

MANUAL FOR ILAB TRAINER

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CHAPTER 1 - DEFINITION

WHAT IS THE I-LAB?



THE CONCEPT OF THE I-LAB

The i-Lab is the innovation laboratory, a multi-modal educational environment dedicated to teamwork. It consists of an inspiring place, an innovatively arranged space conducive to creative thinking and problem solving, smart technology and specific moderation techniques. The i-Lab's *modus operandi* is based on the impact of the surrounding, the atmosphere perceived by many senses (sight, hearing, smell, touch, but also taste, temperature, balance or proprioception), moderation methods and the application of technical equipment dedicated to this method.

The goal of the i-Lab is to support participants of the educational process, triggering their creativity, facilitating access to information and taking into account ergonomic assumptions in communication with software and other users. It is suggested to use i-Labs in relaxation work for children with anxiety; work in groups aimed at improving cooperation and team building; for focus groups, start-up projects (to develop and commission); alternative learning methods, discussions, plan development; student projects, workshops developing new skills necessary to work with physically or mentally disabled persons or pupils with special needs.

The i-Lab's effectiveness stems from co-existence and overlapping of basic factors, necessary to be applied. These are: interior design and its surrounding characteristic for an i-lab, specific moderation activating session members, equipment dedicated to the i-Lab and the application of advanced technologies.



I-LAB'S SPACE

i-Lab contains space dedicated to work and relaxation space, combined in such a way that one can move freely within them. Suitably arranged user-friendly rooms are to give a sense of security while stimulating creative thinking. Factors affecting the human senses such as colour, sound, smell and thermal comfort are very important here. The interior design often draws on such references as a forest, spaceship, desert, etc. It happens that the i-Lab is also assigned an external space closely connected to the interior. The external and internal spaces are to form a whole designed for the same type of work.

Although the i-Lab does not have any scientific features, the arrangement of its space can draw on the experience of shaping academic laboratories, research and development (R&D) type spaces, or macro-spaces used for the production of physical subjects. The i-Lab is designed to build communities, even if short-lived, around ideas (Medialab MIT) To sum up, the i-Lab space should be open, modular, dispersed, non-hierarchical, inviting to interaction, conducive to the desired types of interaction, but not imposing specific attitudes, but only facilitating them.

MODERATOR'S ROLE

The role of the moderator is crucial for the i-Lab. The moderator (faciliator) is in charge of preparing and running a session. Proper session preparation is a starting point for the session

success. Apart from knowing the i-Lab method as well as the techniques and methods used in it, the Moderator has to have fundamental knowledge about the topic covered by the topic of the meeting. He is required to familiarise himself with the characteristics of the group. He has to plan the session in detail, including its length, thematic division, arranging impulses, giving only a small margin for improvisation. A well-prepared session should guarantee success.

The techniques used by the moderator to demonstrate the process of interpersonal communication depend on the specificity of the i-Lab and must be adapted to the needs of a specific group of participants. The two basic techniques used during the session are the following: “brain storm” and “Icebreakers”. A „brain storm” is used with the application of VirtualBrainstorm (VBS) software. “ There are many techniques within this method, e.g. “swapping of own qualities”, role-playing, mental map, SWAT analysis or a flipped situation.” “Iceblockers” is a method used AT the beginning of classes in order to introduce the participants, create interactions between them, suitable for a given situation and relax the atmosphere. It is the friendly, but favourable working atmosphere during the session that is an important element of the i-Lab method.

The moderator must act as an animator, and therefore has the skills necessary to animate the classes. At the same time, he is required to have the qualifications of a technical assistant needed to perform his tasks related to the animation process, and to support session participants in matters concerning the use of information technology. The moderator's skills and knowledge serve both the work carried out during the session and the prior preparation of equipment intended for the given tasks. The moderator is responsible for the entire session, including proper functioning of the technical setting; the appropriate skills can be developed through appropriate training.

TECHNOLOGIES

An indispensable element of building the i-lab session is the use of information technology. Activities carried out by session participants and the moderator are supported by VBS software. It enables operation in different modes ensuring both anonymity of work and sharing of ideas. It is easily adaptable to the session participants and to the needs of the thematic content. Access to VBS is provided via the Internet, through a browser, in a way that does not require software installation on the server.

The principle of the i-Lab operation is to build continuity so that each successive team can build on the experience of its predecessors (knowledge bases, know-how, expert systems, data) (Medialab MIT). It is extremely important to constantly iterate prototyping and testing, playing with the subject, thinking subversively, playing with the existing patterns (Copenhagen Game Lab), opening up users to new ways of interaction and visualization, going out of the existing paradigms of presentation and knowledge transfer ("death by powerpoint" syndrome).

Yet, the interactive, immersive nature of working with new technologies is equally important. According to the idea of Media Archeology Lab, in order to solve a problem you have to "touch" it. Thus, in the i-Lab, it is practiced to interact with objects, touch things, manipulate, the physical, somatic, tactile nature of interaction and simulation: games, dramas, virtual reality, extended reality, narrations (Augmented Environments Lab).

I-LAB. CASE STUDY

i-Labs serve to conduct training and joint research, to solve problems, to test and create ideas, to shape innovation, and finally, to exchange skills and experience or to provide support only. There are already many such solutions in the world, which have many common features but differ from one another.

AUGMENTED ENVIRONMENTS LAB, GEORGIA TECH USA

The laboratory was established in 1998 and deals with issues related to the concept of the Augmented Environment. The philosophy of the Augmented Environments Lab states that watching, modifying, sometimes hacking, or even spoiling interesting objects is the key to discovering new things and it enables you to take a fresh look and discover things that have been previously unknown.



BROWN UNIVERSITY IN PITTSBURGH USA, THE YURT IN THE CENTER FOR COMPUTATION AND VISUALIZATION

YURT is an innovative experimental space consisting of a system of 69 full HD projectors displaying the image on a system of 145 mirrors projecting it further on the wall of the cylinder, which is the interior of the room. The whole package includes operator's tracking systems (trackers) and manipulators allowing interaction with virtual objects. The result is a 360-degree immersion "cave" in which various tests can be conducted. Starting with data visualization, through simulations, training presentations, etc. YURT is an example of how the "interface effect" works. The created space become a separate quality not only at the level of user experience (UX, user experience), but can itself be a key opening alternative ways of thinking about objects, places or structures. The CAVE-type interface does not cut off the user from interaction with other people in the room. YURT can be used by whole groups, but one person controls the interaction.

COPENHAGEN GAME LAB

This is where gaming research is conducted. The laboratory puts emphasis on creating and researching games in a practical perspective. It is more about people than about space and creating solutions or simulations of them. Game Lab works in the field of analogue educational games such as: board games, simulation games, based on the assumption that one learns best through their own experience: "learning by doing".

THE MEDIA ARCHEOLOGY LAB, BOULDER USA

The Media Archeology Lab proposes an action based on an archaeological attempt to understand how media work and what media are. The laboratory has over one hundred historical, working computer devices that we can test, use, program and try to understand. The essence of this idea is to return to physical devices, which are supposed to foster creativity and analytical thinking.

MIT MEDIA LAB

The school of architecture and urban planning operating at the Massachusetts Institute of Technology, specializing in technological and multimedia innovations, created the Media Lab. MIT Media lab was established in 1985 by a media expert, technology philosopher, innovator, Nicholas Negroponte. It is a powerful institution, comparable in terms of its structure and operation to what functions as a faculty at universities. The MIT Media Lab can boast about a large number of patented inventions as well as implemented solutions and unusual ideas. The Media Lab space is open. You can work here and discuss, exchange ideas, do things seemingly or actually not directly related to scientific research. Mixing of people, ideas, environments and specialties is specifically planned here. It is impossible to function in the lab in isolation from the rest of the scientific community.



iLab at the Faculty of Psychology, Palacký University in Olomouc was established in 2016 within the frameworks of the “Erasmus +” project. The implementation of the new laboratory, thanks to the international cooperation of teams and specialists from the Czech Republic, Germany, Poland and Sicily took over a year. In addition to the available iLab devices, such as notebooks, data projectors, writing boards and washable wall paintings, the lab also makes it possible to work with Virtual Brainstorm (VBS) software. Working with this software supports participants of training programs in more effective work and group cooperation. The i-Lab environment has been recognized as relaxing, creative, interesting, and with a good atmosphere.



I-LABS IN POLAND

One of the first events in Poland that heralded the establishment of institutions and centres within the meaning of the i-Lab was the **Chrzelice Medialab** organized within the Culture 2.0 project in 2010. Other places operating to some extent under this formula are: NINA, or National Audiovisual Institute (currently combined with the National Film Archive as **FINA**),

LaCH - Digital Humanities Laboratory at the Warsaw University, **MediaLab Katowice, WRO Art Centre**. In Kraków, there are the so-called „garages”:



LifeScience Garage – a Bio.Hacker.Space undertaking, which meets the expectations of Do-It-Yourself (DIY) circles, created by enthusiasts of natural and medical sciences, **Complexity Garage** – a place which enables work on interdisciplinary projects called an academic makerspace. In 2015, in Kraków, Eurokreator company created the **iLAB Plus Eurokreator**, being an innovative training environment adapted technologically and ergonomically to work over creative solutions. New technologies in the iLAB aim at facilitating training processes, providing evidence of teaching effectiveness and enabling objective teaching evaluation. An important role in the space is played by removing barriers (chairs, traditional tables, etc.), which in the didactic process constitute a kind of interpersonal communication blocker. Training sessions in the iLab PLUS model assume cooperation between the participants, require joint analysis of the problem generating feedback and assume an element of relaxation during the session. „Childhood props" are meant to activate the imagination. The iLab PLUS design was inspired by nature. The interior floor is green grass, a specific microclimate is used, which is formed by plants or natural moss covering the wall, and directly from the iLab you can go out onto the terrace, which is an extension of the interior. Technologies have a great potential here, but they play only a supporting role and do not overwhelm the natural environment.

PRINCIPLES OF ERGONOMICS IN OFFICE SPACE DESIGN

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Standard office work, performed in a sitting position, is very burdensome for the body. Long working hours at the computer can cause health problems. This work is very often monotonous and, in the long run, causes fatigue and reduced commitment to doing it properly. In order to counteract these unfavourable factors, a space designed in accordance with ergonomic principles is required. These principles are designed to create or improve comfortable working conditions, to adapt workstations to the specifics of the profession and the capabilities of the employee, to adapt work tools to perform it safely and comfortably, to achieve better worker performance, to reduce errors, and to ensure adequate occupational hygiene and safety. It is therefore very important, for example, to equip offices with tables and chairs that can be adjusted to relieve the strain on the musculoskeletal system. The workplace must have access to fresh air and daylight. It is good to arrange the tables perpendicularly to the window, not in parallel. Each office room should be equipped with document cabinets in order to reduce the number of documents within the working area. A separate place for breaks and meals should also be provided. Another example of an ergonomic approach can be ensuring appropriate thermal conditions. That is why air conditioning is installed in the offices and rooms are well ventilated. Ergonomics in the office should help to combat routine and reduce stress, help to maintain concentration for longer, e.g. by reducing noise levels.

I-LAB AS A PLACE FOR CREATIVE OFFICE WORK

The standard type of office is conducive to rapid professional burnout. A modern space for team and individual work is the i-Lab (Innovation Laboratory). Properly designed, flexible space, variety of equipment allows for frequent changes of place and adapting it to one's own needs. The I-Lab is an inspiring, innovative solution, designed to move employees from their

daily environment to an extraordinary space conducive to creative thinking and problem-solving. The laboratory is also used in the processes of vocational education and training and work on the development strategy of companies. This place is distinguished by the coexistence and permeation of three elements: an inspiring environment, the presence of multiple technologies used during a session, software for recording submitted ideas and a moderator who guides the work process of the participants. Thanks to special software, the participant can remain anonymous and share ideas about a given topic in an unrestricted way.

A special kind of labs are places where creative people can meet and act. Most frequently these are the following kinds of spaces: hacker-space (maker-space), laby DIY (do-it-yourself) labs or the so-called "garages." These places are characterised by openness and they are oriented towards creativity. A hacker-space or a hackspace, frequently also called a hacklab, a makerspace or a creative space is a place where people with common interests, most often IT, scientific or digital or electronic art-related, meet and cooperate and can use equipment that is not available to them elsewhere. "Garages", Exploratoria, Tinkerplaces, Skunklabs are spaces whose origins go back to the American tradition of "garage" workshops, where - according to Silicon Valley mythology - the largest IT projects were to be born in the second half of the 20th century. Nowadays, "garages" are usually well equipped laboratories, which in the past only borrowed the ideology of unrestrained operation on objects and scientific creativity.

The success of the i-Lab depends on a friendly space intended to allow the participant to get out of work. In order to make participation in the training process effective, one has to exclude himself/herself from "thinking about work". Sensory elements in such space make us feel better and absorb faster. The I-lab can have a specific microclimate, which is formed by e.g. living plants, gentle sounds of nature and special aromas, the selection of which is not a matter of chance and which affect the process efficiency. These elements have a fundamental impact on people staying here - from relaxation to quicker memorising.

Digital technology and the necessary IT equipment, inseparable from the i-Labs form an integral part of all training programmes. Furniture can be used flexibly, i.e. desks, chairs, pouffes, deckchairs, swings, etc. It can be moved, brought in, or taken out according to the needs of a particular session. Good lighting and ventilation of rooms is extremely important. A training group of up to fifteen persons is specified as the ideal number.

CHAPTER 2 - ARCHITECTURAL GUIDELINES

PROPORTIONS AND HARMONISATION

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PROPORTIONS

Interior design is based on proportions juggling. Elements of equipment, detail, colour and light are to constitute a harmonious work of art. The assumptions of the so-called divine proportion, i.e. the golden division known since antiquity, which still function today, consist in determining specific relationships between the length of the longer and shorter side of the rectangle.

The author of the canon of proportions of the human body based on Greek or even Egyptian concepts is Vitruvius. In his work he gives the human body as a model to be used by designers and proves that nature has shaped man in a perfect way, because there are certain relationships between the sizes of individual body parts. The height of the face from the tip of the chin to the root portion of the hair has become the most important module. A comparable dimension is the length of the hand measured from the wrist to the tip of the middle finger. Vitruvius also noted the relationship between the human body and the geometric figures of a circle and a square. He considered the module, which enables to determine the ideal

proportions between the parts of a work of art and its entirety, to be fundamental for all artistic and architectural compositions. The work created according to these rules is characterized by harmony, order and rhythm. The well-known drawing by Leonardo da Vinci depicts two superimposed human body postures, while the circle and the square intersect each other.

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Proportions in building artistic or architectural compositions were sometimes treated very literally. For instance, Villard Honnecourd in the 13th century showed the relationship between the projection of the church and the figure of the sleeping apostle, whereas Giorgio Vasari in the 16th century compared the facade of the church to the drawing of a human face. In the Renaissance, it was recognized that the measure of all things is the human being. Giacomo Barozzi da Vignola and Andrea Palladio were looking for the ideal module for composition. Some of the most important canons of proportion are those of Albrecht Dürer, who took human height as the basis of measurements, Alfred Zeising, who based the canon of proportion of the human body on the principle of golden division, and Le Corbusier, who also used the principle of golden division in his famous Modulor. It was Le Corbusier who, by proposing the typification of furniture and home appliances, became the forerunner of interdisciplinary science based on anthropometric measurements, which is ergonomics. Both anthropometry and canons of human proportions are two-dimensional. Meanwhile, today, using laser scanners, it is already possible to obtain data in three dimensions, which show significant individual differences between people, which has a significant impact on establishing proportions.

By adjusting proportions to the user, place, situation, the rules of composition are applied and one operates an illusion. The colour, light and texture are used. For example, by painting the long walls of the room in a light colour, and the gable wall in a dark colour, we obtain the effect of widening the interior. If we paint the opposite way, we will get the effect of a long corridor. If the ceiling is light and vertical stripes appear on the walls, the room will appear taller, while too high a room will be lowered, e.g. by means of a suspended ceiling or horizontal division on the walls. A ceiling painted darker than the walls will lower the room, while a white ceiling in combination with walls painted darker will seem to be further away from the floor. In a narrow room, furniture should not be placed only along the longer side, as this increases the effect of its length and tightness. The size of the furniture is also important. Smaller

furniture should be chosen for a smaller interior. In a large room it can be larger, but one should remember that the excess of furniture and accessories makes the room smaller, tighter and less comfortable. Light colour and reflective light can optically enlarge the room, while saturated colours and patterns will reduce it. Small rooms painted in a uniformly light colour seem to be larger, as corners and wall connections are no longer visible. A large number of light points gives the space a multidimensional character.

MODERATION AND HARMONY

Successful interior design requires a precise definition of the user's needs and adjustment to spatial possibilities. Natural light plays an important role in space shaping. Large-format windows make the room appear larger than it really is. However, if there is no room for large windows, smaller ones can be used successfully, allowing them to be left uncovered during the day and not using heavy curtains or blinds. Properly selected colors are important for our well-being. Their selection should be based on the sense of aesthetics of the user, the function of the room and the impression that a given colour evokes. The safest color is white that matches everything. White rooms look more spacious and clean. Reaching for different shades of white, one can break down any boredom that might creep in. We use warm colours if we want to achieve a cosy effect. Thanks to appropriately selected colours you can achieve a specific character of the interior - e.g. bottle green or burgundy will give it depth, elegance and mystery. However, colours such as violet, orange or red can be too overwhelming.

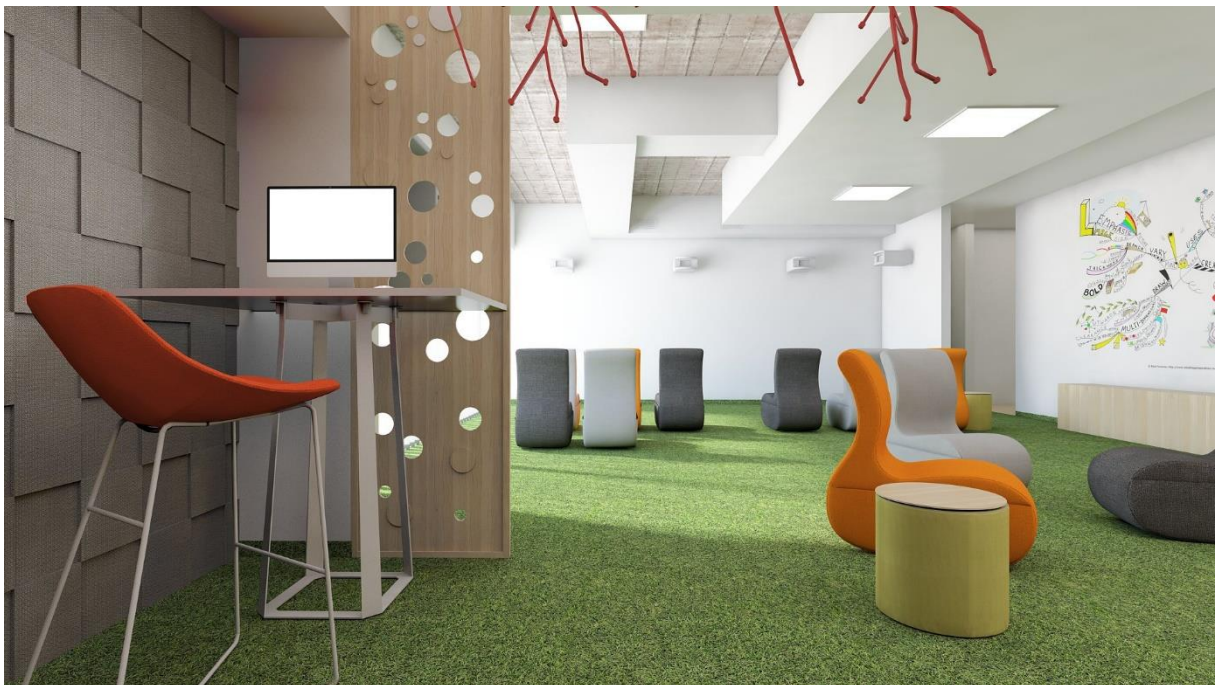
When arranging interiors, one cannot forget about the background, which often plays a decisive role in the composition. A calm background contributes to the use of accents in the interior, e.g. an accent in the form of one wall in a different colour or texture. Such a wall is an eye-catcher, so in a sense it invites you to take advantage of an important function worth emphasizing. Another element that stands out from the background may also be an accent, e.g. a distinctive piece of furniture, colourful pillows, a painting or a poster.

The composition of the interior is largely dependent on the rhythm of the elements, patterns or colours. The rhythm serves to prevent visual chaos. The maintenance of order, harmony and order is helped by using repetitive accents, e.g. cushions, frames, candles. However, an excessive accumulation of repetitive elements will make the whole room seem illegible and

overloaded. It is also possible to use several elements interchangeably, while at the same time ordering and diversifying the space, or use gradation, i.e. introducing the same element in only a few sizes or colours. The interior can also be enlivened by introducing formal and colour contrasts. But a lot of moderation is desirable here. The accumulation of colours, textures, equipment gives the impression of disorder and anxiety, so it is extremely important to maintain balance when arranging interiors. The space can be organized around a selected central point on which we focus our attention, e.g. a meeting and conversation centre in the form of a table. The principle of order and harmony is consistent, uniform aesthetics and symmetry. However, in order to achieve the effect of variety, symmetry should be broken down.

Every interior designed for work must be functional. In the arrangement, attention should be paid to the principles of ergonomics, ensuring comfort as well as an appropriate amount of free space and individual character.

CREATIVE INTERIORS



SPECIFICITY OF WORK

The designing of spaces for creative work must result from the specifics of such work. A

number of factors are superimposed here, which make up the full picture of the specificity of creative work. Most often it is a sitting job, but not necessarily in one place. This work is performed in different dimensions and modes. Sometimes it is group, sometimes individual. Working time is flexible. The identified needs of employees predestined for creative work include providing them with the opportunity to work in different places, e.g. open-space desks or individual quiet work rooms, but also conference rooms, meeting rooms for large and small groups. The basis here is, of course, the principles of ergonomics: a comfortable, fitting seat, large desks, sit & stand desks as well as good natural and artificial light. It is necessary to separate work areas from communication routes and to provide communication areas for the team, i.e. informal meeting places, rest and entertainment areas, kitchens and dining areas.

