Pretend play impulses

Gender sensitive pretend play impulses for kindergarten on digital transformation

We play the future!

akademien der wissenschaften schweiz

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Introduction

What is Digital Transformation?

Digital transformation describes new ways of bringing people, data and processes together that would not exist without digitalisation. Digitisation is the prerequisite for digital transformation. Digitisation means converting analogue media into digital form. For example, a handwritten text (analogue) is written in a writing programme on the computer (text file).

The distinction between digitalisation and digital transformation can be illustrated with the purchase of tickets for public transport. If train tickets were issued by handwriting, they would be analogue media. At the moment, train tickets can be printed out at the counter or from machines at the station. The quota of tickets and the train connections are stored on the computer, so that the tickets are digitally available and printed out. This process is now also possible via the Internet. A ticket can be purchased in advance via a website or an app, regardless of location. These ticket purchase processes are therefore all possible due to digitalisation. Currently, there are apps that register which routes have been travelled and when, and automatically bill the cheapest ticket at the end of the month. The entire public transport process has thus been redesigned. The redesign of this process is an example of digital transformation.

What are the free play impulses about?

Aim is to develop gender inclusive free play impulses for kindergarten in which digital transformations can be played. Children should be given the opportunity to playfully deal with the meaning of digital transformation in different contexts and to experience themselves as active agents in digital transformation in free play. This way, interest in future professions in which digitisation and digital transformation can be awakened as early as kindergarten age. It is also important that girls as well as boys feel addressed by these free-play impulses and identify with them, so that they can experience this (new) topic in a playful way. For this reason, gender inclusive implementation is also addressed in the professional development.

Reference to curriculum

Free play impulses meet the development-oriented approaches of the curriculum: connections and principles, imagination and creativity, as well as learning and reflection.[1]

The content of the free play impulses belongs to the subject areas of "media and information technology". Likewise, interdisciplinary competences are promoted in free play. In particular, skills that are necessary for the increasingly digital world: creativity, problem solving, communication, collaboration and critical thinking.[2]

[1] Bildungsdepartement Kanton St.Gallen (2017). Kanton St.Gallen Lehrplan Volksschule – Broschüre Grundlagen. (S. 30-31)

[2] Genner S. (2017). Digitale Transformation: Auswirkungen auf Kinder und Jugendliche in der Schweiz – Ausbildung, Bildung, Arbeit, Freizeit. Zürich: ZHAW Zürcher Hochschule für Angewandte Wissenschaften. https://www.ekkj.admin.ch/fileadmin/user_upload/ekkj/04themen/08Digitalisierung/d_2017_Bericht_Digitale_Transformation_Genner.pdf

ICT-center

Script for the introduction of free play

The ICT center (Center for Information and Communications Technology) is a free play corner that can be combined with all other free play impulses. It is the linchpin of all free play impulses. Four different play situations are imagined to occur here: (1) ICT specialists repair, install, or program their laptops or tablets with no link to any other free play stimulus. (2) Children bring non-functioning electronic items to the ICT Center, where ICT professionals fix the problem by pretending to repair the item, or to re-programme or re-install software. (3) ICT professionals receive a request from another play corner to provide a service (e.g. convert the family corner to a smart-home) or troubleshoot a problem. They do this remotely from the ICT center or on location. (4) Play can also start at the ICT center if they pretend to get an error message and take action on their own initiative. For example, there could be an error message on the ICT center's tablet about the refrigerator in the family corner. The ICT specialist contacts the children in the family corner and explains that she has discovered a problem.

Script to repair the "smart" family corner (smart-home)

Roles: Kindergarten teacher = ICT specialist; children = father, mother or children playing in the family corner.

The refrigerator in the family corner is no longer working. A request for repair from the family corner reaches the ICT center. The "intelligent"/"smart" refrigerator no longer works. The smart refrigerator is equipped with a sensor and microchip to enable it to order what is missing in the refrigerator. However, the software seems to have a bug, it keeps reordering exactly what is already in the fridge.

