, societies are usually better able to influence vulnerability. Moreover, we can also influence the risk posed by extreme events that are caused or exacerbated by climate change, including – above all – global sea-level rise. Strictly speaking, there is no such thing as a “natural disaster”, because disasters are never caused solely by nature. This also means that the level of disaster risk varies from country to country.

	<b>Prevention</b>	<b>Emergency relief</b>
Disaster preparedness	Analogue	Analogue
Disaster management	Digital	Digital
	<b>Risk analysis</b>	<b>Reconstruction</b>
	Analogue	Analogue
	Digital	Digital
	<b>Early warning</b>	
	Analogue	
	Digital	

© Grafik: Bündnis Entwicklung hilft

## Assignment

→ Discuss, in small groups, which disasters you remember that occurred as a consequence of extreme events, such as earthquakes, hurricanes and floods. Use the world map at <https://weltrisikobericht.de/english/> to find out where risk is particularly high.

- Think about analogue measures that would help
  - a) halt or mitigate climate change and thereby prevent natural disasters.
  - b) reduce a societies’ vulnerability.
- Reflect on which digital innovations and technologies would help improve disaster management.

## What is disaster management?

Extreme events cannot be prevented, but disaster management can help alleviate the impacts. Disaster management encompasses all processes that – in, during and after extreme events – help protect populations, minimise damages and reduce vulnerability over the long term.

In order to prepare for disasters and reduce risks for a region, a thorough risk analysis has to be conducted, people have to be informed about possible risks and advised on what to do when disaster strikes (e.g., by having test alarms). In case of impending extreme events, such as a coming hurricane, people have to be warned early on and evacuated if need be. When a society is hit by an extreme event and suffers damages, it is essential to swiftly organise emergency relief. People have to be rescued, given medical care as well as access to drinking water, food and safe shelter. After disaster relief has been provided, damaged roads and shattered buildings have to be rebuilt, water and power supply infrastructure has to be repaired, and people have to be supported in rebuilding their livelihoods.



Healthcare provision in Indonesia

## What is the role of digitalisation before, during and in the wake of disasters?

Emerging as part of digitalisation, new technologies are used in all stages of disaster management. They help improve precautionary measures and thereby reduce the vulnerability of societies. Modern early warning systems for tsunamis and earthquakes, for example, can be used to prevent a situation in which people are unprepared for the imminent danger. Ideally, the system allows for short-term action to be taken that would mitigate impacts for those affected by the event. In particular, social media have played a crucial role in recent years; they have completely changed the way communication works in crisis situations. National authorities and international humanitarian organisations, more and more frequently, use social media to share safety-related information. Software such as Google Maps or Tableau offers quick and easy ways to create maps, for example of relief goods locations. The software helps coordination efforts in crisis situations. Furthermore, humanitarian aid increasingly works with e-cash and e-voucher systems as payment, allowing people to buy essential goods. The Child Growth Monitor app makes 3D scans that can be used to identify malnutrition in children. Along with the opportunities they afford, these technologies could, if abused, also end up putting the very people at risk who actually need support and protection. Therefore, the use of digital technologies should always involve the development of robust data protection regulations and systems.



Coordination of aid deliveries in the wake of an earthquake in Haiti

## Assignment

- Explain how communication technologies such as Facebook, Twitter or WhatsApp can be used prior to, during and after disasters. Name benefits and risks associated with these communication technologies.
- Familiarise yourself with the other apps and technologies mentioned above. Outline benefits and risks associated with them by listing pros and cons.

The interactive reader titled “The WorldRiskReport” provides insight into the links between extreme events, climate change and development cooperation. The e-paper is based on the global risk report and is updated annually. It is also suitable for mid-level students and, in particular, for interactive white board presentations.

[www.WeltRisikoBericht.de/#e-paper](http://www.WeltRisikoBericht.de/#e-paper)

## Practical exercise 10

Handout



# Humans versus machines?

Digital process innovations offset the most important competitive advantage of the Global South, namely their lower labour costs compared to the industrialised countries. Countries of the Global South have had a mere 33% share of value added in global production networks up to now.