CASE STUDIES

THE HEAD OFFICE OF FACEBOOK

It is located in Palo Alto, California, and was established in 2011. The usable area of the premises is 13 940.0 sq. m. The author of the design is **studio o+a**. The basic assumptions of the design are the following:

- work and leisure areas permeate each other
- meeting places are arranged in a minimalist style
- quiet formal meetings room
- industrial-style dining space
- setting up desks in the open space
- a place to relax, which can also be a place of work
- industrial character of the interior
- installations as a decorative element
- vivid wall colours highlighting the installations on the ceiling
- multifunctional rooms
- no designated division into places to work and places to relax

- very large spaces that can be walked around in different ways
- uniform artificial lighting, which is in a way an element of an artistic installation
- variety of materials
- in open space areas, carpeting was used
- the communication routes are finished with impregnated concrete

THE HEAD OFFICE OF GOOGLE

It is located in Dublin, in the Google Docks buildings, Gaswork House, Gordon House, One Grand Canal. Its floor space is 47 000.0 sq. m. It was created in 2013 according to the design of Camenzing Evolution and Henry J. Lyons Architects. Basic assumptions of the interior design are as follows:

- the theme spaces are inspired by vegetation
- a restaurant providing free meals to employees
- comfortable workplaces in different modes
- a music hall and a restaurant inspired by the colours of autumn
- meeting rooms with terrace seats
- office workspaces associated with recreational areas

THE HEAD OFFICE OF ONET PORTAL

It is located in Krakow in the Alma Tower office building. Its floor space is 4500.0 sq.m. The implementation according to the design of Mocolocco ok took place in 2014. The basic assumptions of the interior design are the following:

- a place designated for leisure and informal meetings
- wall composition referring to the element of water
- a formal meeting room inspired by the element of water
- interiors designed to stimulate creativity

- vivid colours influencing the work dynamics
- colours referring to the elements (analogy also to types of temperaments)
- everyone can find the right workplace for themselves
- there are conference rooms, rooms for group work and for quiet work
- the use of unusual thematic decorations (e.g. a room with umbrellas) enhances the place's individuality
- installations visible on the ceiling which form an element of decoration and give an industrial character
- use of suspended acoustic screens
- use of materials with different textures

THE HEAD OFFICE OF JLL

It is located in Warsaw, the Warsaw Spire, and has a usable area of 4485.0 m². It was developed in 2016 according to the design of Tétris Poland studio. The basic assumptions of the interior design are as follows:

- a quiet formal meeting room
- a room which is supposed to evoke associations with the forest
- wall installation creating a formally interesting dominant feature of the room and giving it character
- the use of artificial greenery on the wall to soothe the nervous system
- earth-coloured carpeting creating a cosy atmosphere
- a table as the main furniture in the room made of solid wood and compatible with the wall installation
- subdued lighting
- kitchenette with dining area
- creating spatial and technological solutions that are favourable to working conditions

- adaptation to the individual needs of employees
- creating work zones for large teams as well as individual work in full concentration
- mobility of equipment
- use of vivid colours only as additives (seats, lamps, baskets)
- use of floor coverings which give interiors a home feel
- use of suspended soundproofing screens

THE HEAD OFFICE OF OPERA

It is located in Wrocław, in tenement houses from the nineteenth and twentieth centuries, with the usable area is 4500.0 sq. m. It was completed in 2016 according to the design of the model:lina. studio. the basic assumptions of the interior design are the following:

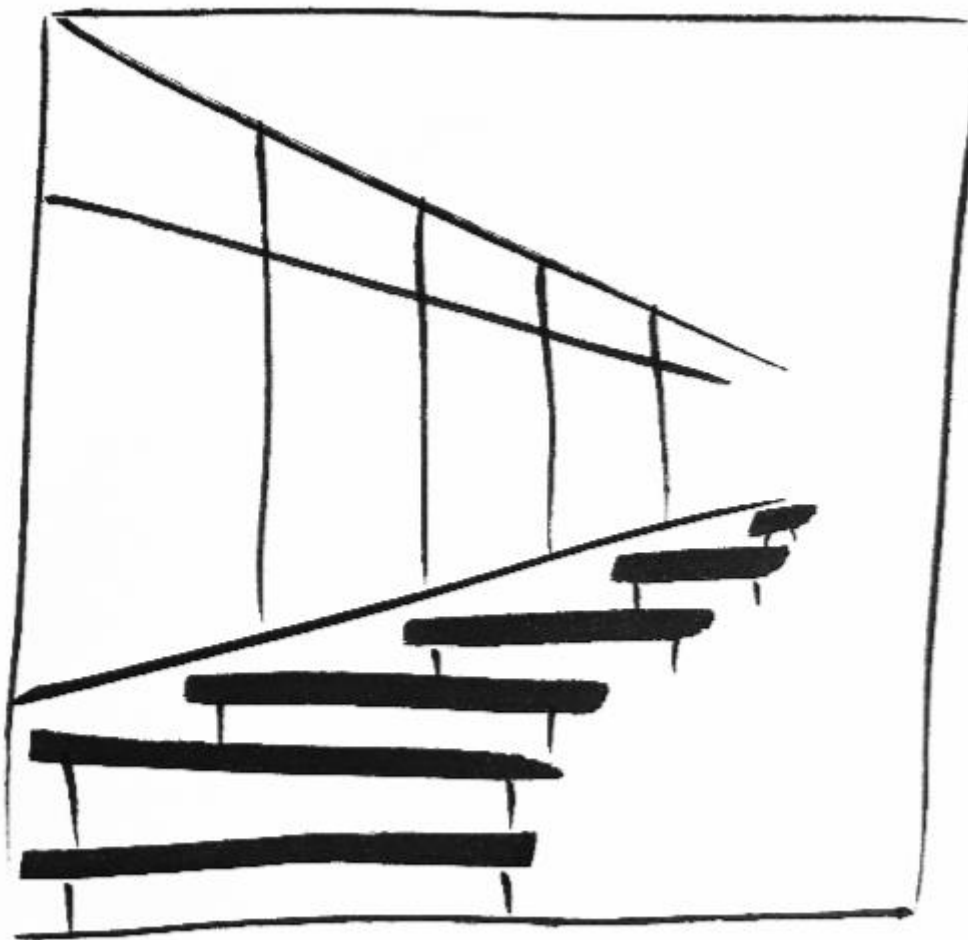
- arrangement of the office part inspired by Wrocław bridges
- kitchen decoration inspired by the Market Hall in Wrocław and the Main Railway Station hall
- office space - desks designed in a way that raises associations with bridges
- wall and table in the formal meeting room lined with diskettes
- in the formal meeting room, the wall installation resembles a computer mainboard
- in the formal meeting room, room walls lined with computer keyboards

THE HEAD OFFICE OF AIRBNB

It is located in San Francisco, 999 Brannan building and has a usable area of 14000.0 sq. m. It was completed in 2017 according to the design of the Airbnb Environments Team, WRNS Studio. The basic assumptions of the interior design are the following:

- building façade designed to let as much light as possible into the interior
- a "castle" made of wooden vertical strips creates a formal centre of public space

- the passage to the so-called "castle" is emphasized by a strong shade of blue
- „The Boat” - a place of secluded work in quiet recesses, located on the top of the "castle"



ARCHITECTURAL BARRIERS AND THEIR REMOVAL

According to the applicable regulations, architectural barriers are all obstacles occurring in a building and its immediate vicinity, which, due to technical and structural solutions or conditions of use, prevent or restrict freedom of movement for people with disabilities. These can be curbs, stairs, thresholds, too narrow passages, etc. The structure of the society and current trends indicate that each year there will be an increase in the number of elderly

people, who will be less fit and need support in overcoming architectural barriers. A disability itself should not exclude people from social life, but, unfortunately, architectural barriers can make it more difficult for them. It is therefore best to eliminate these barriers.

ASSESSMENT OF THE WORKPLACE FOR PEOPLE WITH DISABILITIES.

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The assessment of the possibility of employing a disabled employee consists of an analysis of the job position and determination of the existence or absence of health contraindications to employment or continuation of work at a particular position. The analysis of the workplace is a key element and must take into account: the system of work (shifts, including work at night, business trips, field work), the time and frequency of performing the main tasks (while paying attention to the activities performed, e.g. lifting, turning, sitting down, standing, walking, carrying), the type of equipment and materials used by the employee, working conditions and associated risks, location of the workplace and a communication route to the position, the characteristics of the social and health facilities, required qualifications and skills.

The most common architectural barriers in the workplace are too narrow doors, entrances and corridors, too small areas of sanitary and hygienic premises, differences in levels, i.e. stairs and steps, inadequate or missing lifts as well as insufficient sound and visual information. However, it must be remembered that we are dealing with different forms of disability. Physical disabilities are: motor, visual, or auditory. There are also mental-psychological and other disabilities. The workstations are adapted to different types of disability.

BARRIER-FREE JOB CREATION.

People with visual impairments can work in many professions and have opportunities to work in many positions. The opportunities depend on the degree of damage to the organ of sight, but also on intellectual abilities, personality and character. The workplace for the visually impaired and the blind should be shaped according to certain rules. Information read

by the sense of touch must be provided at the entrance, which is necessary for these people. Floor surfaces should have different textures for better orientation. Sound generators are intended to help blind persons to locate themselves quickly within the space and to provide information on the location of rooms. In a working room, the distances between walls and furniture should be precisely set, with a wide door, preferably sliding, with a hidden handle, which prevents collision. Safety and freedom of movement are affected by the constant and unchanging arrangement of furniture, equipment, objects as well as their construction and marking. The door and equipment should be marked in Braille. Doors in cabinets should be sliding or self-closing, shelves should extend in a rotatable way. Thresholds and differences in floor height must be eliminated. The floor must be non-slip. The desk in the shape of a croissant enables you to place things necessary within reach of your hands. Additional space must be provided for storing objects and materials which are necessary for work of the blind and visually impaired persons.

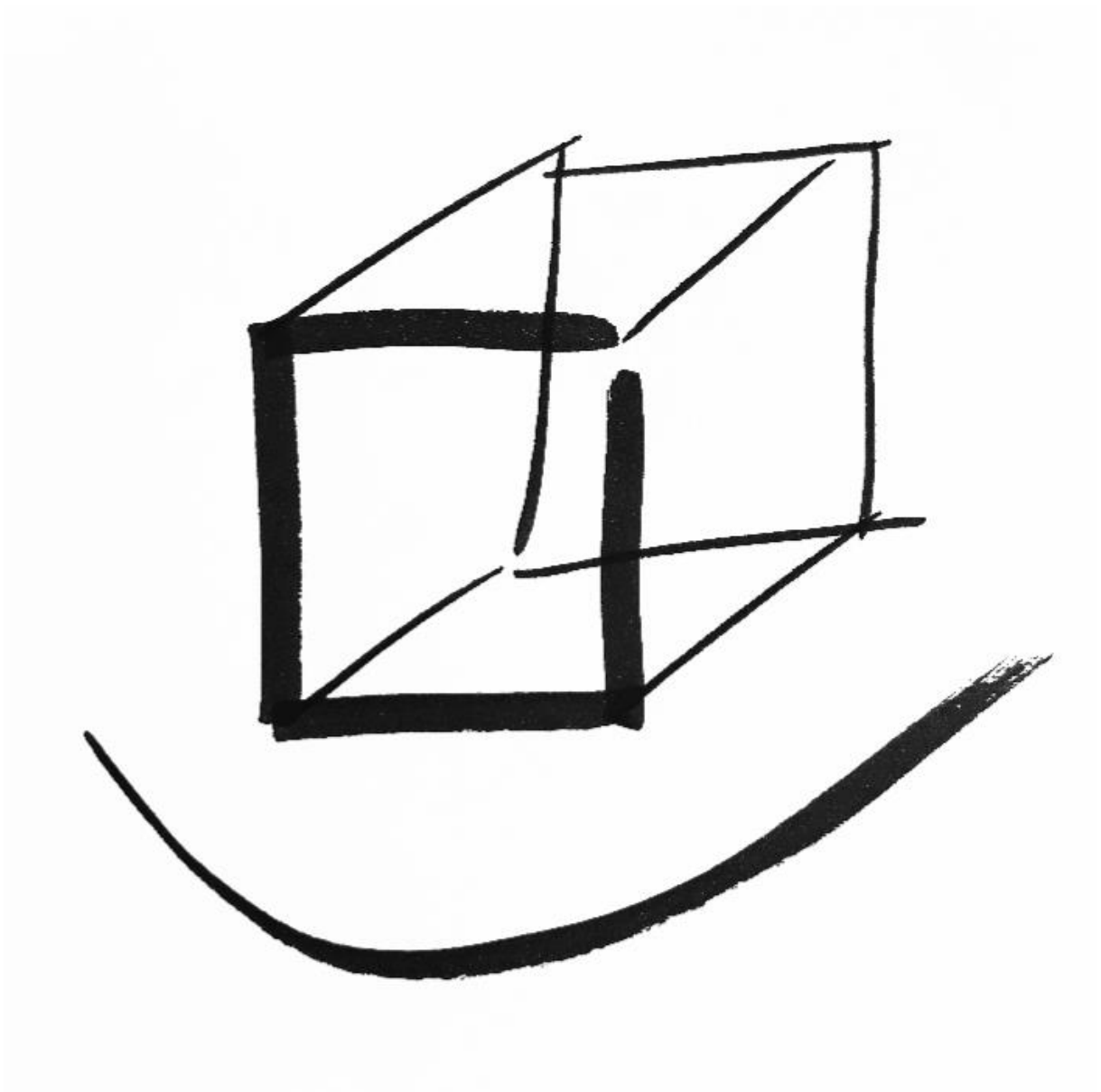
In most cases, employment of persons with hearing impairment does not require special adjustments in the workplace. However, there are principles which, when applied in preparing the workplace for people with this type of disability, can help and contribute to increased working comfort and safety. It is therefore recommended to use light alarms that work in combination with audible signals. To notify a deaf person of an imminent danger, a partner alarm system should be introduced. It consists of two employees working in a pair to monitor their work and help each other. It is important to review safety procedures in the presence of a deaf employee. The deaf person should be clearly informed about emergency exits, alarms, fire extinguishers, and potential risk factors as well as be able to communicate via text messages (SMS) or beepers. It is advisable to employ more deaf people assisted by a mentor. The workstation of a deaf person should be well illuminated. Deaf people working together must be able to communicate freely in sign language, which is facilitated by an open space enabling them to see one another. Organisational order, clear and understandable procedures ensure good and efficient work of deaf people. Training materials should be prepared in the form of presentations, films or interactive boards. For fast and comfortable communication of employees, the workstation of persons with hearing disabilities should be equipped with notebooks, computers, tablets, telephones with applications enabling communication.

Flexibility and innovation in creating solutions to help employees use their skills and abilities is key to job creation.

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The group of disabilities, which is defined as loco-motor system impairment, includes, among others, dysfunctions resulting from amputation, deformations, rheumatic diseases, and spinal cord injuries. The characteristics of these dysfunctions result in different forms of workplace organisation. When creating a workstation for a person in a wheelchair, it should be remembered that the work tools should be within reach of the hands, i.e. 0.5 - 0.8 m horizontally and 1.5 m vertically. The width of passageways must not be less than 1.5 m and that of doors must not be less than 0.9 m. The ramps for trolleys should be 1.2 m wide, the maximum height of the thresholds should not exceed 20 mm. The doors should be opened by swinging or sliding doors. If the workplace is located on the first floor, the building has to be equipped with an elevator, lift or stair climbing wheelchair. The correct dimensions and percentage of the slope of the slipway, which are precisely defined by the relevant regulations, are very important. Access to sanitary facilities, which must not be less than 1.5 m x 1.5 m in size, must be fast, convenient and collision-free. Sanitary facilities must be equipped with handles to allow access to the wash basin and toilet bowl. An armchair for employees with spinal disorders should be equipped with armrests, headrest and lumbar point adjustment. The employee must have permanent access to the necessary equipment and utensils, without having to lean back.

Other types of disability also require careful consideration of the resulting employees' needs and attempts to eliminate barriers.



SPACE FOR TEAMWORK

WORKING GROUP

A working group is any number of people who see themselves as a group, interact with each other, share a common goal and interdependence in achieving it, demonstrate the ability to interact. Working teams are groups of employees appointed on a permanent or temporary basis to perform individual tasks. Working groups are characterized by:

the way they participate in the group and make decisions, communication methods, professional or personal cohesion, team climate, specific attitudes and behaviours, patterns from which they draw, organisational structure and working methods. Teams take on different structures due to many factors. The isomorphic structure occurs when the effect of the group is to create a single product. In the expert structure each member of the group performs tasks for which he or she has sufficient qualifications. A collective structure can occur when the qualifications of the team members are similar and the team members solve a specific problem together. In a surgical structure, each employee has his or her own tasks in which he or she specializes. Team members are selected according to specific criteria so that their qualifications complement each other. The roles of particular team members can therefore be distinguished. The initiator in the group sets goals and identifies problems. The searchers collect data relevant to solving the problem, opinions and interpretations of data. The analyst deals with data processing, tries to draw conclusions from the data and predict the consequences. The coordinator orders and presents achievements. The coordinator determines the appropriate course of work, the critic assesses the proposed solutions. When it is necessary to stimulate the group to work more actively, the activator becomes involved, the procedural technician supervises the performance of routine activities, and the recorder registers and stores data. Each team member often performs more than one role. The division of roles is not fixed.

It is essential to organise the work of the team, i.e. its formation, division of roles, normalization and work.

GOAL OF THE WORKING GROUP AND THE ROLE OF ITS MEMBERS

The working teams have a common goal and the individual tasks of the employees influence its implementation, which is assessed on the basis of the whole team's performance. The goal should be defined in detail, which makes the employees perform their tasks with greater commitment. The objective also has to be measurable, common, known to all members of the team, meaningful for employees, related to the vision and mission of the company. Clearly

defined responsibilities reduce the stress levels of team members and create bonds between them.

Clearly defined employee roles are very important for the efficient use of working time. When the roles of individual team members are not clearly defined, this leads to a situation in which they spend a significant part of their working time on clarifying and explaining individual tasks. Therefore, roles, responsibilities and competences should be clearly defined in a working team. Team members must know the reason for the creation of their position. Employees, understanding their roles and having both their responsibilities and privileges, work more efficiently and their behaviour is predictable.

PLACE OF TEAMWORK

A place for teamwork must guarantee free exchange of knowledge and the development of innovation. Increasingly, loft, industrial or i-lab spaces are used for such work. Such places should be multifunctional and flexible, and quickly adaptable to the employees' needs. To make maximum use of the available space, you can use a furniture system that is easy to configure and reposition in any way you like. A well-organized workspace helps to build the culture of the organization from scratch and to develop its unique character. For the work environment to be conducive to the creative and more effective operation of the team, it is always necessary to take a closer look at its needs and analyze how employees feel in the space where they work many hours.

The method of work of the mentioned i-Lab uses the influence of the environment perceived by the senses of sight, hearing, smell, touch, but also taste, temperature, balance, etc., way of moderation and special technical equipment dedicated to it.

Organization of the i-Lab space is to help the participants of the educational process to trigger their creativity, to facilitate access to information and to take into account the principles of ergonomics. A characteristic design of the interior and its surroundings is permeated in the i-Lab with specific moderation activating session members, specialized equipment and use of advanced technologies. The work and relaxation space is to be connected in a way which enables the free movement. Comfortable, user-friendly premises are to give the employees

a sense of security and encourage creative thinking. Colour, sound, smell, thermal comfort are of great importance in shaping the place for such teamwork.

The arrangement of the i-Lab space can draw on the experience of creating academic laboratories, Research and Development spaces, or Maker-Space spaces to build communities. The i-Lab space should be open, flexible, modular, dispersed, conducive to interaction, facilitating the formation of specific attitudes required in a given job.



INDIVIDUAL WORK

SPECIFICITY.

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Individual work does not involve a multitude of ideas or a diversity of talents, which makes it possible to allocate tasks that are based on employees' competences. It is impossible to share ideas. There is also no collective responsibility. However, individual work has other benefits. When one works on one's own, conflicts are avoided, which can be generated by teamwork. We deal with personal responsibility, but also with the possibility of personal assignment of all merits related to the job. Individuals working independently can set their own speed of work and are not dependent on the commitment and speed of work and the organisation of other persons. They can make decisions and use the methods they choose to solve tasks. Individual work often complements teamwork and it is necessary for these two types of work to coexist, so the spaces dedicated to them must be arranged as a whole.

INDIVIDUAL WORK ZONES

The ability to choose where and how to work has a significant impact the well-being and quality of work. The employee, working in a friendly environment, can focus on what is important and work efficiently. An individual workplace can be organised in a separate room, but also in the open space. It is important that such space is conducive to individual work, characterised by the need to ensure a high level of concentration. Therefore, it is not allowed to talk or make telephone calls there. They may only be permitted if circumstances so require. There is a large selection of desks in the open space, so one can decide where to sit concentration at work is needed. In such a space one can talk in a low voice or make a short telephone call. When a group of people work in an open space and want to work closely together, their desks can be connected to one another to form islands.

However, the most comfortable for individual work is our own daily workspace, which we do not have to share with other employees. It should be equipped with a desk, a swivel chair and a cabinet for storing items necessary for work and personal belongings. It must

be quiet, with a relaxation zone. It is designed for one person, its arrangement is to help gain strength and energy. One can spend a break in it, listen to music, read or calm down. Such workplaces are primarily dedicated to managers. Thus it has a representative function, as formal meetings and reception of important guests require appropriate setting. The interior design should indicate the profile of the company and reflect its prestige. It should form a coherent whole and be characterized by high standard. Ergonomic furniture, giving the possibility of perfect work organization, should be characterized by elegance and high quality.

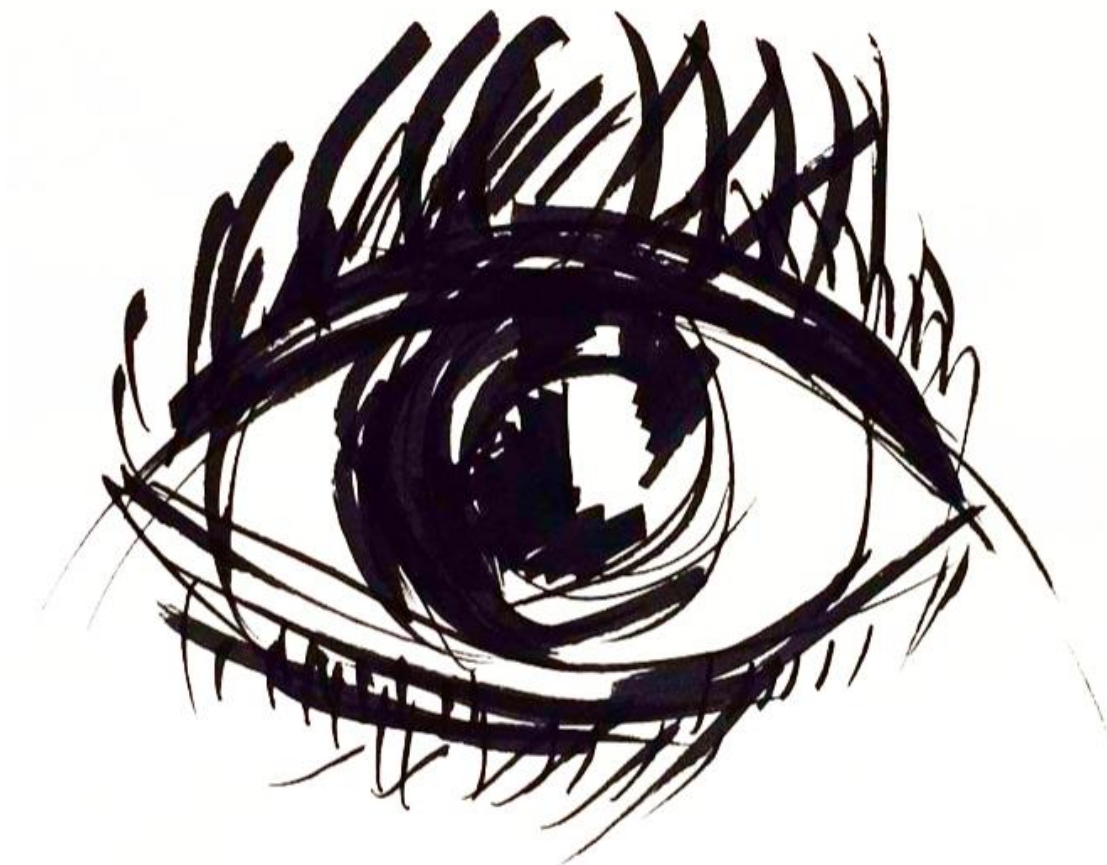
Different needs of participants of talks, negotiations, conferences or individual work require functional and universal solutions. Its multifunctional character determines its shape. This furniture must be adapted to the user, not the other way round. Such an enclosed room is a place where important decisions are made, sometimes difficult negotiations are conducted, concepts and plans are developed. In order to make participants of a meeting feel at ease, a spatially separated meeting area or lounge should be designed within the room, helping to build good relations. When arranging open space workplaces, special attention should be paid to the division of space into zones. Due to the diverse nature of the tasks, different positions should be arranged. Creation of a dedicated workspace is conducive to work which requires concentration to arrange tasks and activities, which is subject to time pressure and the pressure from the persons around and where is a need to analyse a large amount of data. Independent offices, which are arranged according to the user's needs and expectations, are characterized by high functionality, affecting the comfort of work and its efficiency. It is extremely important to organize the space around the employee's workplace so that it is not overloaded with unnecessary and distracting objects. This space is to be arranged aesthetically and friendly for the user so that he or she can use it and come back on the next working day with pleasure.

TEAM COMMUNICATION. PATTERNS

Trends in the arrangement of friendly workplaces are constantly evolving. Therefore, a lot of effort is put into arranging such spaces, which are supposed to support everyday work,

stimulate the creativity of users, develop the potential of employees. Therefore, designers propose more and more advanced solutions.

Spaces that can respond to dynamic changes are becoming increasingly important. Open spaces that enable employees to interact with one another to a large extent and encourage free, often spontaneous, exchange of knowledge should be complemented by more intimate rooms such as: rooms for work which requires concentration, space for morning, short meetings, small rooms for video and teleconferences and conference rooms. Enclosed spaces enable to isolate oneself, calm down, concentrate and build the organizational culture of the teams. The combination of various functions within the workspace enables the organisation to respond to the needs and balance of the organisation functioning. Workshops where employees can express their views on a comfortable workspace are becoming increasingly common. Before beginning design work, relating to the arrangement of the workplace and the creation of a comfortable space, information is collected from future users on how they will perform their duties and what their needs are in relation to the nature of work. Workplace arrangement focused on the users' needs also serves to build a friendly image of the employer, helps to build mutual trust and improves communication within the team.



SENSORY DESIGN IN THE WORKING ENVIRONMENT

MULTI-SENSORY PERCEPTION OF SPACE. STIMULATION AND RELAXATION

The characteristics of the environment permeate our senses and influence our performance, quality of work and speed of learning. Office environments designed with the awareness of synaesthetic perception of space can increase the comfort of people in it and with it the productivity of their work. Environmental psychologists have been conducting research for more than two decades to provide guidance on shaping space for creative thinking. They thus refer to research results that clearly show that most innovative ideas and creative solutions to problems are conceived in the privacy of the home. Offices designed with inadequate lighting, uninteresting colours, raw materials or cramped spaces make you feel worse because

they reflect the stimuli of the environment, subconsciously assuming both its positive and negative features. Workspaces are designed to positively stimulate the senses, help to identify with the environment, create a bond with the place and thus with the employer, based on positive experiences.

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The relationship between sensory experience, office design, work performance and well-being is complex. It is important that the space for creative thinking is friendly and, above all, allows to break away from the daily routine. This will open up new paths of thinking and also make it easier to remember information through subconscious associations with another space. Peter Zumthor in his “Thinking Architecture” and Juhani Pallasmaa in his “The Eyes of the Skin” describe the process of recording memories through multisensory experiences, as well as the mechanisms of reflecting space in references to extra-visual memories. Apart from biological perception, the design of creative spaces for different users should also take into account the psychophysical characteristics of perception related to the cultural circle from which the recipient comes from.

The mechanisms of perception can be used to create or designate areas for relaxation and stimulation. If the intended effect is silence - space should not attack the recipient with a multitude of colours and forms. If we want to make the interior space relaxing, it must be at least partially enclosed to limit external stimuli. Subdued colours - preferably from one colour range. Regular, static forms and rhythmic systems. Steady flowing water. The opposite should be done in order to stimulate the recipient. Then a dynamic composition, varied and contrasting colours (including plant elements) should be used.