The kindergarten teacher as ICT specialist takes the request by mail or phone. *"Okay, someone has a problem with their refrigerator. It is ordering automatically, but keeps reordering the food that's already in the fridge and not the food that's missing. Now the family has a whole lot of cheese in the fridge, but no pizza or tomato sauce. I'll connect to the fridge and look for the problem."* The ICT specialist types on the laptop. *"Ah, here I see the refrigerator now. Yes, it has an error message. How do I solve this problem?"* The ICT specialist pretends to "click" touching on the screen, or using the mouse, and typing on the keyboard. After a while: *"Ah, I think I was able to find the error in the program. I need to reprogram the command here. Now the refrigerator should be ordering what is missing. I will now go and check the refrigerator. Maybe I can change the setting of the refrigerator so that this error no longer occurs."* The ICT specialist visits the family corner with her tablet dummy and stickers of microchips and sensors. She investigates the refrigerator and pretends to run a test with the tablet dummy. *"Ah, this one sensor doesn't cover everything. I'll install another sensor here so the refrigerator registers better what was taken out."* The ICT specialist also tests the family's tablet and explains what she installed. *"Now this error shouldn't occur again."*

Material: Tablet dummy with background image "ICT center", table and chairs as office space for the ICT center, maybe discarded laptops, PCs, cell phones, keyboards, mouse, tablets, cables, telephone, stickers of microchips and sensors as well as tools for repairs.

Vocabulary: Programming, laptop, tablet, network, Internet, cable, mouse, Internet connection, network, log in.

Further Impulses: repairing of various objects like cell phones; checking network connection problems, investigating errors. The ICT center can also develop apps, program robots or install (newly developed) programs (e.g. for the "smart" family corner).

The ICT center can be combined with all other free play impulses, as it deals with any problem, for example with the 3D printer or the self-driving car. The ICT center tries to troubleshoot first tried via remote access from the ICT center (e.g. with a change in programming/adjustment of the software). If help cannot be provided successfully via remote access, ICT specialists must solve the problem on site with their tablets (e.g. to replace hardware).

Digital transformation in the ICT-center: An ICT specialist installs, maintains and repairs stationary and mobile systems and maintains server systems and networks. The main tasks include the provision, installation and maintenance of hardware, software and network components. Furthermore, an ICT specialist instructs users in the use of equipment. They also take care of repairs (either themselves or through an external company) and replace defective devices if necessary. The installation of hardware and software, as well as the localization and elimination of errors regarding hardware, software and the communication network are part of their tasks. An ICT specialist keeps the technical inventory of all installed and stored hardware and software as well as all network components and licenses.[3]

[3] SwissICT (2017). Berufe der ICT. Verfügbar unter: https://www.berufe-der-ict.ch/ (05.12.2019).

Robot

Script for the introduction of free play

Roles: kindergarten teacher = programmer; child = service-robot

In a robotics company (e.g. Kindergarten Robotics"), robotic engineers work as a team to develop robots. Necessary specification of the robot and the task for which a robot should be built must be considered. Orders are taken, prototypes are built, tested, presented and robot sales talks are held. The company "Kindergarten-Robotics" receives the order to program service robots.

One child plays the service robot with a box that it can pull behind him/her. The robot automatically puts items in the box and pulls them to where they belong. The robot recognizes what needs to be tidied up and what should remain, for example something, which has been built. In order for the service robot to know this, it must be programmed by a person. The kindergarten teacher, for example, types on the tablet dummy and specifies which things should be tidied up: only those things that are not (or no longer) needed during play. She verbalizes this aloud as she types it. *"Our robot is the only one allowed to clean items up. The robot recognizes what needs to be cleaned up by the fact that it is lying there in a mess and no one has played with it for a while. The robot should start with it now."* The kindergarten teacher presses "start" on the tablet dummy and the robot starts.

Further ideas for a service robot, in analogy to the situation described above:

Chore robot: All children who have a chore are programmed when they take on their chore and then carry out their task as a service robot.

Cleaning robot: If someone spills something, the robot comes and cleans it up.

Credit card robot: It assists with purchases and gives tips on how to make purchases at the best price.

Towing robot: helps when something heavy needs to be carried.

Blind-guiding robot: Looks at the path and traffic while a blind person is walking and tells him or her how to move (stop and wait, go to the right, etc.).