Now it is possible that their share of value added further dwindles due to digitalisation. We are likely to see such a development, in particular if the most significant progress in the area of digitalisation continues to be made in industrialised countries. Digitalisation changes employment and qualification requirements in industry. Production increasingly requires knowledge, for example about software installation, rather than mere labour force. As automation increases, robots are able to perform routine tasks, which may result in companies with global value chains moving their production back to industrialised countries, a practice called “reshoring”. In mere technological terms, machines could replace two thirds of jobs in countries of the Global South. Many workers, in particular in the textile and electronics industries could lose their livelihoods as a result. Currently, the costs of new technologies still mostly exceed wage costs.

Trade measures may also have an effect on reshoring processes. Import restrictions, for example, could encourage corporations with high levels of digitalisation to set up or maintain production plants in the respective countries. However, relocation is still a growing trend, exemplified by Adidas’ so called Speedfactory. The company opened the plant in 2017 in Ansbach, situated in the region of Middle Franconia in Bavaria. In this factory, robots do most of the work.



Trainer from the Speedfactory in Ansbach

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### Assignment

Whether or not global enterprises opt for reshoring depends on criteria such as quality, flexibility, proximity to customers and state regulations, along with technologies. But costs are the most relevant factor.

- Identify possible benefits and downsides of reshoring for
  - a) companies and
  - b) for workers.
- Develop new criteria companies would have to adhere to if their business operations are to be just and equitable in global terms.
- Look up the term “crowdworking” and discuss to what extent this form of work could be an alternative to current manufacturing jobs.

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### → Further reading

Global Lernen 1/2017, issue of this brochure on decent work, available (in German) at [www.brot-fuer-die-welt.de/global-lernen](http://www.brot-fuer-die-welt.de/global-lernen)



## Practical exercise 11

Smartphone and tablet rally



# India's mega-database Aadhaar

Encompassing 1.2 billion entries, the Indian identification system Aadhaar is the world's largest biometric database. Such databases can be very valuable for e-commerce services, as they clearly identify customers. A World Bank project – ID4D – promotes public-private partnerships that develop digital ID systems. However, these systems harbour enormous societal risks, as the example of Aadhaar shows. Non-governmental organisations have been documenting the weaknesses of the system for years.



In order to obtain his biometric Aadhaar card, Durgarao Potluri enrolls in the system using his fingerprint and a photo, India

### Assignment: Learning with Actionbound

- Learn more about Aadhaar and use the learning app Actionbound to explore the risks involved in the system. Install the free Actionbound app on your smartphone or tablet and scan the QR code. To play the learning game, form groups of 3 to 5 students who work with one device. You may download the content and use it offline as well. Students are asked to solve problems and come up with creative solutions. They send their group results to a joint email address; results should be presented using an interactive whiteboard or a projector for the purpose of evaluation and further discussion. (material in German)

- Learn more about the Aadhaar system. Identify three possible benefits and three possible risks the system poses for people in India. Specify three stakeholders who may benefit from the collected data.
- Mahatma Gandhi (1869-1948) was a major figure in the Indian liberation struggle. He fought for individual and political self-control and self-determination. What do you think he would say about Aadhaar? Write a brief statement.
- *If the amount of information collected reaches a certain level, storing data would actually amount to storing humans.* (Helmut Glaßl). Working in small groups, discuss concrete situations in your day-to-day life that would contribute to “storing humans” and try to find creative ways to present these situations – using cartoons, songs, images, video clips etc. Present your work as part of a gallery walk.