THE ROLE OF EXTRA-VISUAL STIMULI

Multi-sensory stimulation is the basic task of a space with sensory properties. The ways of influencing individual senses can be designed separately and then combined into one space or separate spaces can be created to stimulate one particular sense. Many interactions can overlap, as individual solutions often combine an impact on more than one of the senses. Sensory elements in space make us feel better in this place and we better absorb information. The I-lab should create a specific microclimate which, in

addition to visual stimuli, will be able to take advantage of the benefits it offers to other senses, such as hearing, smell, taste and touch.

Sense of hearing. Hearing stimuli can promote concentration and a sense of security, and can stimulate you to increase or decrease your working speed. However, the wrong type or intensity of sound can cause discomfort. Research shows that our acoustic environment affects both our well-being and our effectiveness. Balanced acoustics in the workplace is conducive to our health and professional success. With increased noise levels, employee stress levels increase, which can result in increased blood pressure, reduced efficiency and lack of concentration on the task. Studies on the working environment comparing enclosed spaces and open spaces have shown that for an open space, which is well-designed from the acoustic point of view, where monotonous factors (e.g. street noise, noise from room ventilation and computer fans) and distracting audible and understandable conversations are eliminated, working conditions remain at comparable levels

When designing the iLabs using sensory technology, particular attention should be paid to eliminating background noise so that the introduced acoustic stimuli can have a full and intended effect on the users. Through appropriate, gradual exposure to auditory stimuli, we can change their perception, the way of responding to the environment, and thus improve concentration in less comfortable conditions.

Having a relatively sound-insulated space, we can provide it with a set of sounds of our choice:

- appropriately selected music (e.g. installation of speakers),
- unique sounds from the device systems that are emitted by air movement or by the touch of the user and which produce sounds (e.g. bells etc.)
- sounds of animated nature coming from the outside: animals (birds - we can try to get their company by installing drinkers, feeders, stalls; plants - by selecting species with leaves rustling in the wind (e.g. reeds, miscanthus, high grasses),
- splashing water: in internal water-wall installations, cascades, water sprays, or similar devices in the outer zone.

Sounds from indoor and outdoor installations should be in line with the acoustic recommendations for different activities:

Table 1. Acoustic environment for human activities

Sound level	15 DB	30-35 DB	50-55 DB	65 DB	70-85 DB
Premises (kind of activities)	Zone of silence (relaxation, background sounds e.g. rustling leaves)	Library (individual work in silence, concentration, reading)	Quiet office (teamwork, brainstorming, exchanging views)	Loud office (adverse conditions, warning sounds, strong sensory stimulation for a very short time)	Noise zone (requires acoustic insulation, e.g. street traffic)
Impact on work performance		WHO recommended noise levels in hospital wards and school classrooms	40% of office work force have trouble concentrating	Average noise level in classrooms and offices	Hearing protection is indicated in case of prolonged exposure to noise
Health risks			Elevated blood pressure, sleep disorders and higher risk of the coronary disease	The risk of a heart attack increases	Permanent hearing loss and elevated cholesterol levels

Acoustic requirements for workplaces are specified by Polish Standard PN-B-02151-4:2015-06.

However, the research indicates that there are certain types of sounds, e.g. noise from human conversations, which, despite its high intensity (about 70 dB), has a positive effect on creativity.

Sense of touch. In the case of this sense, we must remember that for the recipient to try it, the object must be at least within reach. So everything that will be a stimulus must be in the immediate vicinity of the path and at the right height depending on whether there is an element that we just walk or stand around or whether we can also sit next to it or on it.

What can be used as tactile stimuli? Almost everything!

- Finishing materials (wallpaper, all kinds of boards with 3D effect, contrasting materials that allow you to feel different temperatures)
- Upholstery materials (upholstery, flooring materials)
- Water - still, flowing, dripping or in the form of a spray mist
- Plants - nowadays moss is often used, soft leaves can be found in: Verbena, Stachys byzantina, Eriophorum, lavender, sage, rosemary, spicy and rough: cereals, grasses, cones; delicately prickly plants: coniferous. Thorny and very delicate plants should be avoided.
- In addition, manipulation mats can be used.

Plant elements with a sensory effect in the interior.

Sense of smell. It is one of the most primal human senses. Information about it is stored in long-term memory and has a strong connection with emotional memory. The human olfactory system is adjacent to the limbic system and the hippocampus - the structures involved in emotions and their placement in memory. Probably this is why familiar scents bring to mind memories, even exact scenes, words and feelings. It can be said that the sense of smell has a quick access path to the most decision-making structures in our brain. It bypasses consciousness and immediately motivates to certain emotions. According to research carried out by The Sense of Smell Institute, an educational and research unit of The Fragrance Foundation worldwide, fragrances have a positive effect on memory, concentration, stress relief or relaxation. For example, the smell of peppermint, significantly influences the results in terms of visual recognition, short-term memory and the speed of response to visual movable stimuli. Olfactory stimuli are the most ephemeral sensations, so to make their experience possible, appropriate conditions must be taken

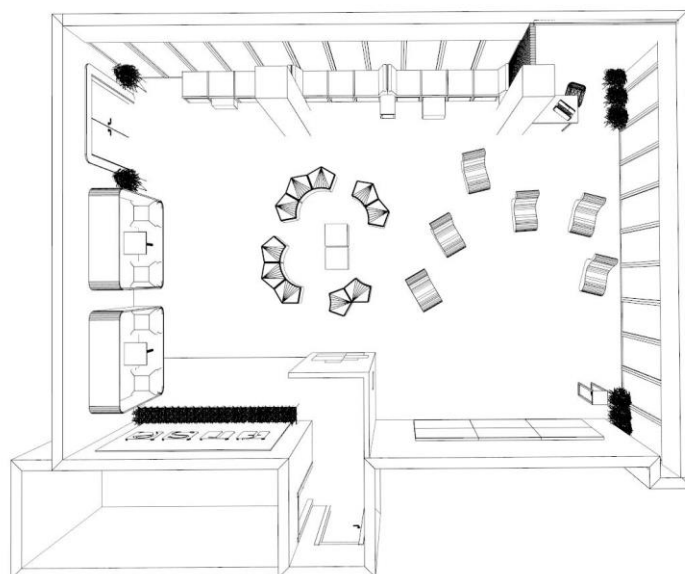
care of. The most important thing will be to shield and separate the space where olfactory stimulation occurs. Intensively fragrant plants or artificial sources of smell can be placed in interiors prepared in such way. However, too intense a smell can adversely affect the condition of the person in the room, so care should be taken to ensure that the smell is not too intense. The comfort of the room can be reduced by headaches, rhinitis or tears.

It is worth noting the additional properties of essential oils secreted by plants. These will be primarily:

- soothing and relaxing effect (boxwood, cherry, almond, hawthorn, rowanberry, jasmine, black currant, willow ash, ligustre, European olive, beech, oak)
- antimicrobial effect - pro-healthy (pine, spruce, fir, vitriol, juniper, coriander, angelica, hyssop, lovage, sage, mint, lavender)

Highly allergenic and poisonous plants should be avoided.

Sense of taste. The sense of smell is physiologically combined with the sense of taste. The sensations coming from these senses are often difficult to be classified and distinguished from each other. The sense of taste can be influenced by fruit trees and shrubs, berries and herbs. However, due to urban conditions, this is not recommended. However, as part of the instructions for use of the pathway, a resting place can be proposed where we will encourage healthy regenerative snacks in the form of washed fruit and vegetables brought with us.



Sight is the most important sense of the human being. It collects information about the surroundings, helps to learn about the world and appreciate its richness. As a receptor sense, it is attacked every day by millions of stimuli, from which our brain chooses those worthy of interest. Eyes register the image from certain distances, thanks to which the recipient has information about many objects simultaneously.

Sight is also a source of many pleasant experiences. It allows you to enjoy the beauty of nature, admire works of visual arts. In today's world, which is dominated by images, pictograms, charts and films, healthy eyes make it easier to orient oneself in cultural and social life.

With our eyesight, we receive more than 80% of information about the world around us. However, we can at least partially compensate for its lack by means of hearing, touch, smell or taste, but there is such information about the world that humans are not able to reach by other senses. J. Goethe was one of the first persons in Europe to describe the influence of colours on the human psyche through a series of studies. ("The Science of Colours" from 1810, which he called the book of life). Few people today are aware of the power of the colours around us, because the world of colours has a significant impact on our health, emotions and behaviour. Many clinics around the world already use the energetic properties of colours, where colour therapy supports the treatment of: gastrointestinal and respiratory systems, neuralgia, migraine, spine and kidney diseases, female ailments, neurosis and mental depression.

In addition, the colours that are used in chromotherapy have an impact on the people staying indoors:

Red stimulates the nervous system and increases blood pressure.

Blue calms down, relaxes, concentrates, cools, calms the body.

Yellow - makes a friendly and warm impression. It strengthens, revives the mind.

Green has a stabilizing and balancing effect. Restores balance, relaxes, calms, keeps physical and mental energy in a state of balance.

Orange regenerates, invigorates, warms up, stimulates energy milder than red and regenerates it calmly

White harmonizes and ensures balance in the body.

In order to sharpen one of the senses it is worth isolating oneself from the excess of stimuli. If the intended effect is tranquillity - space should not attack the recipient with a multitude of colors and forms. If we want to make it relaxing, the space where we need to concentrate must be at least partially closed to limit external stimuli. Subdued colours - preferably from one colour range. Regular, static forms, rhythmic systems. Steadily flowing water. On the contrary, we should act to stimulate the recipient. In such case, a dynamic composition, diverse and contrasting colours will be ordered.

Optically, cool-coloured surfaces seem to fade away, creating an impression of distance, while warm colours such as orange and red seem to narrow down the space.

IMPACT THROUGH DESIGN AND TEXTURE: REVIVAL, SEDATION

The texture not only affects the sense of sight but also touch. It is possible to obtain three-dimensional effects with the use of texture characteristic for a given material (brick thread, concrete formwork) or it can be given by means of stucco, wallpaper or 3D panels (e.g. acoustic ones). When using texture-based arrangements, it is important to illuminate the surfaces on which it has been applied to highlight it by means of chiaroscuro.

The geometry of the room can be shaped not only by the arrangement of walls, but also by the ceiling and floor. The multi-level character of the interior may create an impression of spaciousness, but it may also narrow the space. Owing to the proper shape of the floor we can create places for relaxation, meetings or lectures using steps or ramps. When designing such solutions, special attention should be paid to the availability. An inclined floor, despite its favourable angle, may be unsuitable for wheelchair users if it is not equipped with a pathway limited by suitable railings.



THE SPACE LAYOUT

CREATIVE SPACE

As new media develop, the following trends in the way we work are perceived:

- cooperation of companies with freelancers and specialists in selected fields - these people carry out their tasks as independent experts, the space for these activities is a space for meetings, exchanges of views,
- project-oriented work - teams are set up to carry out specific tasks and resolved after project completion - space for teamwork in variable arrangements,
- flexible forms of employment (artists, marketers, programmers) - availability of space within flexible timeframes, flexible arrangement to adapt to changing needs,
- remote work - shared tools - teleconference space, etc.
- appearance of co-working zones - space to share.

On the basis of the research, the following types of creative spaces were selected:

- 1) "Space for independent work" which enables thinking and meditation and is characterised by a quiet atmosphere,
- 2) "Team space", which encourages people to communicate with one another, and which is characterized by noise and team interactions,

- 3) "Workshop space", which allows to experiment, create and build (e.g. during student workshops,
- 4) "Presentation space" in which people can actively present and show their work or passively consume input (e.g. lectures).
- 5) "Transition space", such as corridors, which are used for informal exchange of thoughts and conversations and to break away from oriented creative work.

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Regardless of the type, different functions of the creative space can be identified, such as:

- a) space as a repository of knowledge,
- b) space as a place of phenomena of particular culture,
- c) space as process manifestation,
- d) space as a social dimension,
- e) space as a source of stimulation.

The main objectives of the space for creative work are as follows:

- stimulation of innovation,
- increased focus on work,
- maintenance of good health,
- mood improvement.

Studies conducted by Shashi Caan confirm that colour, creativity and architectural space are linked to one another. On the basis of her experiments, it can be concluded that in the first stages of creative work (while sketching, drawing ideas, brainstorming) it is advisable to create an optical distance. Cool colours, viewing openings and interiors over three metres high are conducive to the creation of such space.

Another equally important issue is ergonomics of the working environment. The workplace must be equipped with desks of the right size, e.g. sit & stand, and comfortable adjustable chairs. Sit&stand desks are an increasingly popular trend, which allows you to work in different positions and eliminates the health consequences of a sedentary lifestyle. The basis is also to provide appropriate conditions for natural lighting (at least 3 hours a day, in downtown buildings at least 1.5 hours), as well as artificial lighting (here it

is important to ensure uniform lighting in different rooms). It is also important to provide adequate ventilation or air conditioning of the workplace.

In addition to the basic needs, aesthetic factors, order and harmony as well as attention to detail must be taken into account. It will be important to provide elements for saving and sharing thoughts, as well as alternative places for creative work, not connected with desks. These may include, for example, swings, artificial turf platforms, colourful meeting rooms and inflatable sofas and pillows. In addition to office workspaces, attention should also be paid to transition zones, including relaxation zones.

iLabs are a specific kind of creative space. The iLab is not a laboratory in the scientific sense, nor is it an R&D (research and development) space, but it can take the characteristics of such spaces:

- the lab space should be open, inviting to interaction, conducive to the desired types of interaction
- the lab space should not impose specific attitudes but only facilitate them
- the lab space should be modular, dispersed, non-hierarchical
- in the lab it is important to build communities around particular ideas
- in the lab it is important to build continuity (based on the experience of the previous users)
- in the lab it is important to open up the users to new ways of interaction and visualization,
- in the lab, the interactive nature of working with new technologies is important
- in the lab, it is important to be in contact with objects, touching things, manipulation, physical, character of interaction
- in the lab, simulation is important - games, dramas, virtual reality, augmented reality, narrations.

Ensuring working conditions in accordance with the requirements of general health and safety regulations or concerning facilities, rooms and workstations is often sufficient to enable people with disabilities to function effectively and safely in the working environment. However, it is important to remember about individual adaptation of the workplace to the needs of a person with a specific disability.

Adaptation of space for people with disabilities is important beginning with ensuring accessibility of communication, the surrounding of the building, through its common spaces to the workplace. The requirements for roads and walkways in the workplace are not subject to the same requirements as public roads and can therefore constitute a barrier. It is therefore worth following the general rules:

Walkways and shared zones:

- separation of existing pedestrian routes from existing ones by horizontal signs in accordance with the rules applicable to public roads,
- designation and marking of pedestrian crossings with kerbside ramps - within pedestrian crossings, at the junction of the pavement and the roadway, a ramp not less than 0.9 m wide and an inclination of not more than 15% should be made

Gates and wickets - entry to the workplace:

- Handles and handles placed at a height suitable for persons moving around in wheelchairs (in colour contrasting with the colour of the door),
- access systems located at heights from 0.9 to 1.2 m
- top or side lighting of the entrance area and / or illuminated bell buttons, intercoms etc.

It is also important to provide suitable parking places and access to all levels by means of a ramp (with the parameters provided for in the Regulation) or crane (with cabin dimensions adapted to the parameters of a wheelchair).

Arrangements regarding the entrance to the building:

- indication of the direction of access to the door and the extended entrance for wheelchair users
- access systems
- bells (0.7 – 1.2 m above the floor)

- intercoms (0.7 – 1.2 m above the floor, with illuminated buttons; in the case of devices with T9 keypad, button 5, in the case of other devices, all buttons are in Braille).
- lighting of the entrance area (note: do not install luminaires in the floor)
- canopies in the bell and intercom area
- protection of the lower part of a glass door (up to 0.4 m height)
- marking of glass door leaves (belts, markings and inscriptions) at eye level for wheelchair users.

A vestibule, reception, guardhouse:

- in the vestibule, in front of the reception desk and in the guardhouse free manoeuvring area of 1.5 x 1.5 m
- Floor made of a non-slip, anti-reflective material (e.g. made of rubber, PVC, unpolished stoneware or flamed stone)
- reception counter with a height of up to 0.9 m on a minimum length of 0.9 m
- a counter adapted to serve people in wheelchairs, extended beyond the outline of the reception desk by approx. 0.4 m (it cannot narrow the escape route or be an obstacle for the blind and visually impaired because of the lack of mapping on the floor) or a vertical plane placed under the reception desk withdrawn by approx. 0.4 m from the edge of the counter
- additional overhead lighting above the counter
- entry into the guarded area (reels, gates, etc.) ensuring unobstructed passage / passage of not less than 0,9 m wide
- the closing force of the door closer in the entrance door to enable a person in a wheelchair to open it.

Hygiene and sanitary facilities

The building or floors accessible to the disabled must be equipped with hygiene and sanitary facilities for people with disabilities that meet respective legal requirements.

Additional elements relevant to the disabled person are the following:

- marking the hygiene and sanitation rooms with appropriate information pictograms
- the clear width of the entrance door not less than 0.9 m, taking into account the dimensions of the handrails on their surface
- a horizontal handrail to help the wheelchair user close the door

- a door closer in the entrance door with a closing force enabling a person in a wheelchair to open it.

- The internal manoeuvring areas in hygiene and sanitary rooms (not interfering with any obstructions or limiting devices) should meet legal requirements. In addition, the following guidelines should be met:

- the wash basin should be at least 0.6 m wide and placed at a height of not more than 0.85 m

- the space under the wash basin should be not less than 0.65 m so that the legs of a wheelchair user can fit under the wash basin

- the suspended toilet bowl should be installed at such height that its upper surface is 0.45 - 0.5 m above the floor level

- a toilet bowl should be made available from both sides (if possible),

- Wall railings near the toilet bowl should be installed at a height of 0.75 - 0.8 m. It is recommended that the handrails are raised or folded so that the wheelchair can reach the toilet bowl

- the flush button in the toilet bowl should be installed at a height of 0.8 - 1.2 m

- the mirror above the washbasin should be rotatable or allow a person in a wheelchair to see himself/herself

- the light switches should be no more than 1.2 m above the floor to be within easy reach of wheelchair users, and should be distinguished by a contrasting colour from the wall plane

- the floor in the hygiene and sanitary room should be made of a material which does not cause any risk of slipping.

OFFICE ROOMS

Office spaces for people with disabilities should be adapted to the type of disability of the employee. This chapter concerns mainly mobility impairments related to the movement of a wheelchair user indoors, as well as visually impaired people. Both in the interior space and in the arrangement of fixed elements (walls, doors, windows) and equipment (wardrobes, desks and sliding office equipment), the wheelchair dimensions and the

anthropometric limitations resulting from the position of the person sitting on it should be considered.

The free movement of a disabled person in a wheelchair is guaranteed when:

- the manoeuvring area inside the room and on the bends of the corridors (apart from the workplace) has dimensions of 1.5 x 1.5 m
- The width of the passage to the workplace is min. 1.2 m, with a possible local narrowing to 0.9 m
- the tables and counters have a free space of 0.9 x 0.9 m, allowing direct access to the workplace on a wheelchair
- the floor in social rooms has anti-slip properties.

Accessibility of the facilities for a disabled person in a wheelchair is guaranteed when:

- the availability of items stored on the shelves is ensured - for a person sitting in a wheelchair, the last shelf should be at a height of 1.2 m if access is only from the front of the wheelchair, and 1.4 m if access from the side is possible (for a person standing at 1.8 m)
- light switches are not higher than 1.2 m above the floor and are distinguished by the colour from the wall plane
- the plug sockets are installed at a height of 0.4 - 1.2 m from the floor and are distinguished by their colour from the wall plane.

In view of the needs of the visually impaired, it is necessary to:

- use non-slip and anti-reflective materials on floors and anti-reflective materials on walls and worktops (e.g. table and desk surfaces)
- introduce a uniform room marking system (on or next to the door)
- letters and digital markings, contrasting with the background, in sans-serif font, and introduce signs in Braille
- use the colour of the door or its borders in contrast to the colour and intensity of the wall colouring
- install local lighting on the worktop,
- provide lighting at workstations with sufficient intensity. If the technology of the building and the nature of the work permits, the ratio of the surface area of the glass panes to the floor area should be at least 1:8. If the lighting of the workstation is insufficient or the

previous condition is not met, the workstation should be illuminated by artificial light of an appropriate intensity at the workplace.

In addition to the architectural guidelines, it is worth considering ensuring the following by designing the space properly:

- providing a variety of sensory experiences. The type of stimuli sometimes has to be chosen more precisely, e.g. the effect has to last longer in time for the disabled person to notice and feel it. It is good if the space is rich in sources of various sensory stimuli, affecting all human senses: sight, hearing, smell, touch, taste, balance and body feeling in space. However, it is important to be able to dose them, use isolated stimuli and not be exposed to their concurrent emission
- a space where anyone can act and be a creator. An additional restriction on movement is often the seat of a person with a mobility impairment, a wheelchair. The seat allows the dependent person to move, gives comfort, stability, support, the possibility of observing the environment, but sometimes it imposes the owner's position, prevents the person from getting to some surfaces, from reaching the necessary elements. It is advisable for the space to be able to adapt to the individual users' needs by means of technical and architectural solutions. Independence deepens self-esteem, gives a sense of meaning and success, awakens joy.
- a space conducive to observing other persons and their activities,
- a space to facilitate doing something together or in turns,
- a space raising curiosity, with elements of surprise,
- a space generating positive emotions,
- a space conducive to the exchange of emotions, information, conversation. People with severe disabilities often have difficulties with speaking. To convey their opinions and thoughts they need alternative forms of communication (AAC).

The definition states that branding is building brand awareness. The aim of branding is to build a brand image that is more than recognizable. It must be supported by a number of unique features and values with which the recipients of our brand will identify themselves. The basis for branding is brand strategy. It defines its most important characteristics and values, characterizes what the brand is now and what it wants to be in the future. This information is recorded in the form of a document, the so-called brand book, which defines the brand, enables to determine the directions thanks to which it will be possible to build its awareness among the recipients.

The key elements contained in this document to be made known to the public are: the name, slogan and logo. On the basis of these elements a communication strategy is developed and a system of visual identification is created. It consists in selecting characteristic elements which will be used in materials spread through various communication channels.

The visual identification system may consist of:

- a logo or logotype in several variants,
- the typeface used for communication,
- colours,
- the presentation of products, labels, packaging, etc..
- design of promotional materials, gadgets etc..
- interior design,
- clothes of the employees.

A set selected in this way imposes limitations on interior designers, who have to move within the pre-established strategy using specific elements consistent with the desired image of the company. Building a brand identity should also take place through the appropriate shaping of space, its artistic expression and character. Culture and cultural phenomena are a place for building effective and distinctive brands. The space design should take into account not only the aesthetics, but also functionality, which must be preserved, but may also affect, for example, the lifestyle of employees (through, for

example, the promotion of pro-ecological behaviour, healthy food, physical exercise), which will be an image element of the company.

When designing interiors with a specific image, special attention should be paid to:

- adapting the image to the expectations of the recipient,
- characteristics of products, services and solutions offered,
- the emotions that the brand is supposed to evoke,

as well as possible problems:

- chaos caused by excessive use of branding elements,
- processing the image elements to such an extent that they are not clear,
- putting image features above functionality (e.g. aggressive colours in comfort zones).

SUMMARY

The design of spaces for effective learning and creative work requires the use of a knowledge base in the field of environmental psychology. Creating an appropriate atmosphere requires focusing on many obvious factors providing a sense of comfort and safety, but also on stimulating activities on the borderline of the subconsciousness, affecting the intuitive and emotional level. Discovery of new methods of knowledge acquisition and creative paths is supported by ensuring appropriate distance - zones of intimacy and interaction, multisensory stimulation, and awareness of the intended goals. In an environment designed in this way, special attention should be paid to equal opportunities for people with disabilities, as they will be able to use their potential on an equal footing with others, taking into account their perception capabilities and creative predispositions, in appropriate conditions created by a properly shaped space. The shaping of the space should therefore take into account the needs of all users and, through the stylistic means used, give it a character that encourages integration and joint activities.

CONCLUSIONS

The design of the iLab space should take into account the areas of individual and team work as well as communication between teams.

The iLab should provide the possibility of the sensory impact depending on the type of action taken - relaxing or stimulating.

Space for creation, first sketches and ideas is an open space, high, with a long horizon - space for teamwork and precision work is a limited space, focused on what is here and now.

The senses can be affected by visual stimuli such as colour, pattern, as well as non-visual ones: auditory, tactile (texture, temperature, etc.), olfactory and taste.

Natural elements in the interior, such as water or greenery, are conducive to sensory stimulation. Natural elements in the interior, such as water or greenery, promote sensory stimulation.

Interiors must be adapted to the needs of people with disabilities in accordance with the applicable regulations, but the individual needs of different people must also be taken into account.

By shaping the space appropriately, we can evoke emotions, but also shape the company image, which can influence the attitudes, behaviours and lifestyles of the users, and thus constitute a motivation to undertake creative activities or self-education.

The learning process proposed by Kolb starts with experience. The participant takes part in some event, situation, observes something, and experiences something. In this phase of the cycle Kolb shows the participant a certain situation, some event is arranged.

The next phase is reflection. The participant pays attention to what happened or is happening, processes the data flowing into my mind, compares it with what he has in his mind, tries to describe what he experiences and what he observes.

In the conceptualisation phase, the participant is to combine what he or she perceived into a whole. Using the ability of abstract thinking, he is supposed to try to describe mechanisms, create concepts and theories about what he experienced. The participant tries to explain the

experienced situation using the knowledge available to him/her, creates hypothetical explanations and mental models encompassing the whole situation.

he last phase of Kolb's cycle is experimentation. In fact, it is about practical verification of the hypotheses made earlier. Using the general conclusions reached by the participant, he tries to apply them in practice. He tries to answer the question: What can I do? How can I use my knowledge about the situation in practice?