Security robot: It guards the museum from thieves (in combination with the free play impulse "Police").

Household robot: In the family corner, a robot also lives with the family and helps with household chores.

Material: Tablet dummy with background image "Service robot", box or bag to transport the items to be cleaned up.

Vocabulary: robot, program, programming, sensors

Further Impulses:
The robot starts to act autonomously without being programmed.

The robot does exactly the opposite of what you say. The ICT center needs to be contacted; they try to solve the problem via remote access.

Robot engineers receive new orders, for example to program a sowing or milking robot for a farm.

Digital transformation with robots: The tasks of robotics engineers lie in the conception, development, construction and programming of cognitive, intelligent (assistance) systems, machines and robots. These should cooperate directly with humans. That is why specialised engineers deal with interactive elements on a daily basis, which are used, for example, to control service robots through gestures, speech or dialogue. The areas of application are very different, and the respective focus of the engineers depends on the purpose of the robot.

The task of service robots is to perform services partially or fully automatically and not the direct industrial production of material goods, as is the case with industrial robots. The areas of application of service robots are therefore difficult to narrow down; they can perform any kind of service (bringing or cleaning objects, cleaning, refuelling cars, guarding museums, etc.). [4]

Robots for household support already exist. They can help with cooking or move heavy objects. In the future, however, robots should not only be fast, strong and precise. Work is underway to enable robots to support humans in their daily lives as prudent partners capable of dialogue. This is challenging, as it requires intelligence, adaptability and the necessary "sensitivity". On the one hand, robots must be able to grip firmly and, on the other hand, be very careful when e.g. lifting a glass of water without breaking it.[5]

[4] Schraft, R. D., & Schmierer, G. (2013). Serviceroboter: Produkte, Szenarien, Visionen. Heidelberg: Springer.
[5] Bundesministerium für Bildung und Forschung (BMBF) (2018). Hilf mir mal! Wie Roboter den Alltag der Menschen erobern. Bonn: BMBF.

3D-Printer

Script for the introduction of free play: Option 1

Roles: Kindergarten teacher = salesperson; child = customer

The kindergarten teacher is the salesperson and advises the customer. A child visits the toyshop and wants to buy a toy. The salesperson starts the conversation:

"Good afternoon, nice of you to come to us. Would you like a toy?" The child answers in the affirmative. "We'll be happy to make that for you. We need to know what size or color the toy should be to program the 3D printer. Let's get started: What color would you like the toy be?"

The child answers and the salesperson pretends to enter the answer on the tablet dummy. Other specifications are entered, for example shape (round, square, ...), size (small, medium, large, ...) or material (plastic, glass, gypsum, metal, ceramic, ...). After all specifications are programmed on the tablet dummy (tablet background with colours, measures), the salesperson can pass the command to the printer, which prints the dream toy. The salesperson pretends to take the toy out of the printer and passes it to the customer. Payment can be made either in cash, by credit card or via an app on the cell phone (e.g. Twint).

Script for the introduction of free play: Option 2

Roles: Kindergarten teacher = designer; child = 3D-printer

One child is the 3D printer, i.e. sits at a table, possibly behind a cardboard wall or in a box. The kindergarten teacher plays the role of a designer who would like to have something printed (a toy, any fantasy object, ...). The designer draws a sketch of the object he/she would like to have printed on the tablet (white tablet background, laminated, water-soluble pens). While drawing, the designer speaks out aloud what he/she is thinking. Designer: *"What size do I want my object to be, what shape, what color?"*

The sketch is given to the child playing the 3D printer or dropped through a slot in the 3D printer box. The child playing the 3D printer forms the sketched object out of play-doh and hands it out.

Material: cardboard (box), for option 1: tablet dummy with background image "3D printer"; for option 2: play-doh, table.

Vocabulary: Programming, specification, connecting, 3D printer

Further Impulses:
The 3D printer also produces things made of other materials, such as:

- Building blocks for the building corner. Components available in the kindergarten are specified and designers/customer choose what should be built. The 3D printer prints out what is still needed for the planned project. In connection with the free play impulse "autonomous driving", a transport vehicle can be ordered, delivering the newly printed components directly to the construction site in the building corner.
- In combination with the free play impulse "Food Lab", the 3D printer can print food (e.g. cake).