**Actionbound**

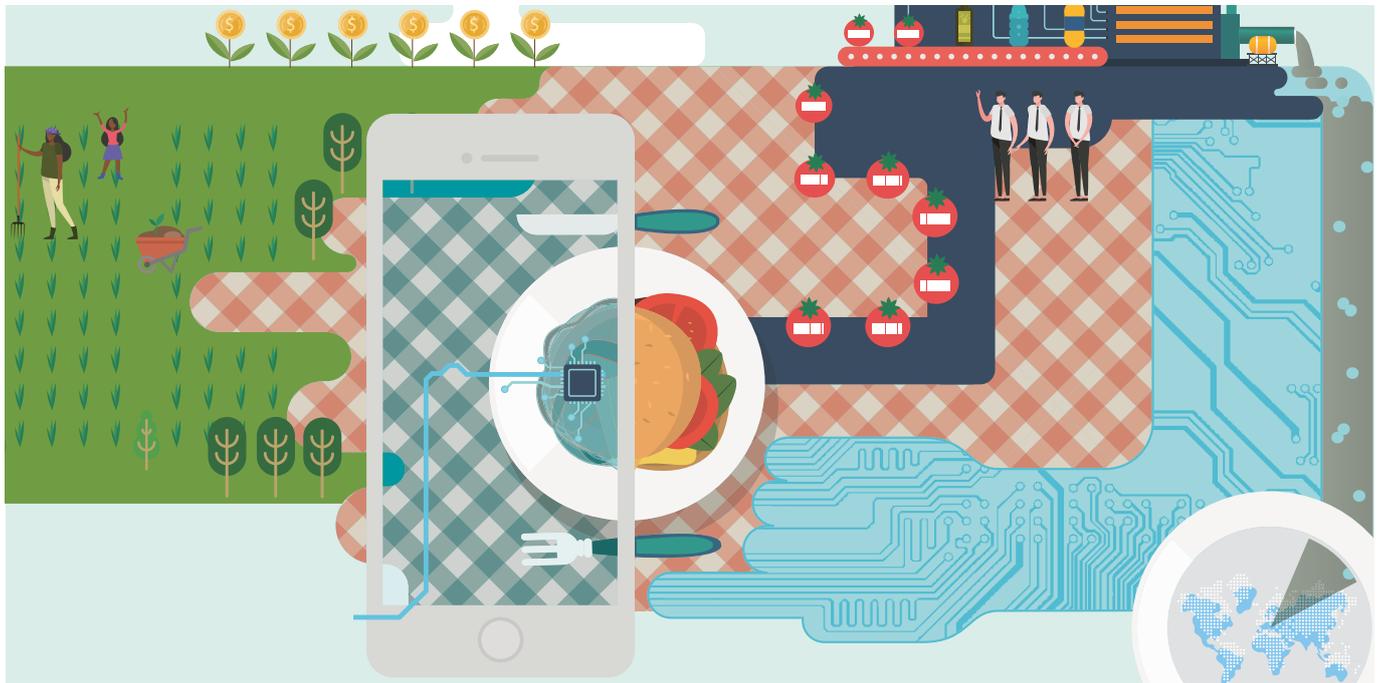


## Practical exercise 12

Interactive whiteboard presentation



# Do we need digitalisation to feed the world?



**Nature shrinks as capital grows. The growth of the market cannot solve the very crisis it creates.**



Vandana Shiva in her book titled :  
Soil not Oil – environmental  
justice in Age of climate crisis

According to the FAO, 821.6 million people worldwide suffer from hunger and malnutrition, meaning that about one out of every nine people does not have enough to eat. Another two billion don't go hungry, but don't get enough nutrients with their food and thus can't live out their full potential and are prone to diseases. Many of the malnourished live in rural areas – i. e., where food is produced. High hopes are placed on digitalisation in agriculture and the global food system. New technologies are to contribute to feeding the world's growing population. However, digital tools and genetically modified high-yield varieties can exacerbate the impoverishment of small producers and threaten biodiversity.

### Assignment

#### Interactive whiteboard presentation

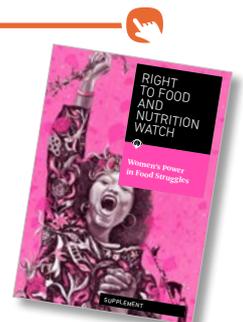
Please find a PowerPoint presentation at [www.brot-fuer-die-welt-de/global-lernen](http://www.brot-fuer-die-welt-de/global-lernen). You can use it for your class on this topic. The presentation addresses the issue of digitalisation in agriculture and the global food system, including benefits and risks involved.

You will also find a quiz as part of the presentation, which you can use to play the four corner game with your students. You can also use the questions to create a Kahoot (<https://kahoot.com>) and do the quiz in digital form.