But that doesn't have to be the end of the learning process. Because **experimenting** causes that the participant **experiences** new situations and can start the cycle from scratch by broadening his/her knowledge step by step.



PLANNING OF EDUCATIONAL ACTIVITIES

FORMULATION AND REVIEW OF OBJECTIVES

The suggested solution for planning activities in the iLab environment takes as its starting point the identification of goals. The trainer who conducts classes in the iLab defines the objectives or goal for the subject matter of the activities. He or she can set goals for the whole training or for individual modules, which make up the whole. The proposed application suggests recording the target in a generalised formula without any reference to a specific topic, the target detail is created by the trainer. The trainer may also give up using the hints of the application and enter his own goals by selecting the "other" option. Goals are the most important element in the planning of the activities, each training instructor aims at achieving the final result defined by them. That's why it's worthwhile to spend some time on this planning stage and to define exactly where we're going with the participants. The scope of content enabling to achieve them and the procedures of their realization, i.e. the forms and methods of work, are selected for specific purposes. Then, having the objectives in mind, we

define what help we will use to achieve the assumed results. The description of the goal included in the application is a proposal to which the trainer creates a detailed description of his/her expectations towards the training participants.

It is important and valid to distinguish between teaching and learning objectives. Teaching objectives refer to the trainer's activities while learning objectives refer to the outcomes observed in the participants' behaviour. The learning goal can be e.g. to convey knowledge about the 5s planning system. Evaluation of such a goal is a statement that the teacher discussed the 5s during the class. However, the learning goals may be formulated as follows:

A participant

- explains the importance of the 5s system in providing a well-organised and safe workplace
- describes the assumptions and phases of the 5s system
- uses the 5s system to plan a well-organised and safe workplace or workplaces.

Therefore, the achievement of the learning goals is checked in a different way than that of the learning objectives - we have to check if the participants have remembered and understood the 5s system, or if they can use it. Since the learning objectives are more important to the contracting institution, the trainer must not only include the content in his classes, but also ensure that participants learn specific knowledge and skills. To verify the achievement of the learning objectives, it is no longer sufficient just to say that the subject is present in the class cycle. There must be a method of assessing the knowledge, skills or changes in the attitude of the participant (depending on the type of objectives). Such methods, adjusted to the type of objectives, are proposed by the ICA (Interactive Curriculum Algorithm)

KINDS OF OBJECTIVES - TAXONOMIES

The construction of objectives can be based on the taxonomy chosen by the trainer. The selected proposals for dividing the objectives have been described below. The application proposes activity objectives referring to Bloom's taxonomy, improved by Anderson and Krathwohl, and the Niemierko's taxonomy.

BLOOM'S TAXONOMY

The most famous taxonomy of educational objectives was proposed by Benjamin Bloom in 1956. The basic premise for his work was to create a system of objectives that could serve as a benchmark for assessing student's progress. Bloom distinguished three areas of educational objectives: cognitive, emotional and psychomotor. Within these areas, he distinguished several levels of objectives. For the cognitive domain these were: knowledge, understanding, application, analysis, synthesis and evaluation. In the theoretical assumptions, the achievement of objectives from a lower level was a condition for the possibility of achieving objectives from a higher level.

Niemierko presents a unified taxonomy of objectives, adapted, as he writes, to the Polish conditions. The unification consists in consistent introduction of four levels in each of the areas of objectives. Niemierko describes these objectives with the letters A-D. The author distinguishes four areas of objectives: cognitive, emotional, practical and world-view. In the cognitive field he distinguishes the following levels: A- memory, B- understanding, C- use in typical situations, C- use in problematic situations. The last of these levels is also associated with the creative application of knowledge.

ANDERSON AND KRATHWOHL'S MODIFICATION

Lorin Anderson, a former Bloom's student and his former associate David Krathwohl, published a proposal to change the taxonomy of cognitive objectives in 2001. Instead of the six levels of objectives relating to teaching through different cognitive processes, the new concept, in the spirit of constructivism, treats students as active participants in the learning process. Students actively select the material on which they focus and construct meanings themselves using this selected information and their prior knowledge. The proposal of Anderson and Krathwohl takes into account the dimensions related to the student's cognitive and metacognitive activity during the learning process. However, this change mainly concerns the constructivist perspective from which cognitive processes are described, and the change is made at the level of rephrasing from nouns (knowledge, understanding, application, analysis, synthesis, evaluation) to verbs (the student remembers, understands, applies, analyzes, evaluates, creates). The change at the linguistic level also concerns the old

dimension of synthesis, now renamed to "student creates", but after a closer look at this dimension it turns out that it is only a cosmetic change. The newly introduced dimension of cognitive processes, referred to as creation, can be included at a general level in the question "whether the student can create new things or find new points of view. The authors also identify examples of cognitive processes used in this dimension of objectives. Those are combining, constructing, creating, designing, developing, formulating, writing. An important change, however, was the introduction of the dimension of the type of knowledge that is constructed in the learning process. Anderson and Krathwohl distinguish four general dimensions of knowledge.

Dimension of knowledge				
Dimension of cognitive processes	Facts	Terms	Procedures	Metacognition
A. Remembering				
B. Understanding				
C. Applying				
D. Analysing				
E. Evaluating				
F. Creating				

Dimensions of the objectives of the cognitive area, modified Bloom's taxonomy. Based on Anderson & Krathwohl (2001)

The most basic type of knowledge is facts. The basic elements of this knowledge, necessary to become familiar with the field in which learning takes place and to solve problems within it, are knowledge of terminology and specific elements of a given field. Another dimension is conceptual knowledge, which concerns the creation of links between the basic elements within larger structures, allowing these elements to function as a coherent whole. In this

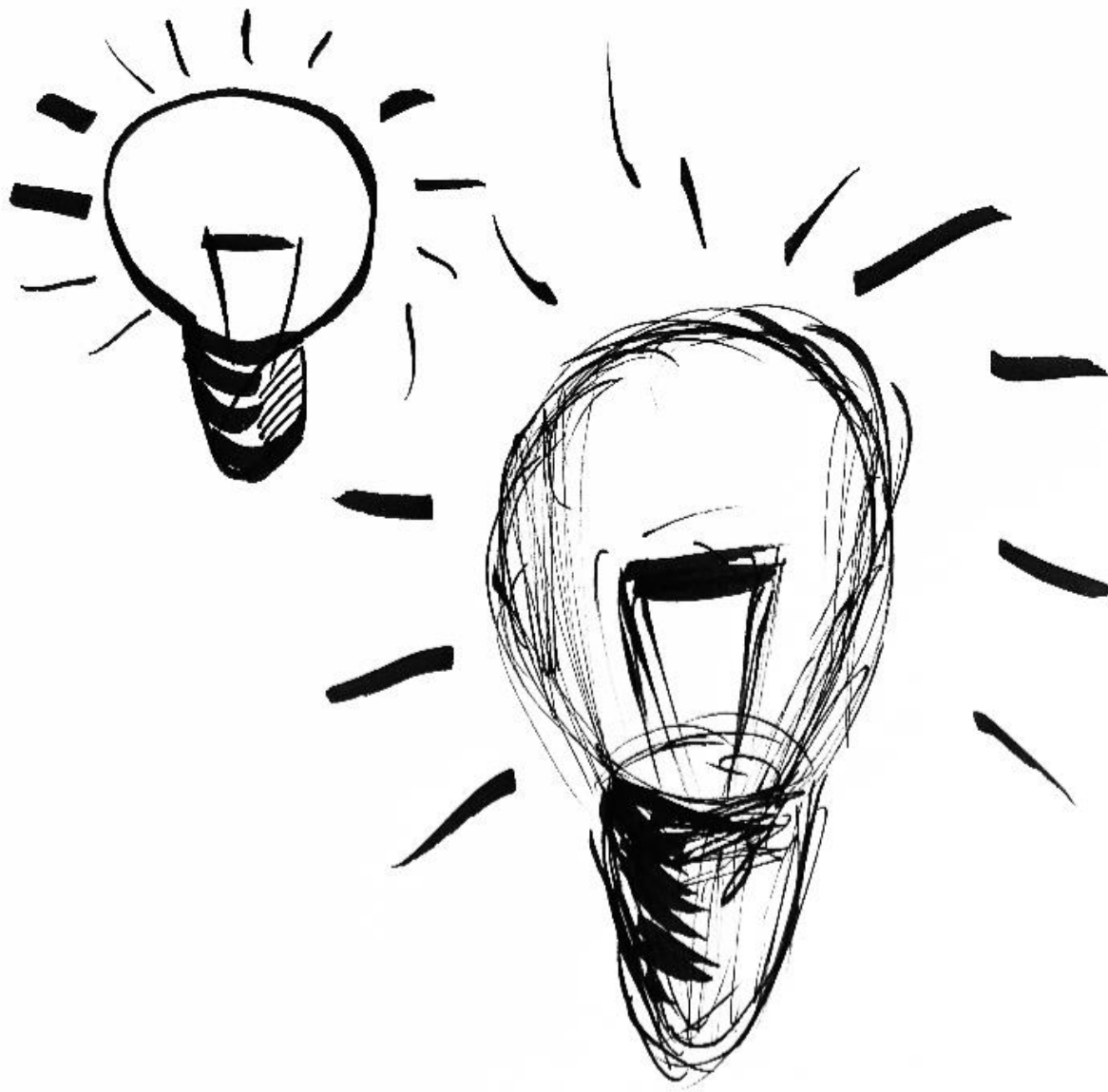
dimension of knowledge classification and categorisation occur. The next dimension is procedural knowledge of the "how" type. This knowledge is related to the ability to do something with methods of obtaining information, criteria for adequate use of learner-specific skills, algorithms, techniques and methods. The last type defines metacognitive knowledge, i.e. knowledge of how, at a general level, human cognitive processes function, as well as awareness and knowledge of one's own cognitive activity.

NIEMIERKO'S TAXONOMY

Bolesław Niemierko (2004, 2007) presents a unified taxonomy of objectives. The codification involves the consistent introduction of four categories for each of the four objective areas. The author distinguishes four areas of objectives: cognitive, emotional-motivational, practical and world-view. The categories of objectives within each field of objectives are designated by the letters A-D. In the cognitive field he distinguishes the following categories: A - remembering (the student remembers), B - understanding (the student understands), C - using knowledge in typical situations (the participant solves typical tasks), C - using knowledge in problematic situations (participant solves unusual tasks). The emotional-motivational field includes categories of objectives aimed at involving participants in school activities and self-development. In this field, Niemierko distinguishes category A - participation in an activity (the participant takes part in educational activities), B - taking action (the participant actively takes action during classes), C - orientation to action (the participant has a relatively permanent orientation towards taking action), D - system of action (the participant plans his own educational activity). The next field includes practical objectives. Category A - mimicking the action (the participant mimics the actions of others), B - reproducing the action (the participant repeats the activities), C - operating efficiency under constant conditions and D - operating efficiency under changing conditions. The fourth field of objectives includes worldview objectives. The basic category in this field (category A) is the conviction of the validity of knowledge. Learning with the conviction that we are learning untruthful knowledge causes resistance. For example, resistance to learning about biological evolution by people who are convinced that Darwin's theories are false. Category B - belief in the value of knowledge (we learn more effectively when knowledge is useful to us), Category C - focus on the application of knowledge (the participant's actions are focused on the use of knowledge)

and Category D - system of knowledge applications (the participant incorporates knowledge into complex cognitive systems and uses it as a permanent element of his or her own knowledge structure).

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CREATIVITY AS A SEPARATE AREA OF OBJECTIVES

In literature, the idea of treating creativity as a subject of teaching prevails (cf. Nęcka, 1998, 2001; Szmidt, 2003, 2007). The concept of creative competence described above is strongly connected with the postulate of developing creativity also outside the specific activities designed for this purpose. And although the authors encourage to support creativity in everyday educational work (Krzysztof J. Szmidt collects and presents a wide range of

postulates for teachers who want to develop students' creativity: Szmidt, 2007), so far there is still no coherent taxonomy of goals to be set by teachers in the area of creativity. What's more, this area is practically unnoticed. This situation leads to the fact that the teacher does not pay attention to the development of creative competence in his or her daily work, when planning a lesson, occasionally and only when the subject of the lesson is to stimulate creativity.

In other words, the demand to introduce the field of creativity for teaching purposes causes that teachers will set these goals not only for creative workshops (creativity as a subject), but also for other classes. In this way, teachers should see the possibility of stimulating creativity in various educational situations. At the same time, we emphasize that creative lessons should not only achieve goals in the creative field but also in the cognitive, emotional-motivating and functional field.

The distinction between the field of creativity as a separate capacity requiring special treatment has long been made (see Marland, 1972; Renzulli, 1977; Torrance & Myers, 1970). For example, the popular model of talent development of Joseph Renzulli (1977) distinguishes creativity as a separate dimension, without which talent is incomplete. This means that teachers, for the overall development of a pupil, should pursue goals not only within the development of directional talents and motivation, but also - and this is important for our proposal - within creativity. The direct, theoretical basis for distinguishing the creative field of goals was Robert Sternberg's concept of successful intelligence and the educational conclusions he drew from this concept (Sternberg, 2004). According to his model, successful intelligence requires the development of three types of intelligence: analytical intelligence, creative intelligence and practical intelligence. Analytical intelligence can be identified with general intelligence measured by intelligence tests. Creative intelligence is the ability to creatively seek and solve problems. A student solves tasks in an untypical way or finds previously untouched problems within a given field of knowledge. Practical intelligence characterizes people who deal with everyday life problems in their natural social and situational context. Based on this model, Sternberg proposed the WICS educational system aimed at a holistic and interdisciplinary combination of elements supporting the development of all types of intelligence. The abbreviation WICS refers to the four educational principles for the development of achievement-oriented intelligence. The first is the development of

Wisdom, which Sternberg links to practical intelligence. Wisdom presupposes not only the ability to reason but also conceptual knowledge and intuition. Another principle concerns the development of Intelligence. Of course, this is about the ability of analytical reasoning. The next rule is developing Creativity. The last rule - Synthesize - refers to the combined use of all the above principles to influence the development of successful intelligence. Sternberg also proposes specific areas of educational activities related to the WICS model. These actions should be oriented towards remembering first. Typical tasks in this area are "recognize" and "remember". Next, analytical thinking should develop, using tasks like "compare", "assess", "explain". In turn developing creative thinking involves tasks of the type "invent", "imagine", "propose". In turn the development of the area of practical activities may be helped by tasks that require the use, implementation, and application, respectively.

Looking at this proposal, it is easy to see a significant similarity with Bloom's cognitive educational goals. Remembering refers, of course, to the category of goals defined as knowledge. Analytical thinking can be related to two areas: analysis and evaluation. The area of practical activities will meet the goals of the field of application, but the area of creativity cannot be compared with any of Bloom's taxonomy fields, even if we adopt its modified version.

Piotrowski's proposal (2010b) extends Bloom's and Niemierko's taxonomies of objectives by a separate, creative field of objectives, equal to the cognitive or emotional-motivating field. One of the basic advantages of Niemierko's idea is a simple and homogeneous system of goals, which is both carrying and simple to use. The field of creative goals, as defined by Niemierko (2004), includes four categories of objectives. The first category (A) defines the objectives related to sensitisation to creative activities. Here we have objectives related to the development of personality, curiosity, imagination and cognitive skills. This category also includes knowledge and ability to use strategies to increase fluency and flexibility of thinking (Guilford, 1971). The objectives under category B refer to the social skills specific to creative people. Creating new ideas and solutions always takes place in a social context. The goals in category B are to prepare students to function creatively among other people, so we call them the courage to create. Category C includes objectives related to the ability to combine distant ideas. At this level, objectives are set to develop such mental operations as associations, metaphors and transformation (cf. Nęcka, 2001; Nęcka, Orzechowski, Słabosz and Szymura,

2005) and conceptual synthesis (Costello and Keane, 2000; Piotrowski, 2002, Piotrowski and Grohman, 2005). The last category of objectives (D) is that of teaching the conscious use of creative problem-solving techniques. These objectives are most closely related to teaching creativity as a subject, however, creative techniques also have their varieties and their specificity depending on the subject. The use of creative methods in the creation of essays will be slightly different than in the selection of techniques or compositions in the arts, and still different within the natural sciences.

Category A: Openness (imagination, tolerance for diversity, openness to novelty, fluidity and flexibility of thinking)	
Category B:	The courage to create (keeping other people's ideas alive and giving one's ideas to the group)
Category C:	Combining distant ideas (associations, metaphors, conceptual synthesis)
Category D:	Conscious use of creative problem solving technique

Classification of objectives in the field of creativity.

As we can see, Piotrowski's classification of goals is not only based on setting cognitive goals (and those goals that are cognitive at the same time are specific to creative thinking), so it is impossible to reduce the classical concepts to this field. The above taxonomy is closely related to Bloom's concept, but whatever approach we take, whether we advocate a rigid division of goals or plan goals based on more dynamic models, we should consider creativity a learning goal.

SOLO (STRUCTURE OF OBSERVED LEARNING OUTCOME) TAXONOMY

SOLO (Structure of Observed Learning Outcome) taxonomy. The SOLO (Structure of Observed Learning Outcome) taxonomy was described more than 30 years ago by John Biggs and Kevin Collis and seems to be simpler than the model developed by Bloom. It assumes that there are three levels of knowledge: superficial, deep and conceptual, and includes five stages:

1. pre-structural, or: "I don't know what's going on!" - learners do not have the knowledge and skills necessary to complete the task.

2. monostructured, or: "I remembered one thing from what we learned!" - learners know a single fact or concept. At this stage, verbs are used to define the goals: name, describe, recognize and implement simple procedures.

3. multistructural, or: "I remember from what I was learning!" - learners know a lot of facts and information. The verbs used at this stage to create goals: organize, define, group, classify, formulate questions and deal with algorithms.

4. relational, or: "Everything I know, I can relate!" - learners are able to relate information they have. When creating goals, verbs are used: generalise, predict, interpret, find analogies, compare, compile.

5. of extended abstraction, or deep reasoning. Learners treat the acquired knowledge as a basis for generalizing, speculating, summarizing and building new knowledge. The verbs used to formulate goals: imagine, prove, create theories, justify, analyze, hypothesize, explain reasons, question and seek analogies.

Levels of competence according the SOLO taxonomy (based on: Biggs, bdw.).

In the SOLO model, the competence increase (conventionally marked on the vertical axis of the graph in the Figure) is qualitative and not quantitative.

In such an approach it is not important how many facts the trainee knows, whether he/she mentions two principles of correct group work or presents many more rules. A higher level of competence is achieved when he/she determines the importance of these principles in effective group work.

Regardless of the approach we use when determining the expectations of the training participants, it is important to remember not to overlook the skills that are at higher levels called sometimes complex.

OPERATIONALISATION OF OBJECTIVES

In order to be able to achieve the intended objective and to assess the extent to which the objective has been achieved, the objectives must be operationalised. The word "operationalisation" means the formulation of the objective in such a way as to determine the

effect of educational activities. For example, the phrase "the goal is to familiarize participants with the Excel program" is too general, because it does not contain any information about what the participants will learn (whether they will only see what Excel looks like, whether they will learn to use only a few basic functions, whether they will learn to program complex computational algorithms, etc.) or what will be assessed (whether we will ask the participants whether they have seen Excel, or whether we will give them specific tasks and what knowledge and skills these tasks will require). The operationalised objectives should be more detailed than the general objectives and be verifiable. The formulation of the objective "the participant calculates descriptive statistics of the datasheet" gives specific information about what the participants will learn and what effects they can expect at the end of the class. The overall objective of "learning the Excel program" should be broken down into operational objectives, so that individual blocks of classes meet one or more well-defined objectives and it is possible to verify the effectiveness of the training by measuring the extent to which the objectives have been achieved.

Of course, in the example given above, we are dealing with practical material that can be precisely defined. However, in the case of so-called "soft" training, the objectives can often be difficult to verify. Nevertheless, we should also try to operate on these objectives. For example, "sensitization of participants to emotional needs" can be operationalised by several goals: "The student recognizes behavioural indicators of basic emotions", the student recognizes behavioural indicators of shame, pride, jealousy" etc. Especially in the case of 'soft' training, the verification of effectiveness can take place with a delay, after some time. Likewise, in the case of the objectives in areas such as worldview or motivation.

FORMULATING TRAINING OBJECTIVES AND MEASURING THEIR ACHIEVEMENT IN THE ICA ALGORITHM

In the ICA algorithm, the person designing the activity should define training objectives. In order to facilitate the selection of targets and the subsequent assessment of the achievement of targets, the ICA algorithm displays a cafeteria of terms related to different fields and categories of targets.

The definitions proposed by ICA are intended to guide the operationalisation of targets in such a way that the ICA algorithm can generate hints for tools to verify the effectiveness of training.

The drafting proposed by the ICA algorithm is content-neutral, meaning that a person constructing a course can use it independently of the content of the course. The terms and objectives defined by them refer to thematic blocks of classes or to whole classes. Due to the possibility of more precise verification, in the initial version of ICA, we propose definitions concerning cognitive goals (concerning knowledge structure and task performance). Social goals (concerning cooperation/competition among the participants and activity in the group) are no less important for efficient running of classes. However, evaluation of their implementation is slightly more demanding. Below we propose a few examples of the operationalisation of the social goals.

CAFETERIA OF TERMS USED TO FORMULATE COGNITIVE OBJECTIVES:

Identification of the learning objective	Examples of using terms
The participant correctly recognises...	The participant recognizes the types of social behaviour in the group
The participant lists...	The participant lists the divergent phases in the CPS method
The participant remembers...	The participant remembers the graph depicting Covey's circles of influence
The participant changes his/her opinion about...	The participant changes the view about the possibility of applying current neurobiological knowledge to create educational programmes
The participant calculates...	The participant calculates the Bayes Factor using the Jasp program
The participant estimates accurately...	The participant accurately estimates the direction and magnitude of changes resulting from innovation

The participant evaluates...	The participant evaluates the value of an idea based on the plus, minus and question mark method
The participant constructs...	The participant constructs a prototype of the product within the Design Thinking method
The participant describes...	The participant describes observations on the use of the product by customers
The participant makes probable hypotheses...	The participant makes probable hypotheses about the causes of the problem situation
The participant reviews the hypotheses...	The participant reviews the hypotheses by means of a social experiment
The participant defines accurately...	The participant defines the problem accurately
The participant plans...	The participant plans implementation activities
The participant uses...	The participant uses Ishikawa's diagram to sort out possible causes of the problem
The participant orders...	The participant prioritizes interpersonal rules
The participant groups...	The participant groups the methods learned according to the criterion he/she has chosen
The participant explains...	The participant explains the impact of the anchoring heuristic on the placement of products in large stores

The participant formulates conclusions...	The participant draws conclusions from data obtained in consumer surveys
The participant compares...	The participant compares different training methods
The participant distinguishes...	The participant distinguishes between reasoning based on true and false premises
The participant selects information...	The participant selects information in press articles
The participant selects from among...	The participant selects the potentially most effective strategy from among possible strategies
The participant makes a model...	The participant makes a graphic model of the production process
The participant proposes...	The participant proposes his/her own solutions to problems
The participant designs...	The participant designs an advertising strategy for the product

CAFETERIA OF TERMS USED TO FORMULATE SOCIAL OBJECTIVES:

Identification of the learning objective	Examples of using terms
The participant listens actively...	The participant actively listens to other participants during the discussion.
The participant proposes to the group...	The participant proposes to the group solutions to the problem.
The participant formulates...	The participant formulates assertive messages.

The participant defends...	The participant defends his/her opinion in front of the group.
The participant speaks up...	The participant speaks in a discussion.
The participant follows the rules...	The participant follows the group rules during the classes.
The participant refrains from...	The participant refrains from criticism of the other participants.
The participant negotiates his/her position	The participant changes his/her position in whole or in part under the influence of others participants' arguments.

In the ICA algorithm it is also possible to select a long-term goal. Such a choice will require a more precise goal by itself. Due to the great variety of content and forms of learning, the ICA algorithm gives you the opportunity to define your own goals by choosing Other. In this case, it will be possible to choose an evaluation technique from all the available options, without any preselection on the part of the ICA algorithm.

VERIFICATION OF OBJECTIVES

The key information for both the instructor and the client is the effectiveness of educational activities. This effectiveness can be estimated on the basis of measurements of the degree of achievement of learning objectives. Assuming the learning objectives of the participants we can check if and to what extent these objectives have been achieved. The appropriate verification tools will help you to measure the effectiveness of your learning activities.

The assessment of learning outcomes carried out with appropriate tools can serve as valuable feedback to the training participants, to the contracting authority but also to the trainer. It can indicate which parts of the activities are optimally prepared for the objectives and which need to be further modified and improved.

Of course, the specifics of the participants should be taken into account in assessing the effectiveness of the classes. An intrinsically conflicting group can direct its activities and members' attention to activities other than learning. Participants who consider a given topic superfluous or evaluate the instructors as incompetent may resist and consequently close themselves to knowledge. However, such situations should be recognized before the start of the class. This will enable the introduction of additional objectives for effective work. For example, when the group is in conflict, it is worthwhile to set the goal of integrating the group as one of the activities or to organize the activities in such a way that the conflict does not affect the participants' work. If the topic is considered unnecessary, it is possible to set a goal in the field of world-view goals, and to devote the time of the class to show the values of the knowledge communicated. This is sometimes the case with occupational health and safety (OHS) classes. Taking the time to make the participants aware of the risks (including legal risks) and the lack of knowledge about how to behave causes interest in this subject. If it is not possible to obtain prior information about the participants (the institution commissions the topic without informing about the training needs and the group composition, or the classes are open and we do not have any information about the participants), we should interpret the results obtained with the help of evaluation tools also in relation to the behaviour of the individual participants.