The 3D printer is broken. It creates exactly the opposite of what has been programmed, or it just creates any object it likes and is easiest to make, etc. The ICT center must be contacted to analyze and fix the error. Depending on the cause of the error, the ICT center repairs the 3D printer either remotely or on site.

Digital Transformation in relation to the 3D printer: The free play impulse option 1 is based on an idea of a walk-in 3D shop, similar to previous copy shops. Customers can visit the shop and get advice on which material is best suited for printing, for example plastic, food, metals, glass, ceramics or gypsum. The idea behind this is to move away from mass production to the small factory around the corner.

Option 2 does not focus on a business idea in the sense described above, but rather on simulating the creation of a sketch on the computer (which is the basis for 3D printing), transmitting this information to the 3D printer and the 3D printer creating it based on this information. [6,7]

[6] Petschow, U., Ferdinand, J. P., Diekel, S., & Flämig, H. (2014). Dezentrale Produktion, 3D-Druck und Nachhaltigkeit. *Schriftenreihe des IÖW*, 206, 14.
[7] Fastermann, P. (2012). 3D-Druck/Rapid Prototyping: Eine Zukunftstechnologie-kompakt erklärt. Heidelberg: Springer Vieweg.

Autonomous driving

Script for the introduction of free play

Roles: kindergarten teacher = operator of tablet; child = passenger

The kindergarten class plans an excursion and the accurate vehicle for this must be ordered. The kindergarten teacher types the destination and the number of people (adults / children) on the tablet dummy. In this example, a city is the destination. The app does not order a plane, train or ship, but a car. An autonomously driving car arrives and everyone can get in (possibly a cardboard box or chairs for the car). The kindergarten teacher confirms the destination, presses the start button and the car drives off. The car chooses the appropriate route on its own. No one has to steer, everyone can talk to each other, enjoy the view or play something. All of a sudden, the car turns around and wants to return to the classroom.

Kindergarten teacher: *"Stop, what's going on now? We don't want to go back to the classroom yet. Stop, we have to stop the car. It has to go to the next parking spot."* The kindergarten teacher presses the corresponding button on the tablet dummy. The car parks in the next available parking space. *"What happened? Why would we drive back to kindergarten? I'll have a look on the tablet. I will run an analysis right now."* The kindergarten teacher pretends to look for the app, opens it when she finds it, and starts the analysis. The result appears in a few seconds. *"The problem is that it will start raining when we are in town. The car wants to go back so we get our raincoats and umbrellas. Ok, that's fine. We can start the car again and let it drive back to kindergarten."* The kindergarten teacher presses the appropriate button on the tablet dummy and the drive continues.

Material: dummy tablet with background image "autonomous driving"

Vocabulary: Autonomous driving, analysis, app, tablet

Further Impulses: There is a control center for autonomous driving vehicles that receives wishes and provides the requested vehicle. For example, the vehicle can be a transport vehicle for clothes ordered in the online shop or for food ordered by the refrigerator. It can also be used as a transport vehicle for material supply in the building corner. Further, the vehicle can take the family on vacation to the sea or a horse / animal transport is needed.

The vehicle makes a detour to invite other passengers who booked a vehicle for the same route.

The vehicle constantly changes destination. The vehicle realizes itself that it is making a mistake and parks at the next opportunity. The analysis reveals no apparent reason, so contact must be made with an ICT specialist (connection to the free-play ICT center). A replacement vehicle is automatically ordered and the children continue their excursion while the ICT center analyzes the vehicle's error.