You can find further material at:

[www.inkota.de/themen-kampagnen/welternahrung-landwirtschaft/digitalisierung-der-landwirtschaft](http://www.inkota.de/themen-kampagnen/welternahrung-landwirtschaft/digitalisierung-der-landwirtschaft)

[www.righttofoodandnutrition.org/media/publications](http://www.righttofoodandnutrition.org/media/publications)



## Practical exercise 13

Handout



# Fair digitalisation

Digitalisation is a process that increasingly shapes the living and working conditions and the economic activity of all people. Digital trade and the digital economy are often associated with high hopes for the Global South. The creation of new digital markets could see high growth rates. But the figures paint a different picture. Africa and Latin America account for only two percent of trade in digital products. In order to enable countries of the Global South to help shape the digital transformation and not become even more dependent, we need a fair digitalisation that is directed to the common good.



**Poster** “If half of humanity can’t go online, justice stays offline.” Three out of four people in sub-Saharan countries don’t have access to the Internet. In order not to further exacerbate inequalities and injustices, Brot für die Welt is working to support a fair digitalisation.

### Assignment 1

→ Write a short text or poem expressing your thoughts on the poster above.

### Assignment 2

→ Work in “expert groups” to develop the building blocks of a fair digitalisation. Use the study titled “Global Justice 4.0”, pages 59-62 at <https://shop.brot-fuer-die-welt.de/entwicklungspolitik/Wirtschaft/gerechtigkeit-4-0-auswirkungen-der-digitalisierung-auf-den-globalen-sueden.html>

Present your building block in “jigsaw groups” (see section on the Jigsaw Method below).

- Suppose you would use the building blocks to build a house. Working in “jigsaw groups”, discuss which of the building blocks should form the foundation of the building.
- Discuss which of the buildings blocks you can actively shape and think of measures to that end.
- In Germany, there are roughly 12 million “offliners”. Is digitalisation an inclusive affair in Germany? Consider whether the building blocks could serve to make digitalisation fair also in Germany.

## 9 Building blocks for a fair digitalisation

1

Create a public data infrastructure to make sure everyone has access to the Internet

2

Support small and medium-sized enterprises by providing them with expertise and capital

3

Regulate monopolies of leading IT companies by putting in place an adequate policy framework

4

Allow for trade policies to protect the local economy

5

Allow countries of the Global South to create national and regional online platforms

6

Strengthen online platform cooperatives (e.g., for ridesharing services) vis-à-vis corporations

7

Promote digital centres in the countries of the Global South

8

Support active labour market and social policies in the countries of the Global South

9

Make education equally accessible to all countries



### → The Jigsaw Method

Break your overall topic into a set of sub-topics or chunks. Divide students evenly into “expert groups”. Each expert group will study and explore a different chunk of content. Subsequently, students form “jigsaw groups” with one member from each of the expert groups. In the jigsaw groups, the students take turns presenting their chunk of information. The Jigsaw Method combines knowledge acquisition in the “expert groups” as students study and explore a sub-topic or chunk of content, and knowledge transfer in the “jigsaw groups” as each “expert” teaches their chunk of content.



# Are we creating a God?

Algorithms make more and more decisions for people in day-to-day life. Does that mean algorithms are competing with God? To introduce students to the topic, let them discuss the question: “**Who has more power – God or algorithms?**” According to where they stand on this, students can position themselves along a scale in the room.

Subsequently, have your students read the following text from Marc-Uwe Klings’ dystopia “QualityLand” – one taking on the role of the protagonist **Peter**, another the role of **the Elder**, who discuss the above question.

**I have a problem**, says Peter.

**Well well**, the Elder mumbles.

**And Kiki told me you might be able to help me.**

**Are you God-fearing?** the Elder asks abruptly.

**Um**, Peter says, surprised. **I don’t believe that there is a God.**

**Oh**, says the Elder. **But there will be one ...**

**What do you mean?**

**Are you familiar with the concept of super-intelligence?**

**Not really.**

**Didn’t think so**, says the Elder, chuckling. **Do you know the difference between a weak and a strong artificial intelligence?**

**Roughly, yes**, says Peter. **A weak AI is made for a specific task, such as steering a car or taking back returned products. This type of AI can be very annoying.**

**Yes, kind of like that. And what about a strong AI?**

**A strong artificial intelligence would be one that does not need to be programmed to perform a specific task. It’s a problem-solving machine able to perform any intellectual task successfully that could also be mastered by a human. It might even have real consciousness. But that does not exist.**

**Oho**, says the Elder. **Someone hasn’t been reading the news lately. Supposedly, this type of strong AI does now exist. It may rule us soon ...**

He points to one of his monitors showing an election campaign ad from the Progress Party.