REVISION OF LEARNING OBJECTIVES IN THE ILAB ICA

Depending on the terms used while identifying the objectives, the ICA algorithm offers a choice of evaluation tools.

PROPOSED TOOLS FOR VERIFYING COGNITIVE OBJECTIVES

Identification of the learning objective	<i>Proposed tools for verifying learning objectives</i>
The participant recognises accurately...	Closed Task Test
The participant...	Open Task Test
The participant remembers...	Open Task Test

The participant changes his/her opinion about...	Questionnaire, Case study
The participant calculates...	Closed Task Test, Open Task Test, case study
The participant estimates correctly...	Closed Task Test, Open Task Test, case study
The participant evaluates based on criteria...	Closed Task Test, Open Task Test, case study
The participant constructs...	Open Task Test, case study
The participant describes...	Open Task Test
The participant makes probable hypotheses...	Open Task Test, case study
The participant reviews hypotheses...	Closed Task Test, Open Task Test, case study
The participant defines correctly...	Open Task Test
The participant plans...	Open Task Test, case study, questionnaire
The participant uses...	Case study, Open Task Test, questionnaire
The participant orders...	Closed Task Test, Open Task Test
The participant groups...	Closed Task Test, Open Task Test
The participant explains...	Open Task Test, case study
The participant formulates conclusions...	Open Task Test, case study
The participant compares...	Closed Task Test, Open Task Test
The participant distinguishes...	Closed Task Test, Open Task Test, case study
The participant selects information...	Closed Task Test, Open Task Test, case study
The participant selects from among...	Closed Task Test, case study

The participant makes a model...	Open Task Test, case study
The participant proposes...	Open Task Test, case study
The participant designs...	Open Task Test, case study
The participant communicates	Observation, questionnaire
The participant cooperates	Observation, Questionnaire

PROPOSED TOOLS FOR VERIFYING SOCIAL OBJECTIVES

Identification of the learning objective	<i>Proposed tools for verifying learning objectives</i>
The participant listens actively...	Observation, nomination, questionnaire
The participant proposes to the group...	Observation, nomination, questionnaire
The participant formulates...	Observation, nomination, questionnaire
The participant defends...	Observation, nomination, questionnaire
The participant speaks...	Observation, nomination, questionnaire
The participant follows the rules...	Observation, nomination, questionnaire
The participant refrains...	Observation, nomination, questionnaire

The proposed methods are supplemented by a choice of specific tools. It is also possible to ask the participants for their subjective evaluation of the achievement of particular objectives. In this case, the "Questionnaire for Subjective Evaluation of the Achievement of the Objectives" (KSORC) should be selected from among the ICA proposals. This proposal will be visible regardless of the objective formulated. It can also be selected as an additional evaluation tool. For example, when selecting a closed task test and subjective evaluation questionnaire for the same purpose, the ICA algorithm will propose a template for a closed task test and create a KSORC at the same time. The panel will ask whether or not the Questionnaire for Subjective

Evaluation of the Achievement of the Objectives is intended to cover all ICA-embedded targets. If all targets are selected, ICA will create an appropriate questionnaire with questions about individual objectives (with a five-stage scale). If the answer 'no' is selected, ICA will create a questionnaire containing questions only for those purposes for which the selection of the KSORC tool has been selected.

Closed Task Test	Single choice questions
	Multiple choice questions
	Matching tests
	True or false tests
Open Task Test	Cloze tests
	Short answer tests
	Extended answer tests
Case study	Multiple-choice tests
	Open task
Questionnaire	Questionnaire with questions in a n-stage scale (by default, a five-stage scale)
	Questionnaire with open questions
Questionnaire for subjective evaluation of the achievement of the objectives (additional tool)	The iLab ICA algorithm can generate a questionnaire which contains questions about the participant's assessment of the degree of achievement of the objectives set by the author of the curriculum. The ICA program downloads the formulated operational objectives and adds to them a five-stage evaluation scale.



TOOLS TO VERIFY COGNITIVE OBJECTIVES

CLOSED TASK TEST

Closed Task Test contains questions with a list of answers. The examined person chooses the answers. The assessment criterion is the number of correctly chosen answers throughout the test. The score for questions can be the same for each question or the score for

questions can be weighted. The scale of points for a good answer depends on the test author. The most common form is the scale: good=1 point, bad=0 points. But other scores are also possible. Sometimes the authors use negative points for the wrong answer. This is to prevent the examined persons from randomly choosing their answers. However, this method may cause that the answers are given only if the examined person is absolutely certain. Less confident people will apply a risk avoidance strategy and as a result the test result will be lower than their actual knowledge.

In ICA we propose several variants of the closed task test, which differ in the form of presentation of answers ready to choose from.

- Single choice questions. Only one of the several answers presented is always correct.
- Multiple choice questions. The number of correct answers to questions in the test may vary. In extreme cases, all answers may be correct or none will be correct.
- Matching tests. The answers are designed in such a way that they can be matched in pairs.
- True or false tests. This is a variant of the single-choice closed task tests, where the number of possible answers is narrowed down to two (yes vs. no or true vs. false)

OPEN TASK TEST.

The Open Task Test is a list of questions without ready answers to choose from. The person being tested must write the answer to the question by himself/herself. In ICA we offer several variants of the Open Task Test.

- Cloze tests. A space is left in the question for answering it. Usually it is one word or a concept. A cloze test may take the form of working with a text in which some of the words have been cut out and the examined person's task is to complete the missing parts.
- Short answer tests. The examined persons are to give a short written answer to the question. This could be, for example, a definition of a concept.
- Extended answer tests. The examined persons are to answer a question in a comprehensive way through a longer form of answer, e.g. an essay. Questions in this form of testing must be open and quite general.

CASE STUDY

A case study consists in presenting an issue. The examined persons should recognize the type of task and apply the acquired knowledge to solve it. The problem in a case study should be described as precisely as possible.

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QUESTIONNAIRE

A questionnaire (questionnaires with closed questions; multi-item scale) is a set of statements with which the examined person may agree or disagree. Statements are created for each issue, which may be helpful in evaluating the achievement of a given objective. Questionnaires often use a multi-stage scale to determine the extent to which the respondent agrees with the statement. An example of such a scale is the five-step Likert scale, where the respondent can choose one of five answers: 1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree. When choosing a questionnaire to verify the achieved training objectives, we must remember that the responses of the participants are subjective and reflect their current beliefs. We will not check whether the participant has learnt something or whether there is any change due to the training.

QUESTIONNAIRE FOR SUBJECTIVE EVALUATION OF THE ACHIEVEMENT OF THE OBJECTIVES, KSORC (AN ADDITIONAL TOOL)

The Questionnaire for Subjective Evaluation of the Achievement of the Objectives is a tool we can use to explore the subjective feeling of the participants related to the achievement of our goals. Such a questionnaire is worthwhile regardless of other techniques for verifying the achievement of specific objectives. Such a questionnaire is created in a relatively simple way. With operationalised goals, we can present them as questionnaire statements and ask the participant to determine to what extent he or she thinks these goals have been achieved. We can use the Likert scale. For instance, if the objectives of the block of activities were formulated as "The participant recognizes types of social behaviour in the group", a single item concerning this objective in KSORC may read, "I can recognize types of social behaviour in the group." The participant may state on the Likert scale how much he or she

agrees or disagrees with this statement. Although the questionnaire only measures a subjective sense of goal achievement, in some cases it may be the only tool to inform us about the participants' reaction to the training.

TOOLS TO VERIFY SOCIAL OBJECTIVES

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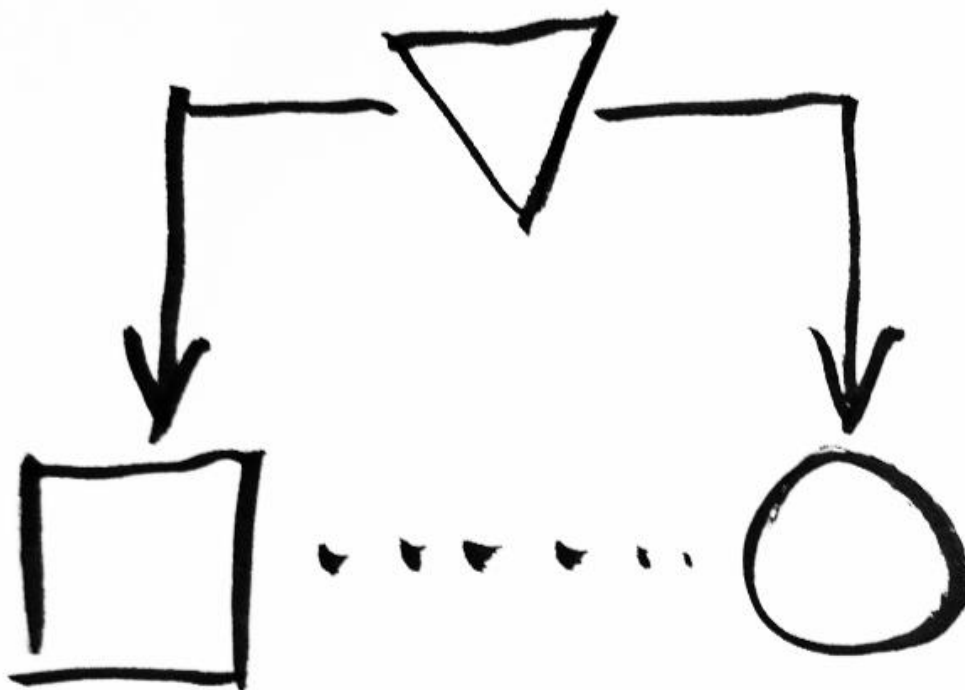
OBSERVATION

Observation is based on acquiring information from the participants' behaviour.

Observations can be qualitative, i.e. only the absence or presence of some kind of behaviour or phenomenon is recorded, or quantitative, if the observed phenomena or behaviour is measured by means of numerical values (e.g. we can observe and record the number of aggressive or submissive behaviours of the participant).

NOMINATION

Nomination is a tool for subjective evaluation of phenomena or behaviours based on general observations. After a block of classes or after the end of classes, the instructor can in this way subjectively assess changes in the group or in individuals. Similarly, participants may subject observed changes resulting from educational activities to a generalized evaluation. Observation requires recording of the observed phenomena and situations on an ongoing basis, whereas nomination is a general summary, without the need to record all observed phenomena. Therefore, the assessment through nomination may be influenced by emotions, single events or subjective interpretations of the situation.



PLANNING OF EDUCATIONAL ACTIVITIES USING ICA (INTERACTIVE CURRICULUM ALGORITHM)

iLab is a training environment with many possibilities. One of them is the Interactive Curriculum Algorithm (ICA). This algorithm is designed to facilitate the creation of a training program by suggesting available automatically preset proposals of evaluation tools, teaching materials and room settings. The ICA system introduces a uniform standard curriculum. Regardless of the content, the persons creating the curriculum should follow the phases below. The unification of the curriculum gives the possibility to evaluate and compare didactic activities in the iLab environment and guarantees trainings prepared with care for the training results.

PROCESS OF CREATING A TRAINING PROGRAMME

The process of preparation of a training course, which is assumed in the iLab environment, consists of several steps that must be taken by the person creating the course scenario. The iLab ICA algorithm can help in this process. The layout of individual stages is dictated by the

orientation of actions on the effects of the training. Therefore, before you enter the subject of a block of classes, you enter the operational goal for a given block of classes. In other words, we first consider what we want to achieve as a result of educational activities, and only then do we consider what content and methods we should use. However, if the person creating the curriculum wants to start by specifying the content of the block of classes and then introduce the appropriate operational goal, he/she can do it in the ICA panel also in this order.

1. We study the training needs. We determine what changes in knowledge and behaviour are needed for the participants (general objectives). These stages are necessary to organise the training, but are outside the ICA algorithm.

2. We assume what specific changes in knowledge and behaviour should occur as a result of an educational process based on selected educational content (hypothesis) and determine how to examine the level of these changes. When formulating goals, we need to know in advance what material the participants are to learn (what changes in knowledge and behaviour should appear in the educational process) and how learning outcomes can be assessed (how to check whether the assumed changes in knowledge and behaviour have occurred as a result of the educational process). The iLab ICA algorithm proposes the list of statements being the basis for formulating operational objectives (**see Chapter: Objectives**). The view of the panel enabling operational objectives formulation is shown **in the figure below**.

3. We select educational content => what range of knowledge and skills will provide sufficient changes in the knowledge and behaviour of the participants to meet the training needs (scope of material). When determining the material to be learned by the participants, we need to know why the participants are to learn the material (determine the usefulness of changes in knowledge and behaviour) - general objectives.

In the iLab ICA panel, we enter the name of the content block. The block should include content and activities by means of which the trainer wants to achieve the assumed training goals. One thematic block may pursue one or more objectives.

4. Based on the formulated objectives, the ICA algorithm proposes possible evaluation tools (**see the description in chapter Tools to verify the objectives**). The trainer selects an evaluation tool appropriate for a given objective. In the ICA panel, proposals of evaluation tools for objectives appear next to the formulated objectives. The settings of the content, objectives and evaluation tools can be printed as part of the course scenario. **The view of this part of the panel is shown in the figure below.**

5. The algorithm proposes specific templates of evaluation tools. The trainer can use them by filling them with suitable content.

6. The algorithm allows you to print out the prepared tools or carry out an evaluation using a projector or mobile devices.

7. The prior selection of the objectives and evaluation tools by the trainer, together with their respective content, will allow the iLab staff to prepare evaluation tools for the group. Changes can also be made during the course in the iLab (e.g. removing questions from the test of knowledge when the teacher has decided to skip part of the material during the class).

Making it easier to use the possibilities of the iLab environment

1. The instructor has a possibility to choose educational methods and techniques from those proposed by the Algorithm.

2. If the instructor chooses one of the methods, the algorithm proposes a default room setting and necessary teaching materials. The settings can be modified by the instructor. **The panel view is shown below.**

3. The instructor can also create his own default room settings for a given form of work in the iLab. The instructor has access to a range of possible table and chair settings and materials needed for a particular class.

4. Preselection of the setting will allow the iLab staff to prepare all necessary utensils and tools ordered by the instructor by means of the iLab ICA algorithm.



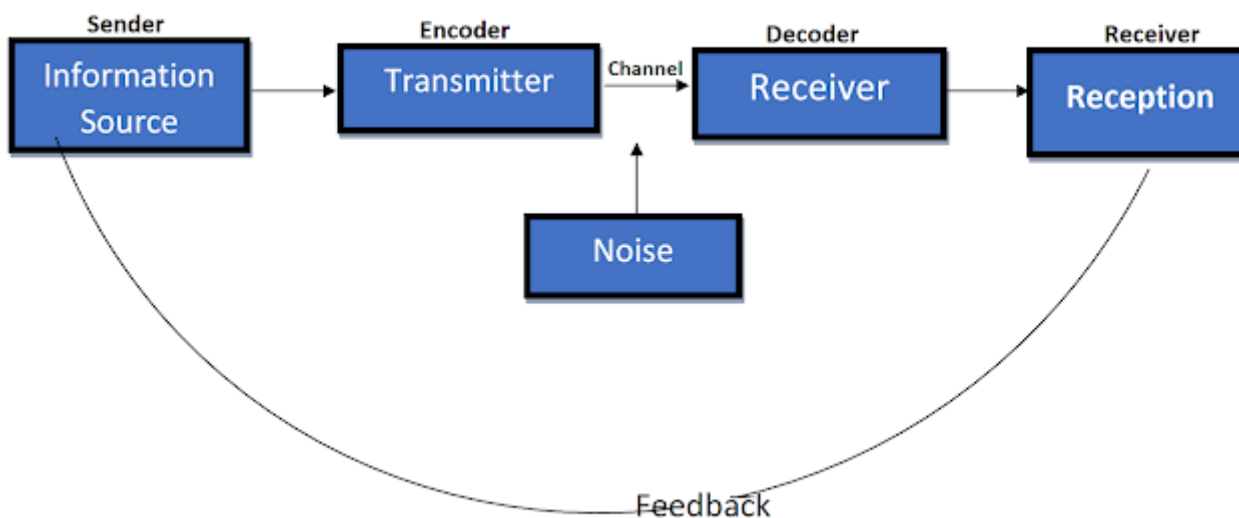
LEARNING PROCESSES

SHANNON AND WEAVER MODEL OF COMMUNICATION

In 1948, C. E. Shannon was an American mathematician and W. Weaver was a scientist. They wrote together an article called “A Mathematical Theory of Communication”, which is now known as the “Shannon-Weaver model of communication”. It is one of the most comprehensive models of communication, as it deals with various concepts like *information source, transmitter, noise, channel, message, receiver, information destination, encoding and decoding*.

The model can be described with a simple scheme:

Shannon and Weaver Model of Communication



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It starts with the **sender**, who has a particular *intention* or *information* he/she wants to transmit to the receiver. So, he/she selects a particular **encoder** = the transmitter which converts the message into signals. This can be waves, binary data or even visual images, but you can also imagine it simply as the exact wording that the sender uses/chooses for his/her message. In this manner, he/she sends the encoded message through a specific **channel** – face to face, through telephone or computer... During this transmission, and also depending on the channel, various **noise** can occur which can distort the message. This makes it harder for the **decoder** – the reception place of the signal which converts the signals back into messages. This can, again, be the other persons' phone, or even the person – the **receiver** – himself/herself. The important thing to remember is that during decoding, other distortions can occur, such as understanding the meaning of some of the words used by the sender differently, etc. The receiver, then, usually gives **feedback** to the sender, often by sending his/her own message.

In one-on-one communication, or even in small groups, the model can explain common misunderstandings. It is quite easy to imagine:

The teacher (**sender**) wants the student to complete a task by working in groups (= *intention*). So he tells the students: "Please finish the task in the next 10 minutes. You can talk to each other if you want to." (**encoding**; the **channel** being his voice). Yet there's quite a lot of **noise** in the classroom and the teacher's voice is not that strong, so some students (**receivers**) do

not hear him at all and start asking their classmates. Other students did hear the teacher, but they took the instruction that they can talk to each other not as a command to work in groups, but rather as a voluntary suggestion (**decoding**). As a result, the class is not working in the way the teacher had imagined, giving him an indirect **feedback** that the message did not come through as clear as intended.

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In such situations, there is no point in asking “Did you hear me?” or “Did you understand what you should do?”, as most of the students will only nod in order to avoid further issues. A better strategy is to let someone repeat the instruction, ask him/her, what did he/she take from it (what does he/she think he/she should do next) and how is he/she going to proceed with this task. In this way, any misunderstandings – or at least many of them – can be avoided.

The model also stresses the importance of proper encoding, decoding, and the influence of various noise – e.g. that one should make sure, especially in group work, that the people are “on the same side”, or at least “talking about the same thing”. In this matter, initial definition of the problem and all related terms, on which all group members agree, is very important. In order to avoid as much noise as possible, a quiet working place is desirable, as well as enough time for this initial phase. The iLab environment can prove very useful in this matter.



While working with (and within) groups, one must bear in mind several aspects, characteristics and effects of group dynamics. We will try to present some of them here.

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A *group* is usually defined as a number of people who identify and interact with one another; they often have a common goal or purpose and there is the sense of *group cohesion*, manifested in talking about the group as “we” or “us”. It is different from a *crowd*, which is a temporary assembly of people who might have a common goal, but the main difference lies in the *anonymity* of the individuals. In fact, one of the (in)famous effects of being a part of a crowd is described as **deindividuation** – a phenomenon in which factors such as anonymity, group unity, and arousal can weaken personal controls (e.g. guilt, shame, self-evaluating behavior), so that one can become more aggressive or behave in a way he/she would normally not, all because of the feeling that one is not recognizable as an individual and because of **diffusion of responsibility**. This is a sociopsychological phenomenon whereby a person is less likely to take responsibility for action or inaction when others are present, usually because the individual assumes that others either are responsible for taking action or have already done so. The more people are around, the less likely is an individual to help the other, which is also known as the **Bystander effect**. One of the most famous cases demonstrating this phenomenon was the murder of Kitty Genovese, a young woman stabbed outside the apartment building where she lived. The original New York Times article about this murder claimed that out of the 38 witnesses who saw or heard the incident, none called the police – which gave the researchers the impulse to study this phenomenon and helping behavior in general. Yet the original article later proved to be inaccurate, a fact that is not often mentioned in psychology textbooks.

But those phenomena are not limited to large crowds only; they can also, in a form, occur in smaller groups. One of the most famous experiments about deindividuation in specific *roles*, nowadays also largely discussed in terms of validity, is the **Stanford prison experiment**. In the study, volunteers were randomly assigned to be either “guards” or “prisoners” in a mock prison. Early reports on experimental results claimed that students quickly embraced their assigned roles, with some guards enforcing authoritarian measures and ultimately subjecting

some prisoners to psychological torture, while many prisoners passively accepted psychological abuse and, by the officers' request, actively harassed other prisoners who tried to stop it. Several "prisoners" left mid-experiment, and the whole experiment was abandoned after six days. This experiment can also be seen as an example of showing **demand characteristics**, where participants form an interpretation of the experiment's purpose and unconsciously change their behavior to fit that interpretation – which is actually quite similar to forming an opinion about what is expected of someone in a specific role and showing that behavior.

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Diffusion of responsibility can also be observed during teamwork – the easiest way is *not* to assign specific tasks to specific people (who are then held responsible for their completion), but instead, “leaving it all up to the team”. If no one claims the leading role, the task might as well end up not being done, because everybody will see it as “someone else’s problem”. Such a behavior is also called **social loafing** – the tendency for individuals to expend less effort when working collectively than when working individually – or the **Ringelmann effect**, named after a scientist who found that members of a group tended to exert less effort in pulling a rope than did individuals alone, and that this tendency gets worse as the size of the group increases. These effects are seen as one of the main reasons groups are sometimes less productive than the combined performance of their members working as individuals, but they should be distinguished from the coordination problems that groups sometimes experience.



Another phenomenon closely related to diffusion of responsibility within groups is the **groupshift**, **group polarization** or **risky-shift effect**. When solving a problem and deciding between options of various risk, the initial positions of individual members of a group tend to get exaggerated toward a more extreme position. When people are in groups, they make decisions about risk differently from when they are alone. In the group, they are likely to make riskier decisions, as the shared risk makes the individual risk less. Some researchers suggest groupshift is actually a sample of a broader **groupthink** phenomenon that occurs within a group of people in which the desire for harmony or *conformity* in the group results in an irrational or dysfunctional decision-making outcome. Groupthink occurs when each of the individuals comprising a group desires and cares more about reaching consensus and total agreement than critically examining, understanding, and utilizing information. Groupthink requires individuals to avoid raising controversial issues or alternative solutions, and there is loss of individual creativity, uniqueness and independent thinking.

Such effects have a lot to do with the **group cohesion**, which can be defined as the tendency for a group to be in unity while working towards a goal or to satisfy the emotional needs of its members. People in general have the need to belong somewhere and groups can provide

satisfaction in this manner. Every group forms its *norms*, *hierarchy* and *roles*, all of them helping to understand or guide the expected behavior of the group members. The individual “involvement” in a group can also manifest in talking about the “*in-group*” (“us”) and “*out-group*” (“them”). Group cohesion per se is neither good nor bad; it all depends on how the norms, hierarchy and roles are set. However, it is good to know that the “need to fit in” can sometimes lead to **conformity**, which is the act of matching attitudes, beliefs, and behaviors to group norms or politics. In the most famous experiments, Solomon Asch exposed people in a group to a series of lines, and the participants were asked to match one line with a standard line. All participants except one were accomplices and gave the wrong answer in 12 of the 18 trials. The results showed a surprisingly high degree of conformity: 74% of the participants conformed on at least one trial. On average, people conformed one third of the time. This might be, in part, due to the **black sheep effect**: individuals tend to upgrade likeable in-group members and deviate from unlikeable group members, making them a separate outgroup.

Peer pressure, which is a major component of conforming to a group, was also studied from a more individual point of view, as the so called **obedience** to authority. The famous experiments by Stanley Milgram measured the willingness of study participants to obey an authority figure who instructed them to perform acts conflicting with their personal conscience. Participants were led to believe that they were assisting an unrelated experiment, in which they had to administer electric shocks to a “learner.” These fake electric shocks gradually increased to levels that would have been fatal had they been real. The experiment found, unexpectedly, that a very high proportion of men would fully obey the instructions, albeit reluctantly. Both in the *conformity* as well as in the *obedience* studies, the likelihood not to conform/obey increased with the number of conflicting opinions shown by other members of the group.

On the other hand, working in groups does not necessarily bear only negative effects. **Social facilitation** is defined as improvement in individual performance when working with other people rather than alone. In addition to working together with other people, social facilitation also occurs in mere presence of other people. The *Yerkes-Dodson law*, when applied to social facilitation, states that “the mere presence of other people will enhance the performance in

speed and accuracy of well-practiced tasks, but will degrade in the performance of less familiar tasks."

So, what should we do to avoid unwanted effects of group dynamics?