Digital Transformation in autonomous driving: There are five levels of autonomous driving: 0 stands for no automatic driving and 4 for fully automatic driving. The highest level is reached when the car can drive continuously under all road and environmental conditions without human intervention. Currently highly equipped production vehicles are between levels 2 (partial automation) and 3 (autonomous driving under certain conditions). For a car to be able to drive autonomously without a driver, it needs information about the destination, the position and the environment. This information is used to determine the route it will take (strategic planning). Information about the environment is needed for maneuvers (tactical planning). All available information is used to determine the route it will take (reactive planning). Depending on the situation, the car reacts by steering, accelerating or braking and it provides information.
The primary aim of autonomous driving vehicles is to increase road safety and reduce the number of accidents. In addition, traffic jams, exhaust fumes and fuel consumption can be minimized. Other areas of application for autonomous vehicles are the extension of bus and light rail services where scheduled operation is not possible for infrastructural or financial reasons, for example as shuttle services from a parking lot on the outskirts of the city to the city center, to an amusement park or to an event. Autonomous driving vehicles can be more flexible than a bus fixed to a specific schedule. Another important point is "shared mobility". This means that people no longer own their own car, but order a vehicle to suit their needs (traveling alone or with a lot of luggage from A to B). In the free-play impulse, digital transformation in autonomous driving is moved even further into the future, in which not only various cars, but also airplanes, rockets, hot air balloons, bicycles and the like can be requested to bring their passengers autonomously to the desired destination as intelligent vehicles.

Internet of Things

Script for the introduction of free play: we are intelligent household items

Some children play intelligent household items, some children play the family at home. Children who play intelligent household items stand next to these items in the family corner, e.g. the cooking stove, or sit in large boxes that are labeled as items, e.g. the dryer, or they hang a picture of a household item around their neck, e.g. the cooking pot. Intelligent household items can talk.

At the beginning, the kindergarten teacher plays along as an item. As soon as the children playing family want to handle an item or as soon as they announce playing actions, the intelligent items understand this and become active. The kindergarten teacher announces what she observes and "thinks" as an intelligent item. She also takes care of the interconnectedness between items.

Roles: Kindergarten teacher = cooking pot; child = family member, child = stove

A family member says, *"We want to cook."* The kindergarten teacher goes to the stove, takes the cooking pot, puts it on the stove, and verbalizes, *"I am the cooking pot. You want to eat. For dinner we often have spaghetti, I'm the biggest pot, I'm getting ready."* As an intelligent cooking pot, she addresses a child in the family, *"Please fill me with water."* She networks with other items. She addresses the child playing the cookstove, *"Did you notice, I'm on this hotplate, you can heat now."* She also addresses family members, *"I feel that some salt is missing here for the spaghetti."*

Other smart items could include:
Waste bin that independently sorts for recycling, refrigerator, toaster, vacuum cleaner, laundry basket, washing machine, dryer, closet, iron, sewing machine, heating, lighting.

Material: Tablet dummy with background image "Internet of Things"; big boxes, cloths to turn into an intelligent item, pictures of items to wear as necklace.

Vocabulary: microchip, sensor, Internet.

Further Impulses: At the beginning, items react and act on the needs and problems of the family. As a progression, the networking of items could be introduced: several items are needed to solve problems, they are coordinated via a tablet.

When joining the free play in a role, the kindergarten teacher makes sure that she needs several items to solve a problem. As the refrigerator fills itself, it could also realize that something should be cooked now and can connect with a food processor or a cooking stove.

The ideas of what can happen in the home automatically become more and more fantastic. Free play can turn into a conversation in which children and the kindergarten teacher outdo each other with wishes (a kind of land of milk and honey).

As a progression, it is no longer necessary for children to play the intelligent objects themselves. It is also possible to just pretend that the refrigerator in the family corner is a smart refrigerator and automatically orders the groceries (cf. script for the repair scene in the free play impulse ICT center).

Digital transformation for Internet of Things: The free play impulse Internet of Things addresses the learning ability of things. Children play intelligent items of the future, which, based on observation, realize themselves what needs to be done. The free play impulse Internet of Things focuses on artificial intelligence in connection with smart items.[8] These items learn from the data (observations), and in playing out artificial intelligence, they speak out aloud what they are thinking.

The Internet of Things means that more and more objects "monitor their context via sensors, network with each other, access Internet services and interact with humans. The digitization of things with inexpensive micro-chips, the linking of things with the Internet, which enable data exchange and monitoring in real time, leads to a new starting position. Companies are challenged to develop new business models. The aspect of linking things in this way and connecting them with services is digital transformation.