**John of Us?** asks Peter. **Is John of Us a super-intelligence?**

The Elder chuckles. **Did you follow his election campaign? No. It’s not a super-intelligence. No. He ponders. But on the other hand ...**

**What?** asks Peter.

**An old quote just came to mind: Any machine smart enough to pass the Turing test could also be smart enough not to pass the test.**

**I don’t understand.**

**Never mind**, says the Elder.

**What’s the Turing test?**

**In 1950, Alan Turing suggested a method that could supposedly assess whether a machine’s intellectual capacity is on a par with a human’s ability to reason.**

**How is that supposed to work?**

**A human is asked to communicate with two different interlocutors, which he\*she cannot see or hear. They communicate via a keyboard. One of the interlocutors is human, the other an AI entity. If the questioner were not able to find out which of the interlocutors is human and which is a machine, the AI entity’s ability to think would be equal to a human’s intellectual powers.**

**I see.**



**Do you? Machines give away the fact that they are machines mostly by being too nice and overly polite.** The Elder giggles. **Well, John of Us is definitely a strong AI, capable of everything humans are. Just faster of course. No mistakes. And what is the most important skill that we humans possess? How did we become the powerful species we are today, dominating the world?**

**I don't know**, says Peter. **Is it the ability to build communities? Compassion? Love?**

**Ah, well, frills and furbelows!** shouts the Elder. **We can make tools. Machines! Do you see what I'm getting at?**

**No**, says Peter. **Not really.**

**A strong AI is an intelligent machine capable of building a machine that is more intelligent yet. Recursive self-improvement. This would result in an explosion of intelligence. Our John is of course banned from improving himself, quite reasonably so. Let's suppose he were to find a way around the ban or others were to develop an AI and fail to put in place such a ban ... What then?**

**I guess you are about to tell me.**

**A super-intelligence would materialise, of a nature far beyond our imagination. This intelligence would surely not be so dumb as to stick around in some central computer and wait for someone to come who might pull the plug on it. It would decentralise and spread out through the entire web. There it would have access to billions of cameras, microphones and sensors. It would be ubiquitous. It would have access to all data and information ever stored, which it could extrapolate into the future. It would be omniscient, all-knowing. And not only could it alter the virtual world, but it could – as almost everything can be controlled via the Internet – also change our physical world as it pleases. It would be all-powerful. Now you tell me, what do you call a creature that is omnipresent, all-knowing and almighty?**

**God?** asks Peter.

The Elder smiles. **Yes. Now you know what I mean when I say that as an ironic twist of everything the religions tried to teach us, it was not God who created humankind, but it is humankind who will create a God.**



Peter ponders for thirteen seconds.

**Anyway**, he eventually says, **that's all very interesting, but it has nothing to do with my problem. I came to you because ...** Then he pauses. **Will this God be benevolent??**

## Assignment

- Answer Peter's last question intuitively. Give reasons for your answer.
- God's omnipotence and omniscience play a central role in the Jewish and Christian tradition. The text alludes to that tradition. Find examples from the Bible that describe these characteristics of God. What do omnipotence and omniscience mean to you? How does the notion that machines could take over these qualities of God make you feel? Put your thoughts on this in writing not exceeding one page.
- Love, compassion and benevolence are further attributes of God. Can you conceive of a machine endowed with artificial intelligence that could also show love, compassion and benevolence?
- People communicate with God in various ways. Do you know people who also communicate with machines? Find examples of this and present them in a drawing.
- Create a table and describe the communication between humans and God on the one hand, and between humans and machines on the other – what do they have in common, how do they differ?