There are several things we can learn from the above described effects and use them to our advantage while working with groups in iLabs:

- **set clear, explicit, measurable goals** - Setting unambiguous goals is believed to stimulate an array of production-enhancing processes, including increased commitment to the group, thorough planning and quality-monitoring of group work, and improved effort exertion.
- **make the goals challenging** – If you can do the work “on your own or with a phone”, it is not a suitable group task.
- **increase identifiability & make everyone feel needed** - When people feel as though their individual ideas or outputs are identifiable (e.g., subject to evaluation), they are motivated to exert greater effort towards a group task. Individual members should be made to feel like they are an indispensable asset of the group. A similar effect can also be achieved by reducing the size of the group, because as group size shrinks, the role of each member in that group becomes increasingly integral, so there is less opportunity to loaf.
- **when generating ideas, avoid groupthink** – This is best achieved via anonymous brainstorming. In this case, the lack of identifiability can be used to avoid the fear of expressing a different or critical opinion, which can in turn result into more creative ideas.
- **occasionally, use competition between different groups** – Competition can help foster the group cohesion, the “in-group” feeling of group members, resulting in higher effort put into the task. However, if we later need the different groups to work together, too much competition can be rather counterproductive.

Last but not least, let's not forget that every group has its **stages of development**, and the group dynamics and processes might differ significantly, depending on the stage the group is currently in. One of the most popular models is that by Tuckman & Jensen (1977), describing five linear stages that a group will go through in its unitary sequence of decision making:

- **Forming:** Group members learn about each other and the task at hand. A leadership strategy to help groups that are forming is to act as a "coordinator" by helping to "set the stage" (i.e., purposefully pick the team, facilitate group goals, and create a team shared mental model).
- **Storming:** As the group members continue to work, they will try to establish a clear structure of the group and their own status – a process which is often very emotional. A leadership strategy to help groups that are storming is to act as a "coach" by helping to "resolve conflict and tension" (i.e., act as a resource, develop mutual trust, calm the work environment).
- **Norming:** Group members establish implicit or explicit rules about how they will achieve their goal. A leadership strategy to help groups that are norming and performing is to "empower" to help the team "successfully implement and sustain projects" (i.e., allow for the transfer of leadership, seek feedback from staff, set time aside for planning and engaging the team).
- **Performing:** Groups reach a conclusion and implement the solution to their issue.
- **Adjourning:** As the group project ends, the group disbands in the adjournment phase. During the adjourning stage, the leader should transition into a supporting role in order to expand the initiative (i.e., create future leadership opportunities for the group members).



ANDRAGOGY

Andragogy is a branch of science that deals with teaching adults and adopting new knowledge and skills in adulthood using conventional methods. However, due to the advancement of information technology (IT), it has become necessary to include newer technologies along with conventional methods.

Conventional and IT methods need to be combined and included in all areas of learning. Mastering IT application skills is necessary in order to improve practical application of IT methods in the learning process and the quality and speed of adult learning and teaching.

Current living and working needs require constant expansion of knowledge and acquisition of skills in order to keep up with technological advancements, which is not adequately covered by conventional basic education (schools, colleges, universities). Therefore, it is necessary for people in the field of andragogy to continuously learn, improve and advance their skills. The needs of the new labour market have become very demanding and more university networking is necessary in order to create relevant and qualified staff capable of responding to these needs. Existing curricula need to be constantly updated and adapted to real labour market needs.

Adult learning requires a student-centered andragogical approach. Unlike the pedagogical approach, in which the teacher holds a dominant position, the andragogical approach revolves around the student. It is necessary to allow the adult learner to independently decide whether the material is important and immediately useful. Seeing as adults have previous knowledge, skills and experience, they want to participate in shaping the learning content, and teachers must adapt to their needs. In this case, the quality of the learning process also greatly depends on the teacher's previous experience, particularly relating to evaluating students and their needs.

The basic principles of adult learning are:

- Motivation – adults will learn if they have a reason and a goal.
- Control – adults have responsibilities and feel the need to control their lives and, by extension, learning processes.
- Experience – adults have previous knowledge and experience that they want to connect to learned material and skills. Experience plays a big role in the learning process as a whole.
- Diversity – adults are different in terms of knowledge, life experience and age. This diversity may slow down the learning process, and the teacher has to find a way to equalize the group in order to improve results. In this case it is important to apply learning methods that would minimize these differences.
- Age – affects learning speed and ability. Learning speed decreases with increasing age. This should be taken into account while preparing classes.
- Goal and importance of learning – adults learn in order to achieve their goals faster. Goals play an important role in the motivation to pursue lifelong learning. Adults learn only if the applications of the material are clear.
- Habits – changing lifelong habits is difficult. Explaining the importance of accepting innovation and change is essential for a successful learning process.
- Respect – adults have existing knowledge and skills. The learning process goes both ways, as the teacher also learns from students. It is therefore necessary to respect the students' opinions, suggestions and attitudes throughout the process.

QUALITIES OF A GOOD ANDRAGOGUE

“You cannot teach a man anything, you can only help him find it within himself.” (Galileo).

In order to achieve results, an andragogue has to:

- Foster student motivation using various motivational techniques according to each adult's needs, interests, emotions and importance of learning.
- Adapt learning content to student interests.
- Connect previous knowledge to learning materials.
- Allow task selection during learning.
- Create learning content that will make participants feel successful.
- Create tasks that will develop competence and give students positive expectations.
- Give frequent feedback on student achievements.
- Connect learning content to current and future student goals.
- Continuously apply motivational techniques (familiarization, course content introduction, revision, encouraging cooperation with other students and the teacher, progress monitoring).

LEARNING STRATEGIES

In order to properly create a learning process, it is important to understand learning strategies. Popular myth says that people can be divided into the following ways of learning:

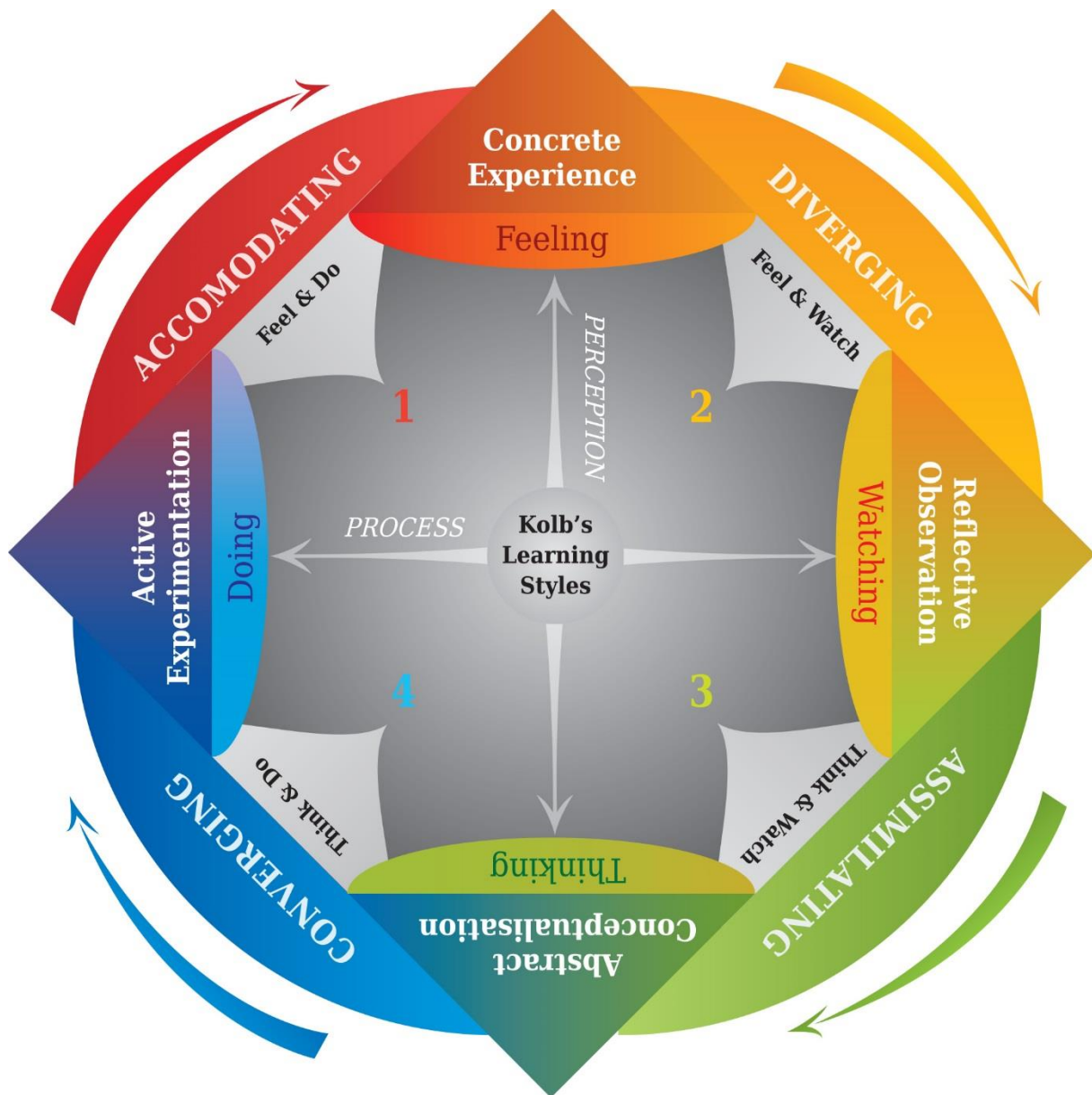
Visual type – learns through images. These people use the visual part of the brain to acquire new knowledge.

Auditory type – learns through heard or spoken words. The sound of spoken words is important to them.

Kinaesthetic type – learns through motion and touch. They enjoy practical work and learn while doing it.

There is no strong evidence to claim that learning styles exist. However, Paivio research results show that effective learning should use different ways of presenting the same content. The parallel verbal and visual presentation of the content gives very good results. The best way to

use a variety of learning methods is to adapt the message modality to the type of material and not to the mythical style of learning.



Special attention should be given to **David Kolb's Experiential Learning Model**, which divides stages of learning into:

The learning process proposed by Kolb begins with experience. The participant take part in some event, situation, observes something, experiences something. In this phase of the Participant's Kolba cycle, a certain situation is shown, an event is arranged.

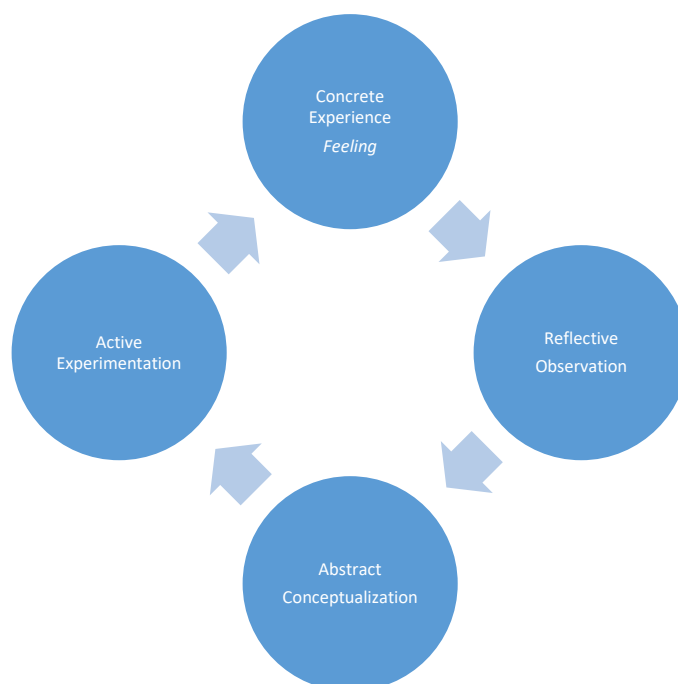
The next phase is reflection. The participant pays attention to what happened or happens, processes the data flowing into my mind, compares it with what he has in mind, tries to describe what he experiences, what he observes.

In the conceptualization phase, the participant is to combine what he perceives into a whole. Using the ability of abstract thinking, he is supposed to try to describe the mechanisms, create concepts and theories about what he experienced. The participant tries to explain the situation with the help of available knowledge, creates hypothetical explanations and mental models covering the whole situation.

The last phase of the Kolb cycle is experimentation. In essence, it is a practical verification of the hypotheses made earlier. Using the general conclusions reached by the participant, he tries to put them into practice. Trying to answer the question What can I do? How can I use my knowledge of the situation in practice?

But this does not have to be the end of the learning process. Because experimenting causes the participant to experience new situations and can start the cycle again, expanding their knowledge step by step.

Stages of learning according to Kolb:



Constructivism

Constructivism, as a theory on human ways of learning, defines learning as a process in which understanding and knowledge are reached through gaining experience and reflecting on it. Participants actively create their own knowledge and range of useful information and they do research, ask questions and use critical thinking for this purpose. In order to encourage active participation in the learning process, methods such as research, simulation, case studies, etc. are used, followed by discussions on what has been learned and the effect it had on changing participants' attitudes. The teacher encourages and motivates participants throughout the entire process. In this way, students can learn more and the learning process is based on understanding learned material rather than mere memorization. Results of learning can be spread to other areas as well, and participants have ownership of learned material because of their participation in creating course content. They are also more motivated because they can connect learned material to real environments and apply it in real life. This way of learning strengthens communication skills through teamwork and the exchange of ideas and opinions.

TRADITIONAL AND CONTEMPORARY TEACHING

The traditional approach puts more emphasis on the educational function of teaching, while the contemporary approach prioritizes students. The contemporary approach also has a different view of student and teacher roles. The traditional approach emphasizes the transfer of information, with teachers actively relaying information to passive students. The contemporary approach focuses on students as active participants who use critical thinking to make their own decisions, instead of uncritically accepting information given to them by teachers. Learning becomes a two-way (rather than one-way) process and teaching is adapted to specific individual needs. The teacher becomes a facilitator who helps students define the aims and goals of learning, and helps them use the information given to them to re-examine and solve problems and finally apply the acquired knowledge. Personalized learning has become the rule, and it is essential in contemporary teaching.

"In a personalized learning environment, teachers are no longer the keepers of knowledge, basing instruction on standardized curriculum at one level. Instead, a teacher's role is to manage the resources and supports that students need, when they need them, in order to reach mastery. In personalized learning classrooms, teachers adjust instruction daily –

sometimes even more frequently – based on identified individual needs instead of creating highly structured lesson plans days in advance.”

Jenkins, S. et al., *The Shifting Paradigm of Teaching*

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In the traditional approach, evaluation of knowledge was conducted exclusively through written and oral exams and grading. The contemporary approach uses various methods (e.g. Kahoot quizzes), including application of existing knowledge in various projects.

Characteristics of contemporary interactive learning:

- Participant-centered,
- Learning as the active construction of knowledge,
- Learning styles adapted to individual differences, previous level of knowledge and abilities,
- Application of cooperative learning,
- Application of various types of activities and teaching methods,
- Goals set based on real student needs,
- Teaching process relevant to specific problems,
- Teacher as facilitator, and formal evaluation of learned material.

Contemporary learning also takes place in a different environment. Unlike traditional classrooms made up of a frequently elevated teacher podium at the front (ex cathedra teaching), a blackboard and rows of desks opposite to the teacher podium, the contemporary iLab classroom is characterized by furniture that creates a flexible learning environment. Projectors and screens, interactive whiteboards, displays and measuring instruments, and systems for testing the level of acquired knowledge are used during class.



NEW COMPETENCIES AND NEW TECHNOLOGIES

The new learning environment usually uses new technologies that stimulate several senses. Advantages of adult learning and teaching using digital technologies compared to conventional methods:

- a) The use of digital technology facilitates fast, secure and extensive data processing,
- b) Digitally literate citizens can use computers for problem solving, which is faster and more efficient than the conventional approach,
- c) Communication skills of digitally literate citizens are faster, higher in quality and more comprehensive,
- d) E-society saves users time and money.

In addition to individual learning, it is also necessary to use the **think-pair-share** strategy, which is based on group learning and joining several individuals, one of whom shares their ideas with the rest. Ideas are then shared mutually or with a group of people in order to create a new product or service. This method is also used in the conventional approach, but the use of electronic technology helps achieve better and faster results.

The **Steam method** connects various fields of science and modern technology in order to increase motivation for cooperation among people with different knowledge and professional backgrounds, with the goal of creating new products or services. In the conventional approach, this method entailed a long process that required a lot of time and physical meetings of various experts in order to exchange ideas and achieve results. With the use of electronic technology, the process of communication and idea exchange has become significantly faster and higher in quality, and it produces better results with less invested time and fewer financial, material and human resources.

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The following tools are becoming increasingly popular in teaching:

- **Online classrooms, so-called connectivism**, where participants can take classes and acquire knowledge and skills online, from the comfort of their own homes, which has a stimulating effect on some people and produces positive results. There is a lot of quality content available online free of charge, which means anyone who wants to learn can do so and acquire knowledge at home. Some universities allow their students to graduate this way.

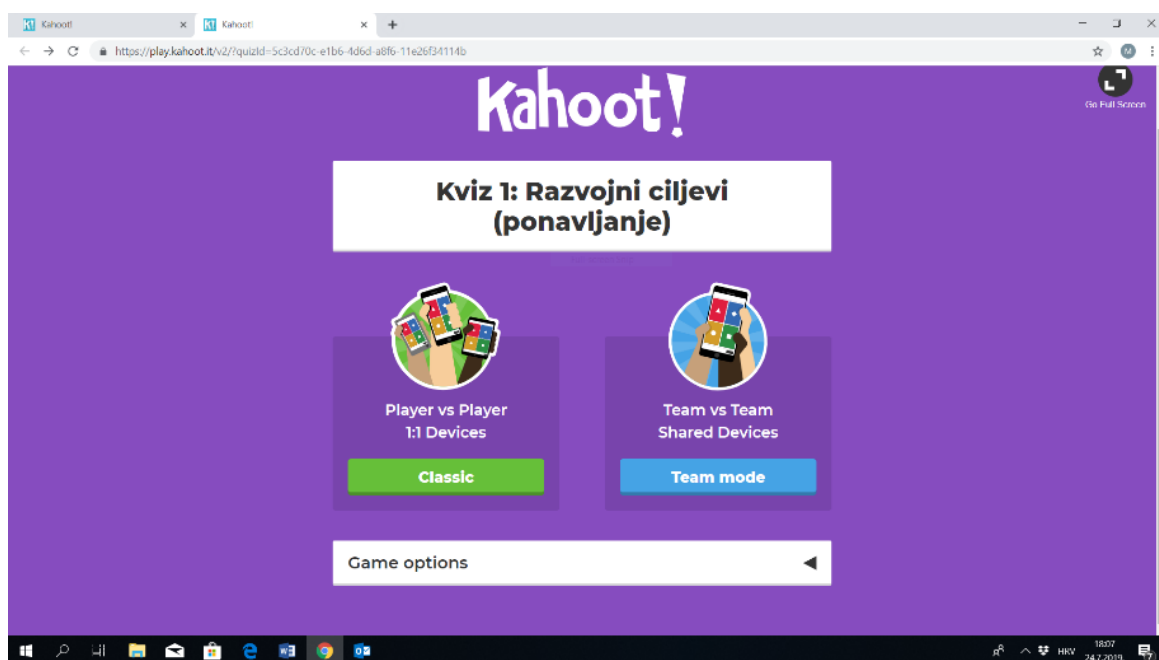
- **Learning via social networks**, can also be called social learning. This is a relatively new method used for entertainment and communication that also allows younger people and adults to share and acquire new knowledge and skills. (YouTube, Facebook, Twitter, Snapchat). Social network users usually don't know each other and frequently use pseudonyms, but they also share their opinions more freely and creatively than in physical environments around people they know, which can result in more innovative and higher quality ideas. They show high levels of involvement and interest in proactive problem solving (exchange of ideas, experiences, innovations).
- **Virtual communities** for learning and problem solving.

The modern way of life is overwhelming and makes people impatient while problem solving, which prevents them from successfully using the conventional approach in understanding the full scope of community problems and providing high quality, adequate solutions for them. This method allows participants to virtually express themselves from home via social networks, without fear of causing harm to living beings, humans or the community. It has produced completely new ideas of community structure with the goal of improving general community functioning.
- **Learning via reading** – Bloom's taxonomy is a method that works by letting readers or listeners identify with characters and, by being empathetic to their circumstances, reach the conclusion that they can learn from others in order to improve their own status. This method is also used with people who have difficulty acquiring new knowledge and habits which would improve their status. It produces good results because it fosters positive thinking. Aside from the conventional approach, this method can also use electronic media to familiarize readers with class material using audiovisual means, which produces even better results.
- **Creative methods of writing, drawing and creating 3D objects** boost and develop imagination in already creative people, but also in those who have not previously been creative, in order to develop existing and discover new creative abilities. This method is particularly productive in the iLab environment, with a group of people with various creative abilities gathered in one place. With the use of electronic achievements, this

method may uncover hidden artistic and creative tendencies that can have various useful applications (e.g. YouTube).

- **Communication through images** is a meditative form of communication useful for people who have trouble with verbal expression. Experts extract messages from artwork created by students who cannot verbally express themselves during class, and apply methods that use an individual approach to reach desired results. The iLab environment allows them even more freedom and spontaneity to acquire necessary knowledge by way of artistic expression. Electronic media and the possibility of joining social media under a pseudonym can produce excellent results and shed light on reasons why this particular method is necessary for teaching people like them.
- The **PAR (Present, Apply, Review) method** is a method most frequently used for designing project applications. The design must be realistic and tailored to the competition so that it can be reviewed and its results can be seen. Electronic media play an important role in this method as well because of faster communication, exchange of ideas, finding partnerships in different environments and connecting projects with common goals from different countries (Erasmus).
- The **research method** is used in the conventional approach to study the need for adults to develop or acquire new knowledge and skills. However, when there is a need to do a faster and more thorough, higher quality investigation to find the most appropriate method, new technologies that yield more results are used. Social networks and electronic achievements can greatly speed up the research process, both in target groups (Messenger) and social networks (Facebook, Twitter).
- **Gamification** is a popular approach to learning that resulted from the development of electronic games. Human resources departments, while following dynamic changes and trends, have frequently opted for this learning method in order to engage participants interested in experiential learning. Creation of new games that are both educational and entertaining is expensive and challenging, but it leads to excellent results.

- The **flipped classroom** approach is one of the most popular contemporary education methods. The learning process entails studying course content at home and applying this new knowledge in class. In this kind of approach to learning, face-to-face interaction is combined with independent research using technology. Students study pre-prepared online course material at home and come to class with questions and some new knowledge.
- **Kahoot quizzes** are an excellent online tool for testing students' understanding of course material. This tool is easy to use and allows anonymous participation of students logged in using a PIN given to them by the teacher. After each anonymous answer, the teacher has access to the number of correct and incorrect answers. Each student also has access to these results. This kind of testing process is stress-free, and the competitive spirit that develops during participation in the quizzes motivates students because they can improve their knowledge by reviewing correct and incorrect answers.



- **Hackathon*** is a framework or innovation process for creative problem solving and overcoming obstacles according to common rules in a short time frame. It is a participatory innovation method with the goal of creating an environment that makes it possible to not only innovate through hard work, but also meet new people and discover new things. Activity is realized through physical or virtual participation with

the help of several skilled participants, who can be professionals, but also amateurs (students, researchers, etc.). This type of event has 3 goals:

- Strengthen and engage the community
- Attract new community members
- Give members an opportunity to learn something new.

It is meant for a bigger number of participants, but logistics, expenses and participant experience must also be taken into account. The ideal number of participants is considered to be 40. Participants must have a team leader and tutor, and results are judged by an expert commission. A good hackathon requires: space (one large and 2-3 smaller rooms), food and drinks (refreshments and lunch in a fitting ambient), prizes (certificate courses, gift vouchers, gadgets, various devices), broadband internet and a professional Wi-Fi connection. A hackathon must have a main team leader, mentor and facilitator, who gives participants detailed explanations of the hackathon program and handles group work synchronization and schedules. Main stages of a hackathon:

- Planning (resources, rules, format),
- Execution (defining challenges and ways of communicating with target groups),
- Confirmation (ensuring minimal number of participants),
- Organizing the hackathon (maximum of 2 days and 1 night).

Hackathons are about open innovation and everything needs to be documented on photos, videos and individual recordings, and participants are put through written and oral evaluations in order to determine their levels of satisfaction with the event's organization, logistics, facilitators and results. All hackathons have several free online platforms for result sharing.

- Github – sharing source codes and documents created for hackathons
- Facebook/Twitter/Instagram – sharing photos and videos
- Slack – sharing structural documents and starting discussions on specific topics.