When the Internet of Things becomes part of everyday life, it is no longer noticed (e.g. sensors that monitor and regulate air quality in the house). The pleasant thing about a smart home is that things get done without the occupants having to decide, trigger or do anything. In the free play impulse, however, these smart objects make themselves noticed.

[8]When AI Meets IoT, FORBES, 20.12.2019 https://www.forbes.com/sites/bernardmarr/2019/12/20/what-is-the-artificial-intelligence-of-things-when-ai-meets-iot/

Police

Script for the introduction of free play

Roles: kindergarten teacher = ICT specialist; children = curators of the art gallery, police officers and thieves

One or more children are curators of an art gallery. They select drawings for an exhibition (children's drawings). The kindergarten teacher together with other children plays an ICT specialist. She visits the art gallery and suggests that they protect the valuable artworks even better. She explains:

"You have an alarm system, but if a painting is stolen and taken away, you can't find it again. We propose to protect the artwork so that it can always be found. We spray the back of the paintings with a thin layer that can be tracked by GPS, and we connect each artwork to the police tablet. The police can monitor all the paintings in real time and see if the paintings are still in the art gallery. If paintings are stolen, the police can check on their tablet where the paintings are and retrieve them."

The ICT specialists spray a layer on the back of the artwork for locating the artwork and install an app on the tablet, which they give to the police for monitoring. Some children play police officers, they get the tablet. Other children play thieves who steal a piece of art in an unguarded moment, run away and hide it. The police receive an alarm on their tablet and is provided with the location, where the artwork is. They find the artwork (and arrest the thieves if they were near the artwork). They return the artwork to the gallery.

Material: tablet dummy with background image "police", drawings made by children, empty spray bottle

Vocabulary: art, art gallery/museum, locating, spraying, GPS, real-time

Further Impulses: The art gallery curators also want to shop the artwork data so that, if necessary, a lost or destroyed artwork could be restored. The technologists are developing a scanner that analyses all aspects of the artwork and sends the information to an art robot.

The art gallery curators want to produce a digital copy so that the artwork is not lost in case it is stolen and destroyed or in case of fire.

The police want to make sure that the copy is not a fake and analyze the artwork and its digital code.

In conjunction with the free play impulse "autonomous driving": Police use a self-driving plane, ship, train or car to search for the stolen art work.

In conjunction with the "ICT center": The police cannot locate the art work. The ICT center can log into the app remotely and analyze the error. They fix the error via remote access or visit the police station to make changes on the police tablet.

Digital transformation for "police": The digital transformation here is the networking of organizations and things in real time via the Internet. The art gallery, the artwork and the police are directly connected.

The digital transformation of the judiciary and the police is proceeding rather hesitantly because the legal situation for e-justice is unclear; e-ID alone is problematic. Video surveillance and facial and body recognition also raise further legal questions, for example about the limits of police surveillance.

For this reason, an unambiguous situation (theft of valuable art objects) is deliberately chosen for the free-play impulse, without touching on the issue of personal surveillance.

For particularly valuable, real or also digital objects (digital art), it is required that a digital twin[9,10] is created, so that an object can be restored and thus well secured.

With the futuristic microchip spray, the artwork is provided with digital properties in order to be located. Digital transformation can be found in the networking of the systems (art gallery and police) and in the automated triggering of the alarm. Children come up with these networked solutions as ICT specialists.

[9] Art (2019). Digital Twin What do you know about Industry 4.0? Presentation https://art.art/digital-twin/
[10] Eckhart, M. & Ekelhart, A. (2019). Digital Twins for Cyber-Physical Systems Security: State of the Art and Outlook. *Security and Quality in Cyber-Physical Systems Engineering.* 383-412. DOI 10.1007/978-3-030-25312-7_14

Online-Shop

Script for the introduction of free play

Roles: kindergarten teacher = mother or father; child = child

The kindergarten teacher plays the mother/father of the family and tells the child: *"Amazing, you've grown again! Your legs are suddenly much longer and your pants are too short. Your arms grew too! You need new clothes. But we won't make it into town until the shops close. Come on, let's surf the Internet."*