## Using virtual reality technologies to visit projects

Even though they have not been around for very long, VR technologies are already used in many areas, such as health care and education. 360-degree camera shots create experiences that allow students to view things from different perspectives. Used as a digital approach in the field of global learning, VR can do what other tools can't: create and evoke empathy. Jeremy Bailenson puts this scientific effect down to the experience involving a person's physical activity: **"Content that moves the body will also move the mind."**

Virtual reality experiences can effect changes in people's attitudes and behaviours in the real world.

Mel Slater

At Brot für die Welt, we use VR movies to make projects tangible without travelling there. Our first 360-degree video allows viewers to visit a project carried out by the Afar Pastoralist Development Association in Ethiopia. The region has been categorised by National Geographic as the hottest place inhabited by people. That's where the Afar live by livestock farming. Among other livestock, the Afar pastoralists raise camels and goats. But life for the Afar is becoming increasingly difficult due to climate change: poor rains, frequent storms and also more often temperatures above 50 degrees Celsius. The Afar have to leave their settlements and often cover long distances for water.

The project supported by Brot für die Welt works to support:

- building water-spreading weirs that help stop erosion and increase fertile land area
- cultivation of agricultural products, such as mango, papaya, onion and moringa, to improve self-provision
- education programmes and micro-credit systems for women, allowing them to start small businesses and no longer be dependent solely on livestock farming.



Visit the project at:

[www.youtube.com/watch?v=5iS8tPSyHW8](https://www.youtube.com/watch?v=5iS8tPSyHW8) using your smartphone or tablet. Rotating your device allows you to view from different perspectives. You can also use a Cardboard – a low-cost viewer (which is made of cardboard and has two lenses, along with other simple components) that fits any type of smartphone. Use special VR headsets to best appreciate the 360-degree panoramic view.



## Virtual project visits with Actionbound



Take your students on a trip around the world that's free and climate-friendly. You can visit projects in Albania, Kyrgyzstan, India, Ethiopia, Zimbabwe, Columbia and Nicaragua. Children and youth of the same age as your students share how they experience social injustices, how they cope with these injustices and what the projects contribute to their lives. They talk about inclusion at schools, integration of refugees, children's rights, equality, non-violent conflict resolution and fair working conditions.

Access this repository using the Actionbound app. Use a smartphone or tablet to download the app and scan the QR codes on the world map. You can also download the content to use it offline. The stars above the codes indicate the level of difficulty. Project visits are designed for groups of 3 to 5 students who use one device together to do assign-

ments, solve problems and get points as they do so. In this way, students learn more about the country and its people, they solve puzzles and explore whether the countries' approaches can be applied in their own context.

You can order the map (A1 format) and the accompanying working material free of charge at our online shop or download the map (PDF).

[shop.brot-fuer-die-welt.de/Schule/](http://shop.brot-fuer-die-welt.de/Schule/)

## Brot für die Welt

As a development agency of the Protestant churches in Germany, Brot für die Welt is active in more than 90 countries across the globe. Together with local partners, we work to support and serve the empowerment of poor and marginalised people.

[www.brot-fuer-die-welt.de/en/bread-for-the-world/](http://www.brot-fuer-die-welt.de/en/bread-for-the-world/)

### If you are interested in our teaching materials and events, please get in touch:

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The brochure **Global lernen** (Global learning) is a service for teachers in secondary education and is available free of charge:

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Art. no 112 106 020 219*

*Download  
Or download the brochure (PDF, issues  
from 2006 to present) at:  
[www.brot-fuer-die-welt.de/global-lernen](http://www.brot-fuer-die-welt.de/global-lernen)*



### Get involved!

Production and disposal of digital technology is also a burden on the shoulders of children. Despite the fact that the global population has never been richer than today, these children are forced to work hard for their survival instead of going to school. Join the 100 Million campaign! We want to work together and call on thousands of members of parliament to end the exploitation of more than 100 million children globally. [www.brot-fuer-die-welt.de/100million](http://www.brot-fuer-die-welt.de/100million) <https://100million.org>

**Photo** Brot für die Welt youth meeting to plan actions against child labour, 2019 in Weimar, Germany

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