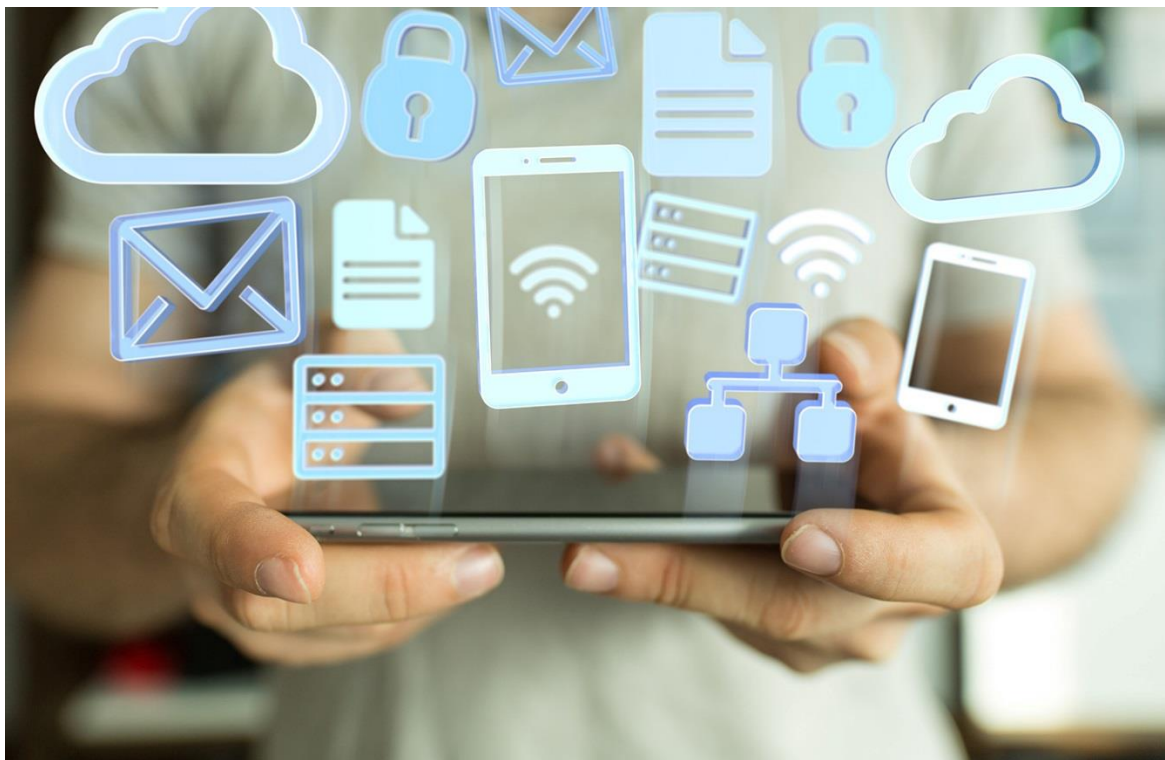
When organizing a hackathon, it is advisable that:

- The hackathon plan is unique and different from others
- The civil sector, associations, and small and medium-sized enterprises are included
- The hackathon is open to the public

- Participants have existing necessary skills
- Stakeholders who might use the results are included
- Social networks are used to share photos, videos, materials and results.

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- A **webinar*** is a presentation, lecture, workshop or seminar conducted over the internet in real time, including video, audio and textual communication among participants. Its main advantage is interactivity and the possibility of giving, receiving and discussing information. This method allows interaction between the lecturer and participants regardless of physical distance. Webinars, as a part of e-learning, remotely maintain learning processes and produce better results. In addition to lectures, webinars can be used to hold consultations, meetings, conferences and conduct various forms of interactive knowledge and information transfer.



Mobile platforms

- **Moodle** is an e-learning tool used for adult learning. This IT application facilitates learning and spreads knowledge by hosting content and various educational materials available for download.

- **Skype** is used for learning, communication and skill sharing. It is frequently used to connect people with the goal of communicating, as well as acquiring and exchanging knowledge and skills. The use of Skype enables virtual connection of two or more iLabs, and in doing so establishes communication among participants and facilitates knowledge acquisition and skill presentation. The Skype method can promote development of creative abilities and use of new skills to improve quality of life.
- **YouTube** is used for the exchange of knowledge and skills with the aim of promoting development of creative abilities, as well as acquiring new knowledge and skills and sharing them with the masses. This platform is particularly popular among the younger population because it allows them to quickly and efficiently master skills they are interested in. This method can be used to connect people with common interests with the goal of enabling them to exchange skills and acquire knowledge by individually sharing content. They can also film their skills and upload them to YouTube. This encourages people to be active and involved in the learning process.
- **UDEMY** is an online learning platform with over 35,000 courses and 15 million students. Any adult who wishes to discover their talents, develop skills or advance in their personal or professional life can join the platform, with the caveat that the courses are certified and some require payment.
- **HOOTSUITE** is a platform that supports over 40 social networks. This platform offers the possibility of learning while also saving time, because it allows users to track several things at once.
- **ALISON** is a platform with certified business, digital IT and language courses accompanied by audio, video and live stream materials. It allows self-assessment of knowledge and progress using available tools and all courses are free of charge.
- **HUBSPOT ACADEMY** is a platform that teaches users how to advertise products, attract visitors to social networking sites, and master marketing tricks to turn potential clients into real ones.

- **Edx** is a platform that hosts over 2000 free certified courses, in cooperation with 140 world-renowned institutions. This platform can be used to acquire new knowledge and skills that will improve quality of life, and professional knowledge for improving competitiveness of employed and unemployed adults in the labour market.

JENKINS LIST

Professor Henry Jenkins lists 11 basic skills required for success in the 21st century:

Play - the ability to experiment with the environment as a way of problem solving;

Performance - the ability to take on other identities for improvisation or discovery;

Simulation - the ability to interpret and create dynamic models of real processes;

Appropriation - the ability to sample and modify message content;

Multitasking - the ability to carefully review the surroundings and focus on important details;

Distributed Cognition - the ability to interact with tools that expand cognitive capacity;

Collective Intelligence - the ability to gather and exchange knowledge for a common purpose;

Judgment - the ability to assess reliability and validity of various sources of information;

Transmedia Navigation - ability to track stories or information in various modalities;

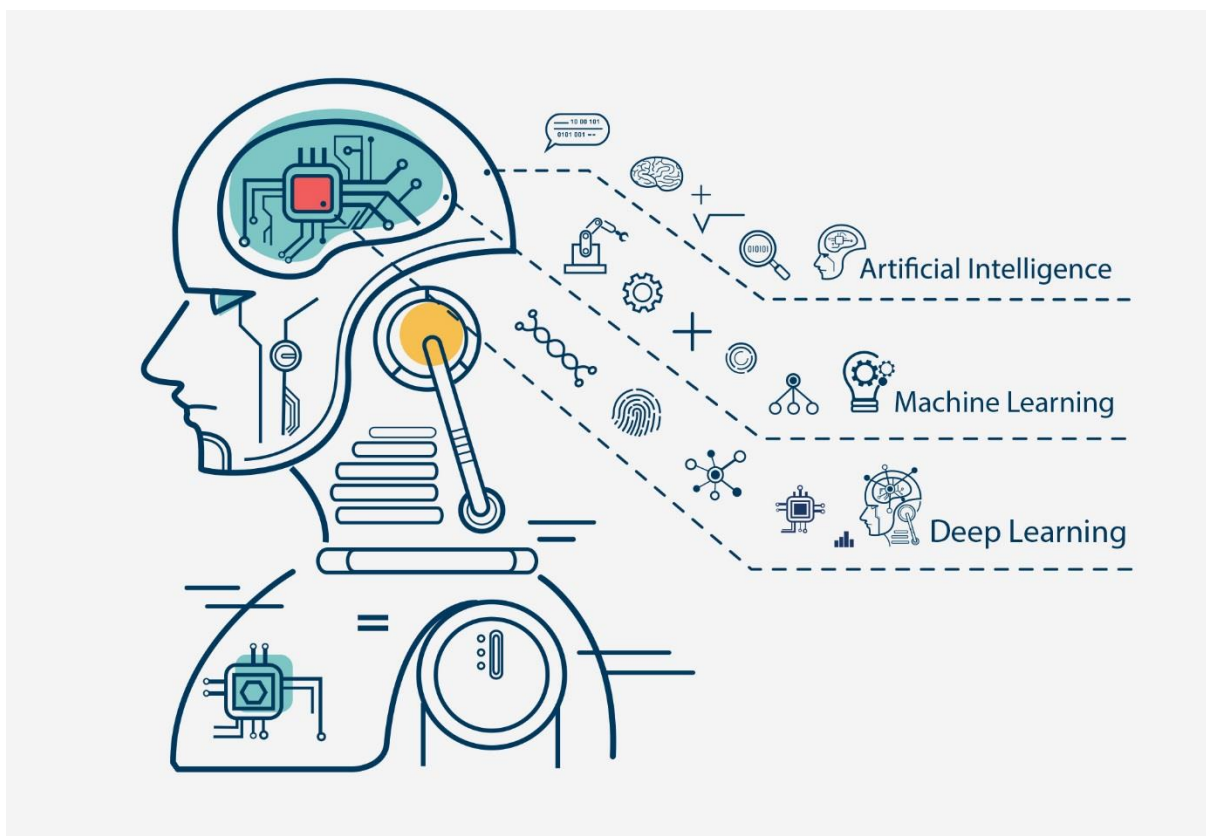
Networking - the ability to find, synthesize and transmit information;

Negotiation - the ability to see different perspectives and follow different standards.

The learning process should help memorization and stimulate the participant's perception.

It includes evaluating participants in terms of learning and cognitive styles.

An important element of this process is the development of an activity design algorithm. Such an algorithm involves setting timelines for the implementation of individual parts of the course, choosing means of communication, as well as progress monitoring and evaluation methods. The whole process should be planned in a way that makes it possible to design classes on e-learning platforms later.



TECHNOLOGIES SUPPORTING THE LEARNING PROCESS

By creating a manual of educational work in the ilab PLUS environment, it is impossible to omit the context of global technological trends. Based on the research of Deloitte, Forbes, Gartner and BBVA, we drew attention to several global phenomena in the development of technologies that may be important in the implementation of ilab solutions and will contribute to a better understanding and definition of the concept of intelligent space. This concept (intelligent space) is closely related to ilab, although in the strictly technical sense it is usually limited to the automation of equipment work or remote management of equipment components.

The biggest problem in describing technological global trends is their interconnectedness and you can really say that there is one megatrend at the moment, which consists in increasing the autonomy of devices and improving the synergy between human brain and software. This happens through the growing role of self-learning systems (in this case, the English name "machine learning" is more accurate and accepted in technical literature, so this term can be used instead of the Polish, Czech, Croatian equivalent) RPA (robotic process

automation), Edge computing and for many years, the developed idea of the Internet of Things.

The above-mentioned phenomena in technology are to form the basis for creating intelligent space (smart space), which in turn, enriched with software consists of its own components such as: Automating office tasks (automation of not only office processes in a literal sense, but rather understood as a “work environment”), Computer-Aided Facilities Management (CAFM, space management support), energy management, or wearables (electronic clothing parts combined with affective testing software, biofeedback, etc.).

The ilab environment is supposed to promote the widening of the user's perception which can be achieved through the Augmented Reality (AR) and so-called Digital Twins (electronic equivalents of objects existing in reality having built-in simulation of the behavior of objects).

SMART SPACE

In the last few years the term "smart" has already appeared in industry, architecture, mechanics, IT, project management, clothing design, etc. It has become fashionable due to its "capacity" meaning and ease in combining with various elements.

In our context, we will pay attention to the "smart" elements related to the management of educational space and the use of such space along with IT infrastructure.

ENERGY MANAGEMENT

Energy and electricity consumption has always been a problem for homeowners and businesses. As energy expenditure continues to grow and resources become limited, it is very important to be aware of how we use energy and how to do it in the most effective way.

Some smart energy systems are simple, such as energy-saving air conditioners or smart devices, HVAC systems, energy-saving fluorescent lamps and more. Others are more complex, such as multi-building automation systems and solar panels installations. There are various ways to manage systems and increase their energy saving capacity.

Most often, the first step in energy management is to diagnose potential energy losses and existing problems in commercial, residential and industrial energy systems.

This topic is particularly important in the context of the so-called green-labs, or ilab spaces, placing great emphasis on energy management, environmental protection and fostering sustainable development.

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The main goal of green labs is to reduce energy and resources in labs and to promote innovative ways of managing resources in the most effective way.

The components of such an environment are:

- educational space based on intelligent solutions
- elements related to greenery and reduction of pollution (natural moss)
- inclusion of energy saving in the training process (designing the training process)

The "smart energy" elements included in green labs are associated with savings water, electricity (sensors, smart switches), temperature, Co₂, waste management (review and identification of the recycling possibilities of the laboratory). A very important concept that should appear in the context of green-lab is the zero-energy building, although in our case it is better to talk about a zero-energy or almost zero-energy system. It is an ideal situation, difficult to achieve, but it is possible due to the application of appropriate technologies and building procedures. By definition is a space that consumes as much energy as it generates.



SMART HOUSE, SMART ENVIRONMENT

Smart house is a technology that uses sensors that cooperate with each other, communicating via Internet access, infrared or other communication channels. These devices can be remotely monitored and managed.

The technology was first developed by IBM and was intended as a failure analysis.

With the help of this technology, the user of such a room can control all devices using, for example, a remote control, smartphone, tablet with a special, dedicated application. One example is the use of, training rooms where turning on the projector extinguishes the light, etc.

The technology itself allows for more efficient use of energy (actually its saving) and also allows for greater security. It is also an ideal solution for people who do not have full mobility (such as for people with disabilities or elderly ones).

Part of this technology is "smart security and locks" - these are intelligent security and locks systems: alarms, smart locks, etc. Intelligent locks allow users to give access to a third party

using a virtual key. This key can be sent to the recipient's smartphone via standard messaging protocols, such as email or SMS. After receiving this key, the recipient will be able to unlock the smart lock at the time specified earlier by the sender. Smart locks allow remote access or denial of access via the mobile application. Some smart locks include a built-in wifi connection that allows you to monitor features such as access notifications or cameras to show the person requesting access.

We can also talk about intelligent space in the aspect of the ability to manage such space using software.

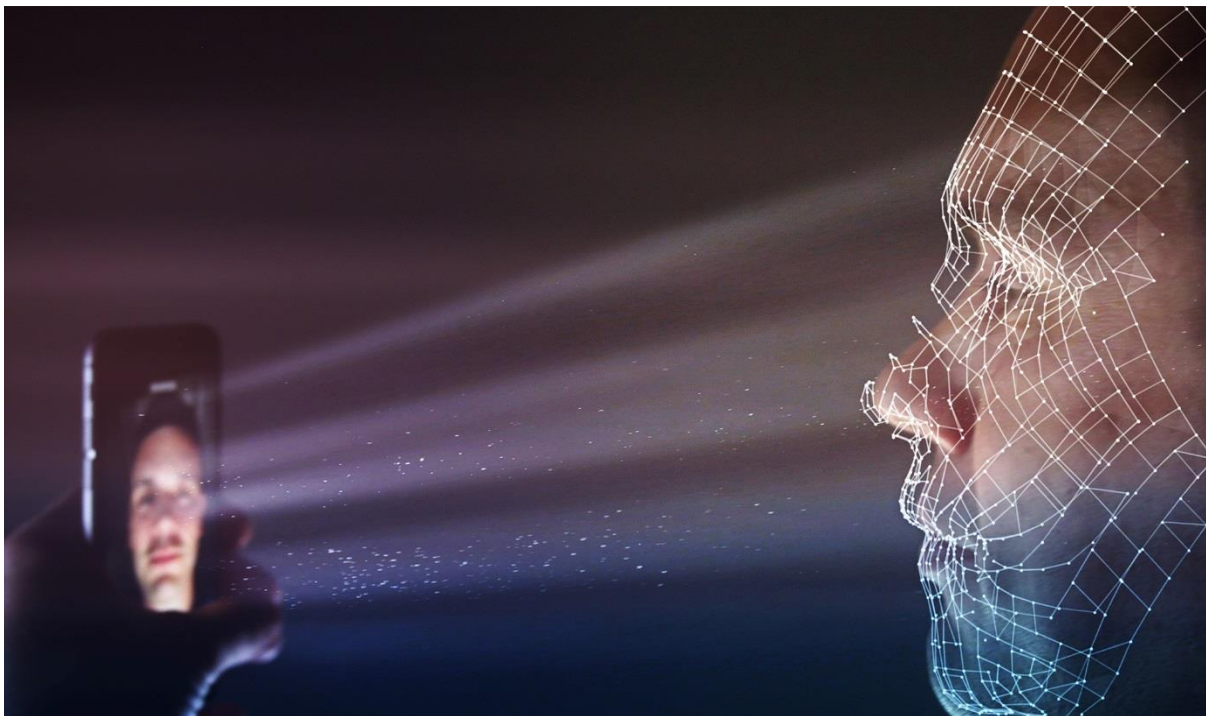
SMART INTERFACE

The field of user interface design has been developing very dynamically for years. Progress is driven primarily by the boom in the market of consumer electronics, especially mobile and IoT-related devices, where intuitive operation is a feature that can encourage (or discourage, if not be assured) the use of the equipment in tandem with other functions.

The ways of contact between the user and the computer can be different: text and graphical interfaces (GUI) using, for example, brain waves (so-called BCI interfaces), interaction methods via touch, gestures or voice - the group of natural user interfaces (Natural User Interface, NUI). Artificial Intelligence is more and more often used as an interface.

This topic is important from the ilab's point of view because the ilab space is open, modifiable, movable, devoid of architectural blockers, but through these features it supports the use of less-typical interfaces such as voice (issuing commands via sound) or interfaces related to gesture and movement.

This, in turn, is associated with various elements of electronics, sensors that we can wear on ourselves as so-called. **Wearables**. They usually have the form of a watch or a multifunctional wristband, as well as glasses, headphones or other gadgets.



SENSORS, SENSORS, BIOMETRICS - CASE STUDY: ILAB PLUS CRACOW

In order to check if ilab is a space that helps and speeds up learning, measurements of biosignal activity of participants during educational training were carried out. During the experiment, the participants were monitored by the Eye Tracking device, the hand-bands and Emotiv Epoc as an example of the brain-computer interface (BCI) implementing non-contact human-computer interaction. The Emotiv Epoc device was supposed to study the activity of the participants and the teacher, as well as monitor the interest and commitment of the participants and the trainer during the classes.

During the experiment carried out in the ilab creativity class, participants and lecturers were subjected to observation of emotional states accompanying them during the classes. The research was aimed at observing the participants' involvement during classes, their excitement or boredom.

The iLab space has been tested using multi-platform mobile sensors. The aim of the study was to check the biophysiological reactions of users in a specific iLab environment. The test was done using the e-Health device on the Arduino platform. The second one was aimed at gathering basic data about emotionally charged biophysiological reactions and was partially implemented with the Empatica E4 (MIT) device and partly with the help of the Microsoft

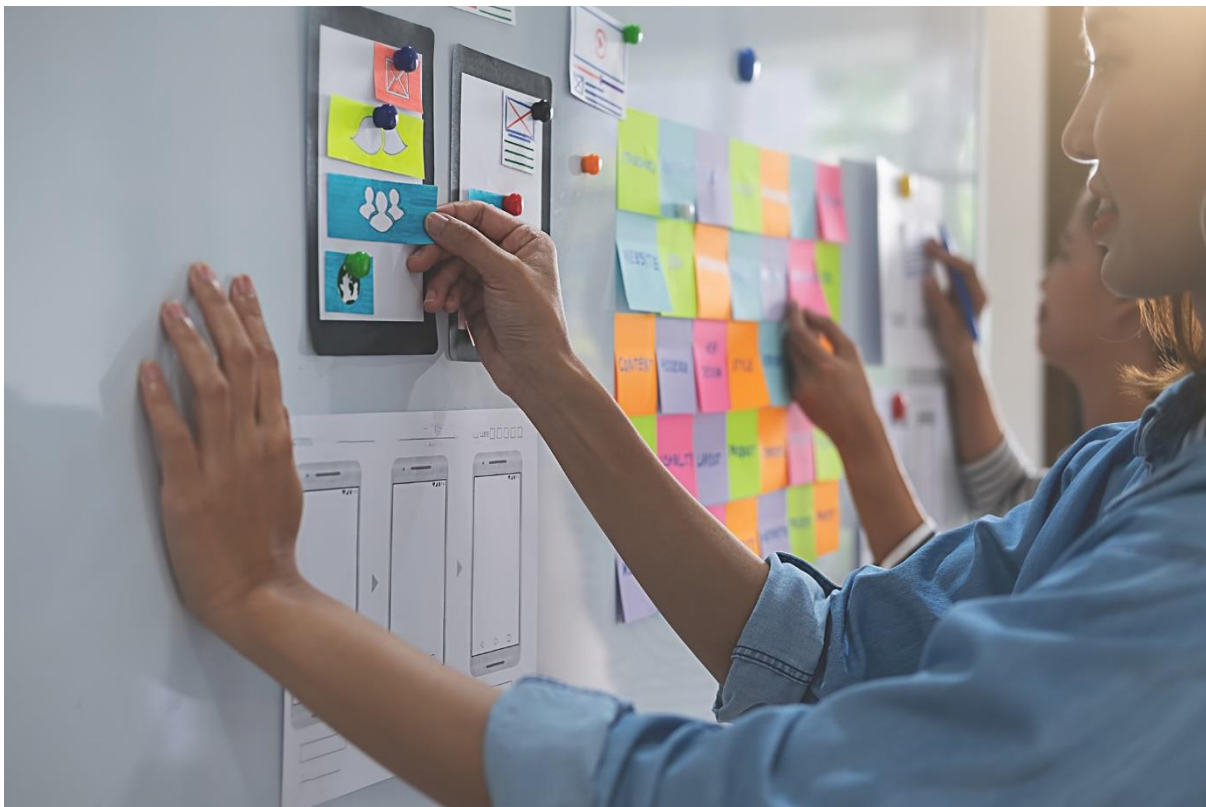
Band2band - for both cases, dedicated software and procedure was created in the PsychoPy tool.

In the case of testing with mobile sensors - bands, the best choice seems to be the measurement of heart rate (HR, HRV, etc.) and the sweating reaction on the hands (or feet) (GSR, EDA).

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The main reason for this choice seems to be the fact that practically all "wearable" or "fitness" devices have a built-in optical heart rate monitor and some of them (unfortunately still a minority) - also GSR sensors. Other types of sensors, if you do not count the standard accelerometer or light meter known from cell phones, are rare.

The key channels that can be distinguished here are the "heart rate" expressed in beats per minute (bpm) - where the average number is count for some period. From this source we can get knowledge about general activity (bpm grows with physical activity) but also general stress and arousal. Another channel related to the same system is HRV, meaning "heart rate variability" which means the change in the length of the interval between "peaks" of the ECG graph. Acquiring such a signal is much more troublesome (ECG) but possible in mobile devices. We can acquire knowledge about mental load, effort, and emotional response to the stimulus. It would also be useful to submit the above mentioned sources with data on the subject of breathing, however, standard wearable equipment rarely offers such an opportunity.



FIRST STEPS TO FACILITATE THE TEACHING PROCESS

FACILITATING THE PROCESS

PREPARATION OF THE ENVIRONMENT. TRAINING

Good training is a highly valued service on the market. When preparing training in a creative space, you must ensure that the effect of innovative methods and creative space is not spoiled by simple mistakes. It is not enough to invite participants to a nice and friendly interior, packed with technology and gadgets. Poor preparation of the training is the best way to get bored of listeners and thus to waste potential and opinions about the trainer. So what can we do to make each training course perfect?

SPECIFY THE PURPOSE OF THE TRAINING

The basis for preparing a good training is to outline its specific purpose. Events of this kind cannot be, because more or less successful social gatherings, where one can talk "about this and that" or impress its participants with interesting technical solutions. It is important that our goal is actually possible to achieve at a specific time, place and conditions. We must remember that when defining the goal, we inform participants and principals what skills we will transfer. It is also important to get to know the training goals of its participants beforehand. It is worth asking them to complete a short survey (it can be online).

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ADAPT TO RECIPIENTS

The second very important step on the way to prepare a good training is to consider the possibilities of our audience. The discussed content and the means of communication used should be closely related to the listeners, their age or knowledge about the given issue. It is important to ensure about the same level of knowledge of the issue at the recruitment stage. Knowing who we are dealing with will avoid situations when some participants will know the topic you are discussing and for some it will be completely new.

CREATE A TRAINING PLAN

The next step in preparing good training is to develop the program of the event itself. It should consist of a detailed list of topics and issues discussed, as well as the topics covered in the introduction and the teaching and evaluation methods themselves. This "road map" is perfect for us, because it will help in preparing the presentation, as well as during the implementation of the training, protecting against falling into the abyss of questions and side issues.

CONFRONT THE PLAN WITH REAL TIME

Each of the issues discussed by us should absolutely have sufficient time allocated. This will allow us to make a preliminary assessment of whether our assumptions are realistic at all

during one or two days. When creating an hourly schedule, it is always worth considering a large number of breaks, and in the case of the most important issues, also provide much more time for questions and answers.

PREPARE TRAINING MATERIALS

Once the assumptions of our training have been created, then it is time to prepare training materials. In fact, for your convenience, it is worth dividing them into two categories at the outset - aids for use during the training itself and intended for participants. When preparing training aids in a creative space, it is worth considering using this space in an optimal way. Similarly, any use of equipment should be adapted and checked in advance on available equipment.

PREPARING THE MEETING ENVIRONMENT

Even the most creative space alone will not solve all problems that may arise during classes. We need to check our program point by point and think about where and how to best implement it. We must guarantee places for group work so that groups do not interfere. If you need to save information or create drawings we need to prepare a place for writing pad.

The implementation of these six steps to prepare a good training will certainly give us a good foundation. In practice, however, the very implementation of the project will prove our success or failure. Therefore, it is worth taking care of every detail, as well as rehearse the speech itself and draw conclusions from previous experience.

START A SESSION

Contrary to appearances, this is not a trivial question. A lot depends on the first few minutes: atmosphere, your credibility, attitude of the participants to the training, tone of classes. It is good to prepare well for these first few minutes. It all starts before you leave the room.

Think about what you focus your attention on.

Inexperienced leaders are self-centered. They think:

- Will it work out?
- Will they accept me?
- Will I not give a stain?

- Will I know all the answers?
- Am I even good at it?

These are legitimate concerns, especially when you are just starting to train. The problem, however, is that not only you are facing the unknown. Participants also have their concerns and ask themselves many questions.