The mother/father takes the tablet and pretends to click on an app and enter a search term. *"There are lots of different clothes to choose from. But I have to make sure that I order you the right size. We don't want the pants to be too short or too long, or too wide or too tight! Oh dear, how do I know which pants fit you if you can't try them on?"* She finds the solution: *"Ah, the online shop solves the problem by first ordering a suit that scans your body measurements. The suit then sends the information to the online shop and the app shows us all the clothes in your size. That's great because we definitely won't need to return anything."*

The mother/father orders the suit, which is delivered in a box (e.g. from the service robot). The child puts the suit on. *"Now we have to connect the suit to the tablet."* The mother/father presses the sensor app in the list at the bottom of the tablet dummy. *"Great, now you're measured and the information is automatically forwarded to the online shop. All the clothes that fit you will now appear here. What do you think? What would you like? You definitely need a new pair of pants and a new sweater. What colour would you like for the pants and sweater? Now all I have to do is click order, pay, and we're done."* The mother/father types in the details on the tablet dummy and then submits the order. The employees of the online shop get the ordered clothes ready and ship them to the family by mail or in getting a service robot.

Material: Tablet dummy with background image "online shop", different clothes (for example available in kindergarten), and cardboard box for shipping.

Vocabulary: Internet, online shop, clothing size, sensor, app, scan, tablet

Further Impulses: The desired garment can be created by customers themselves. It is recorded on the tablet and sent to the online shop. With the help of the suit, the measurements are calculated and the desired garment is personalized and delivered.

The online shop creates the desired clothes or clothes for the role that the child likes to play (another person, an animal, an object).

In conjunction with the "Internet of Things" free play impulse: the online shop can offer food that the refrigerator orders (see Internet of Things free play impulse). This online shop can not only provide food, but also, based on previous orders, identify the family's preferences and provide new recipe ideas with the ordered food. A large screen listing various everyday products can act as the refrigerator's digital shopping list. Dots or numbers are drawn next to the products make clear how much of which products are needed. Thus, the child playing "online shop" can see which products need to be provided.

In conjunction with the" ICT center": The suit with the sensor measured incorrectly. The ICT center can correct the programming of the sensor via remote access.

The owner(s) of the online shop think about what new products they want to sell and whether they want to create them themselves or buy them from somewhere. How do they want to present their products on the Internet?

The employees of the online shop arrange for the family to evaluate the clothes they bought. This allows the online shop to be programmed further to know the family's preferences and suggest appropriate clothes.

Digital transformation for an "online-shop": The special thing about online shopping is that it can be done quickly and at any time. Companies also want to digitize and automate business processes. The latest developments go so far as to record the exact measurements when purchasing clothes, so that clothes can be bought to fit exactly. The aim is minimizing the large number of returns, as currently the same item of clothing is often ordered in different sizes.

Using a suit (body scan suit), body measurements are precisely determined at over 400 points and transmitted to the online shop. The computer determines the appropriate size using the information passed on by the suit. Customers are offered a selection of clothes fitting their measurements.

Food Laboratory

Script for the introduction of free play

Roles: kindergarten teacher = food chemist; child = food chemist

The kindergarten teacher is part of a team of food chemists and ICT specialists who work together in a lab to test and develop new foods and apps. The kindergarten teacher summons the team in the lab and says:

"We want to develop a program producing amazing cakes taking into account the allergies of all party-goers. The cake should also contain vitamins, be healthy and taste delicious. We need a sensor that uses fingerprints to detect whether a party-goer has allergies and what those allergies are. Then the machine will bake the right cake that everyone can eat."

The sensor is installed on the tablet. They test whether the sensor notices which allergies a person has. The tablet shows what composition of the cake is calculated. The team then plans a baking machine that automatically bakes the cake. Afterwards, the allergy sensor and the baking machine can be used for a party.

Material: Tablet dummy with background image "Food Lab", pens to sketch machine or invented cake, play-doh for continuation with 3D printer, microchip glue for continuation with Internet of Things.

Vocabulary: Food chemist, laboratory, allergy, sensor

Further Impulses: Data from the machine will be collected to see which are the most common allergies and which are the most popular cake recipes, measured by the number of cakes baked. To do this, the food chemists and ICT specialists must connect the cake machine with their laboratory. This will enable them to develop a cake that takes into account most allergies and is also very popular.

In conjunction with the free play pulse 3D printer, the cakes or other foods invented can be made with the 3D printer.

In conjunction with the free-play impulse Internet of Things, the refrigerator can be programmed to order only food that is suitable according to allergies.

If something does not go as planned, the ICT center can be contacted and asked for help.

Digital Transformation for „Food Lab": In the food industry, digital transformation means integrating analytics as well as adapting to new contexts. The best possible packaging of food is also a topic of digital transformation, with the aim of extending shelf life and monitoring it.

Possibilities imagined here are not yet a reality: a fingerprint scan cannot yet detect allergies today. Therefore, the topic of allergies should be taken seriously when playing this free play impulse. It should be emphasized how important it is to take allergies into account, and it can be mentioned how practical it would be if this could be done more easily in the future. Therefore, it is important to distinguish what the future can be, and how it is now: that it is necessary to ask exactly who has what allergies, and to check exactly what a cake contains. Thus, it becomes clear that the free play impulse is a wish for the future. At the same time, the free play impulse can raise awareness of the topic of food allergies.

Glossary

App: Apps are application software programs that are set up on a smartphone, tablet or computer, designed for a specific function. Apps are additional applications, they are not required for the operation of the system itself.

Digitization: Digitization describes, for example, procedures/processes in which analog media are digitized (converting handwritten text into a text file on the computer).

Digital Transformation: Digital transformation offers opportunities to bring people, data and processes together that would not exist without digitization, such as calculating the cheapest ticket at the end of the month.

Remote Access: Remote access or remote maintenance means that repairs and installations on a computer, robot or smart object are not carried out on site, but via the Internet using the remote maintenance software.

Gender-inclusive: Gender describes sex as a social category that is shaped by culturally transmitted ideas and stereotypes. Gender equitable means an approach, e.g. in teaching, that does not stereotype girls and boys (girls do not like technology, boys have a better spatial imagination), but consciously addresses everyone, thus being gender inclusive

GPS: Global navigation satellite system for position determination (Global Positioning System)

Hardware: Hardware can be defined as all technical components that make up the computer, tablet or smartphone. That means all parts that can be held in the hand. Consequently, in addition to the casing, this also includes all components that are built into the computer, tablet or smartphone. Printers, USB sticks and keyboards are also included.

ICT: information and communication technology

Internet: The Internet is a worldwide network of several million computers. The servers are connected via Internet service providers (ISPs), which manage (host) the information as Internet pages (homepages, blogs, shops, e-mail accounts, etc.) and make it available to visitors (users).

Internet of Things: Internet of Things refers to the technical development in which objects are independently connected via the Internet so that they can exchange data. The objects are equipped with microchips and sensors in order to respond to the environment and, for example, trigger orders, regulations or maintenance.

Microchip: A small, rectangular plate of semiconductor material on which billions of electronic components are mounted in an integrated circuit. Microchips have various functions, such as computation, control, storage or processing of analog and digital signals.

Network: A network consists of at least two computers (PC, smartphone, laptop, game console) that are connected or "networked" with each other.

Program: A (computer) program is part of the software of a computer, tablet or smartphone. With the help of (computer) programs, devices can perform tasks. It is based on a certain programming language that plays a sequence of instructions in order to be able to process and solve certain functions or tasks or problems with the help of a computer, tablet or smartphone.

Programming: Programming something on a computer, tablet or smartphone means giving instructions to a computer, tablet or smartphone. A computer-controlled system or similar is set up.

Robot: A programmable device that can perform specific tasks. Robots can be equipped with sensors that allow them to act and move "intelligently". A distinction is made between industrial robots (manufacturing products) and service robots (providing services).

Sensor: Sensors measure certain physical states (e.g. light) and transmit them as digital signals. Sensors increasingly include microchips and control processes in response to what is measured.

Software: Software includes all non-technical physical functional components of a computer, in particular computer programs but also the operating system (e.g. Windows) or stored data. Consequently, software is everything that cannot be touched.

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