It is much better to focus on their fears and questions than yours.

Start on time, even if not everyone arrived on time. Starting punctually you give a signal to those who have already come to the training room that you respect them and that you are well organized. If you want to wait for the others, first thank those who are already punctual and ask them if they mind, to wait. This is not good if the start of the training is delayed because of the trainer himself. There is probably no worse image thief than the thrashing leader in recent preparations (e.g., nervously looking for an outlet or other important cable) - all in front of a complete and suspenseful training group.

After the welcome, say a few words about yourself - about your experience, education or competence. However, it is not about talking about yourself and your life. Undoubtedly, you are an interesting person and you have many experiences, but your experiences, even if they are the widest and most colorful, do not matter if they are not related in any way to the training and the situation in which the participants are. When you talk about yourself, you answer the question: Why am I doing this training? Thoughtful "a few words about yourself" given at the beginning of the course certainly increases the credibility of the teacher in the eyes of the participants. Of course, all information about yourself must be provided in a confident and calm voice, with simultaneous eye contact with the participants, without unnecessary and nervous gestures.

Appreciate the experience and knowledge of your participants, let them feel co-authors of the training, and not just clean tables to write. Use what you know about participants (their aspirations, concerns, problems, opportunities, etc.) and link it to the topic of training. Use the knowledge you had from surveys before the training. If someone has already put in an effort to answer your survey, show that you also looked into it.

It is worth proposing some introductory exercise that breaks the first ice cream and relaxes the atmosphere. Such an exercise is justified even when the participants know each other well, then you can suggest the exercise so that everyone presents somehow information about themselves that is not widely known. This form of getting the participants familiarized with facilitates the introduction of an atmosphere of cooperation and trust.

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Important elements that will help in getting to know the group:

What do the listeners already know about this topic?

- To what extent can I use professional jargon?
- What functions do they perform in this organization?
- Where and why reservations may arise?
- What is the cultural characteristics of the group (norms? Values?)

A good trainer cares about the hygiene of his and his participants' work and therefore proposes that the so-called group work rules. It is very important that the participants are co-authors of these principles - only then they will take them seriously. Imposed from above will not work. So not: I would like to propose the following set of rules, but: What are the rules we should make in order for us to work well and efficiently? You must be prepared to suggest something at the beginning or introduce some rules that will facilitate your work (e.g. turning off phones during classes or returning from breaks on time)

Present goals and program. This is an indispensable period above and throughout the introduction. It is important to do it interestingly, not just to read the points of the program (because these probably everyone already know (good practice requires that you send the full training program to the participants at least 2 days in advance). The presentation of the training program is also an opportunity to give a signal participants that we care about their activity. Many trainers immediately after the presentation of the program encourage participants to ask questions and share their doubts about what they heard.

Establishing relationships with individual training participants

At this stage of training, you should primarily:

Ensure that the individual participants introduce themselves at the beginning of the training.

Be aware of the importance of eye contact.

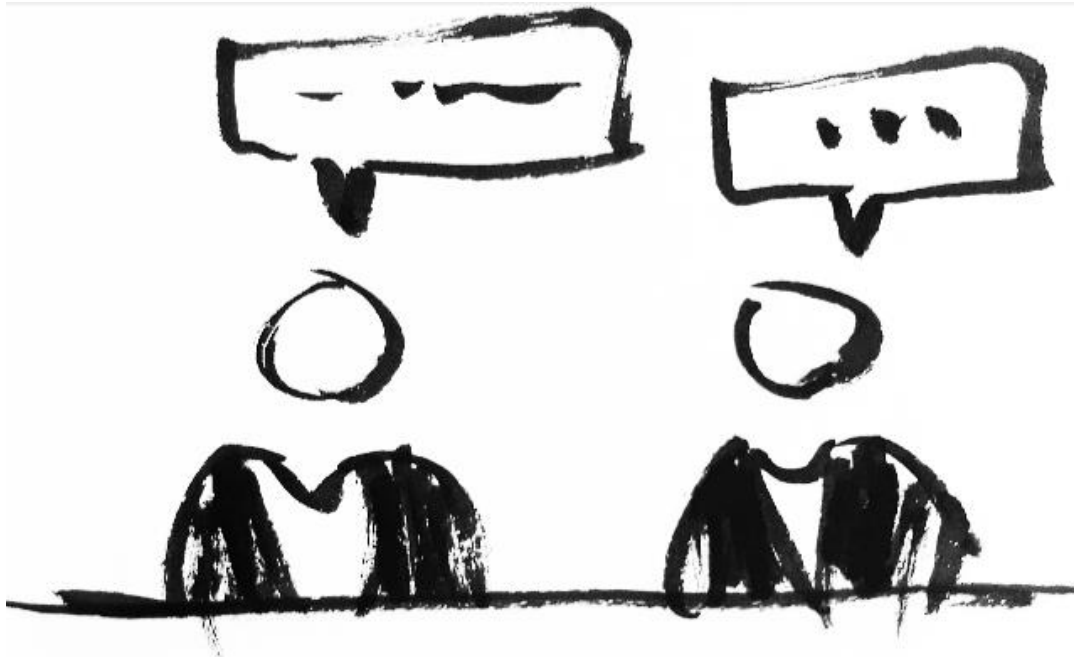
While listening to individual training participants:

Keep eye contact with the person who introduces himself.

Ask additional questions to get to know the participant better.

Remember the name of the participant (if you have trouble remembering too many participants, you can, for example, ask you to write names on previously prepared identifiers).

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PROCESS OF REACHING A MUTUAL GROUP DECISION

Group dynamics concerns:

- The pace of development and attitude to change,
- Quality of communication,
- Goals set by the participants and facing the group (explicit or hidden),
- general climate prevailing in the group at individual stages of work (e.g. ease of expressing specific feelings, dominant values and expectations, energy level in action),
- Norms - formal and informal, (explicit or hidden),
- Group structures - leadership system and group roles,
- The development phase of the group and the accompanying crises.

Today, practitioners and theorists of working with a group by methods pay special attention to the period of preparation for the creation of the group and the way it is organized. They believe that this stage may prejudice the results of working with a group.

Many very good ideas about group ventures do not come to fruition, because an action plan has not been developed and clearly defined, and those who lack specific goals and formulated expectations. Lack of rethinking and planning usually causes later problems in working with a group. It can be a source of frustration for participants, a sense of dissatisfaction and minimizing the teacher's own competences

Groups can be divided in different ways

- Open group: new people can join it at any time.
- Closed group: no one can join during it (most often we will deal with it during trainings)

During the training, which lasts several hours and certainly longer than a day, we will deal with a group process and its characteristic development stages.

This is the first phase of "life", a group in which it meets and forms. It is the beginning of September, we are a bit stressed with a new group, we meet people, we try to be nice (because everyone at the beginning I want to get to know each other from the best side

In this phase, the trainer's task is:

- Help in getting to know each other's members
- Introduction of rules that will help us achieve the goal (eg by writing a contract)

Reaching

- In the next phase, we get to know each other not only from the good side, but "it turns out" that we also have disadvantages. Not everyone gets along well, even if everyone tried to be nice at first. There may be someone who does not accept the goal set for the group.
- In this phase, the trainer's task is:
- Goal reminder
- Collecting information for what it is (conflict mitigation)

- If the group is larger than 5-7 people, you can enter a group structure, divide tasks, give everyone responsibility so that everyone feels that they are important and needed in the group
- It is worth giving the group an ambitious goal (eg introducing an integration exercise or training task at the moment forcing the groups to compete)

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Cooperation

- In this phase, the group resolved the first misunderstandings or established a way of coexistence. Maybe not all matters have been agreed, but work somehow goes ahead.
- In this phase, the trainer's task is:
- Maintaining group motivation
- in the event of misunderstandings and misunderstandings, act as a mediator
- Leading the group to the synergy phase, i.e. dividing tasks in such a way as to maximize the talents of the members and that these talents complement each other

Group dynamics

The fact that the training participants are active, communicate with each other and cooperate means that between them begins to "spark". They begin to confront, compete with each other and enter into different roles. Over time, they perceive more clearly their dependence on others and the need to constantly specify goals and principles governing mutual relations. These phenomena describing the process of creating a group identity and entering higher and higher levels of cooperation are called a group process. They are cyclical in nature and temporary crises may occur between the individual stages. Metaphorically speaking, the group process is a way to effective cooperation, in which team members must eat a barrel of salt, and preferably several times.

The incentive for activity is an invitation to effective learning. At the same time, it opens the door to a group process that must be accepted with all the benefits of inventory. It's not easy, because it is often associated with anxiety, frustration, crisis. Is it worth taking such a risk? Yes, and for several reasons:

1. The development of the group is determined by crises, each of which closes the old and opens a new stage. This process is a testimony to healthy adaptation to new conditions. You can see the old structures and ways of functioning are not adequate and need to be changed. Positive solution to the crisis, i.e. finding new ways of functioning - will promote the group to a higher level of development and cooperation

2. People reveal in their actions various qualities, advantages and preferences for tasks in which they feel well. In this way, roles in the group that build its structure are clarified. There are leaders, implementers, those who follow the rules, etc. This process takes place as part of daily cooperation, but it is particularly evident in the crisis. Paradoxically, the crisis allows members of the group to have what they have best.

3. Deadlock in teamwork allows you to verify the standards of mutual intercourse and cooperation. Since the group is entering a crisis, the current rules are not working in the new situation and it is time to modify them.

4. The reflex of rebellion and rejection of the "new" characteristic of the crisis stages in the life of the group paradoxically favors the acceptance of upcoming changes. It is often the case that we reject a proposal from the finish line to accept it soon. However, this is a personal choice in our experience, not a directive or external coercion. It is the impulse of rebellion and the possibility of rejection that gives us a sense of free choice.

5. The developing group process allows achieving the synergy effect. Synergy is a phenomenon appropriate for a well-cooperating group. It consists in the fact that its real effectiveness (e.g. the speed of learning and the quality of the solutions it finds) is much higher than the sum of its members' contributions. This is clearly seen in the work of creative groups.

Too much tension in the group and unresolved conflicts are a threat of conflict and a bad atmosphere that may prevent you from continuing training. Too small, in turn, is too low dynamics, which causes the lack of participants' involvement and "falling asleep" units. For a group to properly meet its purpose, conflicts and mutual criticism and confrontations are needed. They constitute material on the basis of which participants can provide feedback

Features of an effective group

- 1) He understands his goals and tasks
- 2) 1. Flexibly adjusts the operating method to the adopted goals

- 3) 2. Is characterized by a high level of communication and understanding between its members
- 4) 3. Individual feelings, positions and views of all its members are conveyed in a direct and open manner
- 5) 4. Is able to make and complete the decision making process. At the same time, he carefully examines the minority point of view and ensures that all members participate in making all important decisions.
- 6) 5. Achieves a balance between the effectiveness of team activities and the implementation of individual needs.
- 7) 6. Ensures sharing of responsibility among all its members. Everyone can present their own ideas, develop and develop the projects of others, give opinions, check the enforceability of potential decisions, as well as in other ways contribute to achieving the goals adopted by the group and its proper functioning.
- 8) 7. Is compact but does not limit the independence of its members.
- 9) 8. Properly uses the skills of its members
- 10) 9. It is not dominated by a leader or any of its members
- 11) 10. Is objective in assessing oneself. She doesn't run away from her own problems and is able to modify her actions.
11. Maintains a balance between emotions and reason, and creatively uses the emotions experienced by group members.

ESTABLISHING SHARED UNDERSTANDING:

The group works best in synergy. It is a very well-coordinated and effective team, because by complementing each other and making the most of their talents, working together is no longer just "cooperation", but it leads to more than just the sum of its elements. Members of the group want to work, they feel good in the team, they have a mail of fulfillment

In this phase, the trainer's task is:

- Maintaining the state of synergy limiting its role to organizational issues and setting ambitious goals.
- At this stage you should also look for potential sources of conflict before the next phase

Conducting exercises during training

Any active procedure involving the participants' work requires appropriate introduction and discussion. However, everything depends on the type of exercise used. There are generally 2 types of exercises:

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- Pre-emptive theory: awareness (e.g. role playing before theory, often brainstorming, questions at the beginning of classes etc.).
- Following the theory: enabling it to be practiced (eg simulations, case studies etc.).

In the first case, your own activity is crucial. You must know well what you are going to - what you want to make your audience aware of. The exercise must be conducted so that its participants become aware step by step of the importance of individual elements. It is worth writing them down on a separate piece of paper in the order in which they should appear as a result of the exercise. In this group of exercises, the importance of discussions and summaries increases.

There should be all the substantive elements that appeared as a result of the work of the participants of the class and additionally what we consider important and what the exercise itself did not reveal.

In the second case, we are in a much easier situation. While the theory preceding the procedure has been implemented effectively, you have the right to expect that at least some of the participants will complete the exercise correctly. It is enough to bring out the most important elements in the summary and thus fix them. Remember, however:

- The instructions must be very accurate,
- Exercise should obviously refer to the material presented earlier,
- In the case of learning skills, we practice them best one by one.

MANAGING CONFLICT

In this phase, the formal ties that connect the group disappear, and the informal ties also weaken slightly, because although acquaintances with school can last for many years, they will not be as intense when you do not spend so much time together.

In this phase, the trainer's task is:

- The trainer must look for methods to reintegrate the group. It can be a change in the composition of working groups, taking a break or discussing problems
- At this stage, it is worth ensuring that the group does not finish its work with unresolved conflicts, if something was mismatched or something went wrong. This approach can take revenge during further classes and it is worth working on it.

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Adaptation of the language to the recipients

There is nothing worse than the language between the trainer's language and the language of the recipients (participants of the training .. In this case, the most interesting training can be a failure and despite providing the best training methods and technical means of communication we will not find a common language with the group. We can use a language that is too professional or too " infantile ", so at the stage of learning the training needs we should find out how advanced the training participants are and adapt the language to it.

As part of this, the trainer should:

- Pay attention to the preparation of the form of expression adapted to the knowledge, age and skills of training participants.
- Prepare to meet training participants by becoming familiar with the environment in which they operate.
- Be able to build understandable messages characterized by brevity and the use of simple words.

The trainer must match the dictionary (resource) of words used in his language to the cognitive capabilities of the participants. The shorter the statements, the better the conditions for understanding the transmitted content, and thus for the correct reception of the transmitted messages and knowledge. The way words are selected, thoughts and examples formulated is not only important for achieving the training objectives, but also for the attractiveness of the training. He should pay special attention so that e.g. used English and jargon phrases are understood by the participants, and if necessary explained by the trainer. He should also ensure that words or content are not too difficult for listeners. The trick is to talk about difficult things in a simple way.

CLOSING THE SESSION

Training left without an attractive ending or with a clichéd "Thank you, everyone for your attention" will leave participants unsatisfied and have the impression of being left open. The ending should be intriguing and satisfying to the audience. It is worth being prepared to use different variants of the ending, previously prepared for different situations. At the end of the training, most of you only think about going out, so you shouldn't stop them too much, so it shouldn't be long. The end of the training must contain several elements that will be remembered and will often fulfill the obligations arising from the training procedures.

1. Summary, i.e. referring to the objectives of the training, presenting the conclusions and concluding the message that we wanted to convey.
2. You can be tempted to use an adequate quote - the words of famous people refer to emotions, so that participants will remember your final speech. Another variant of the attractive ending may be telling a story / anecdote - you can also include a message or an analogy to it.
3. Asking a question - it should be provocative and thought-provoking, so that the students, after the training, stay with something that will intrigue them after leaving the room. These types of endings are particularly recommended when we plan to continue the topics at subsequent trainings.
4. Call to action - that is, encouraging participants to implement the content provided in the training in their professional life or work environment.
5. Acknowledgments - in the last phase of completion, we should sincerely thank you for participating in the training, without unnecessary decorations and coquetry. Eg "I was very pleased to work with you."
6. Knowledge test - a well-prepared training should, at least at the end, conduct a test on the most important training content. Thanks to this, we will be able to assess both the trainer's work and the attractiveness of the training methods used.
7. Evaluation surveys - this is usually a design requirement as well as meeting training standards. In creative space, this should be done on-line or with the help of special devices ensuring anonymity and at the same time the ability to quickly download data.

KEEPING DISCUSSIONS ON THE TRACK

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Often, the exchange of experience between training participants is part of the training. This is a very important moment because often participants (especially when it is not a homogeneous group, e.g. from one company) feel the need to share their experience or applied solutions with the group. Absolutely, however, such a discussion can not be let loose. Moderating discussions is a difficult and demanding task. The trainer must moderate discussions all the time so that it does not deviate from the topic or is not contrary to the training goals.

Initial phase - initiating discussions, Specifying the topic, Impulse to start (sometimes it helps to save the discussion contract)

Discussion development phase - Showing interest - eye contact, listening in focus, Allowing for free exchange of opinions, Watching time and the main thread, Making sure that all participants have the opportunity to speak (in group discussion they let a person know the dominant units that do not allow others to vote), If necessary - reformulating, as well as explaining questions and statements of participants, Summary of the next stages of discussion.

The final phase - summary - Deciding to end the discussion, signaling the end (asking if anyone else wants to add something) Summary in a few sentences of the discussion.

During moderation of the discussion, the trainer can use specific wording-tools to activate participants or guide them about the discussion.

- 1) Establishing contact with participants by repeating a sentence like, for example: "If I understand correctly, you talked about ..."
- 2) Involvement in lively discussion with the questions: "What do you think about it?"
- 3) Answering a question, a question, which allows you to delve into the subject
- 4) Repeating questions to draw participants' attention to the threads.
- 5) So-called 'Bounce Ball', used to interest participants in the discussion.

As part of the trainer's workshop, you can use 3 communication channels: vocal, verbal and non-verbal. Your workshop on these three channels affects the attention, concentration and perception of training content.

The meaning of the words you convey throughout the training depends largely on how they are spoken. The most important elements of a vocal channel that have a significant impact on the way the content is transmitted are:

1. Voice modulation: Its essence lies in the changeability of high and low tones in the voice. Changing these trainer voices supports concentration and interest among listeners by pointing at higher tones to more important content. A smile during the message helps the voice sound friendly and open.
2. Speaking volume control: If you speak too quietly, participants may lose the thread and this can lead to nervousness. Speaking too loudly can cause annoyance. If the participant speaks loudly, then speak a little more quietly to silence him. If you want to take control of a conversation, speak a little louder than the participant.
3. The pace of speaking: The pace of speaking should be adjusted to the recipient, that is, to the time he needs to understand the transmitted content. When a trainer who maintains a slow pace of speaking appears in a group of dynamic people, he will not gain the favor of participants who will pick him up as a conceited person. The rule applies to public speaking - the larger the room, the slower the speaking speed.
4. Emphasizing: It is important to emphasize (speak slower, clearer, slightly louder) those parts of speech that you care about most, which should draw the attention of the participants.
5. Tone of voice: Tone of voice can indicate emotions. Feeling the tension you can (unconsciously) speak in a higher voice, which can be negatively perceived by the participants.
6. Volume: The appropriate volume affects the participants' concentration on the content transmitted. Speaking too loudly can be perceived as arrogant and gives the impression of trying to dominate the group. Silent speaking may be perceived as a lack of confidence.
7. Speech rhythm: Before speaking important information, and in order to focus the attention of listeners, you should temporarily suspend your voice
8. Paralanguage: An important element of the message is the elegance of the language used, including not abuse of language inclusions (so-called *Prajęzyk*), which interfere with the

reception of content. Frequent repetition of the words 'truth', 'of course', 'yes' discourages participants, and inclusions such as aaaa ..., er ..., yyy ... can be perceived as lack of knowledge.

INTERVENING DISCUSSIONS

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Interrupt important content with anecdotes or examples.

Divide the whole into modules - logical whole, each starting with the words: The next point that I would like to discuss is "

Follow the rule of "heating the channel" - start important content with the words: "Now I would like to move on to a very important issue"

Anticipate and anticipate participants' questions, e.g., You can ask yourself if a product really has so many benefits. "Ask the audience questions about: general - e.g., Do you agree with what I have said so far? ? "

Show commitment - it is contagious.

Use aids - transparencies, transparencies, charts, etc. - help you focus your attention and add variety to your presentation

Adaptation of body language to the content of the statement

Body language is of great importance in the communication process, because information goes to the brain:

87% through the sense of sight,

9% through the sense of hearing,

4% by other senses.

Body language is a window showing thoughts - messages can be received by facial expressions, gestures, body movements, eyesight. Therefore, the body has a huge impact on the recipients.

The most important elements of body language are:

- Eye contact: Eyes are the most important area of visual attention - during conversation attention is focused on the eyes for about 43% of the time. Avoiding eye contact may suggest that you do not know what you are saying, but when you look constantly in the eye, the

recipient begins to treat the statement with suspicion. Maintaining eye contact helps to reach agreement and builds positive relationships with training participants.

- Facial expressions: The face is a very important source of emotional information, as it reflects rapidly changing moods, reactions to statements and behavior of the interlocutor. First of all, it expresses feelings. Empathy can be signaled, among others by smile.

- Body posture: A body curled up, hunched means withdrawal, and straightened with a raised head indicates confidence.

- Hand gestures: Open hands increase the credibility of the spoken words. When you want to be open to the auditorium, point one or both hands open to the participants and say "I am asking for questions, I will gladly answer them." arms crossed, hands hidden behind - aversion.

- Dynamics: Movement and presentation of materials makes the presentation more convincing.

- Engagement - enthusiasm: Do not hesitate to show your listeners your personal commitment and belief in the rightness and importance of what you present.

ACTIVE LISTENING

Listening is the most important element of interpersonal communication. Our ability to listen well affects the quality of all our relationships, not only with family and friends, but also at the place of employment, also affects the efficiency and quality of our work. In our lives, we engage in many conversations with friends, colleagues and our family members. However, most of the time we don't listen as well as we could and sometimes we should. Listening, however, is not something that comes naturally or easily for most of us; it is a skill that should be practiced in everyday situations as well as during interpersonal training. Active listening in interpersonal communication means, as the name suggests, to make an informed effort to give the speaker full attention. We are often distracted by other things in the environment, such as television, the Internet, our cell phones or other tasks. We think we're listening to the other person, but we don't really give them full attention.

TECHNIQUES FOR ACTIVE LISTENING:

Give all your attention to someone. Try to minimize external interference and communication barriers - noise and activities you dealt with. Do not look at the clock, do not hang around and do not view your to-do list. Put down your mobile phone and close your mail. Get completely involved and really focus on what's going on in the conversation.

Ask questions and listen carefully to the answers. Be an attentive listener.

Take notes. For listening to pay off, you must be able to remember what you heard. Conversation notes are an invaluable source of information when you want to analyze what you've learned.

Keep eye contact. Direct eye contact indicates your interest and intention to listen. However, this does not mean intense gazing - such eye contact can be disturbing for some - especially for shy or introverted people. Be sensible and try not to look at everything that is happening around you.

Smile The facial expression expresses a lot of feelings, and when a smile is encouraging and friendly, it raises positive emotions.

Observe body language. Be aware of your body. Keep an open, non-aggressive attitude, face the speaker, lean rather than stand back, watch your hands, tilt your head slightly. (For example, the tendency to cross your arms in front of you because someone feels comfortable then frowning because it promotes concentration - but it can be seen as a defensive or critical attitude, so you should try to control it a bit). Also pay attention to the speaker's body language - it works both ways. If someone shows signs of excessive aggressiveness or anger, try changing the topic of conversation slightly.

MANAGING OPEN DISCUSSIONS

Encourage the caller. Use short, positive hints to continue the conversation and show that you are listening. From time to time, nod your head, express your understanding by saying 'Yes', 'OK', 'I understand' or 'Good'. Be careful not to overdo it, otherwise it will be perceived as irritating or urging the caller.

Silence is also needed. Silence during a conversation can be embarrassing, but such a break allows the speaker to gather thoughts and you understand what has been said. Silence can be very helpful in disperse unproductive interaction.

Do not interrupt. It's disrespect and distraction. In our information-filled world, it's easy to forget that communication is not a one-way process. It's not just about expressing your own opinions: it's about exchanging ideas and learning from each other.

Paraphrase. By reflecting what you heard, you show that you are trying to fully understand your interlocutor. However, do not repeat literally, use the phrases: "What I hear is ..." or "Let me check if I understood you correctly", "Let's see if I am sure."

Be open to the views of others. Do not judge, regardless of whether you agree or not, and do not make assumptions. Wait for the speaker to finish before formulating opinions. It is hard to think about what you want to say next if you do not understand, but you also do not pay attention to what someone is saying, thinking about your own answer.

- 1) Ask questions, You can ask open questions to find out more information or closed to make sure you understand the interlocutor correctly.
- 2) Answer as appropriate. Be open and honest in your answers. Share your thoughts, views and feelings in a clear but respectful and caring way. You can express your fears and thoughts, even if you disagree, and especially if you disagree.
- 3) Give feedback. The caller then has clarity about your initial thoughts on the situation. Provide relevant information, observations, insights and experiences. Then listen carefully to confirm.
- 4) Avoid using phrases that block communication. "Why?" - Makes a person adopt a defensive attitude. "Don't worry about it," "I think the best thing for you is ...", "You should / shouldn't", "You always do that." Do not try to get information by force and do not force someone to talk about something that he would prefer not to talk about - such barriers in interpersonal communication effectively hamper dialogue.
- 5) Use salutation. Expressions such as "I'm sorry", "Please forgive", "Wait a minute", "Let's talk about solutions", "Please", "Can I suggest something?" They have a positive impact on the conversation.

BRAINSTORMING

Brainstorming is one of the so-called heuristic methods .. They are characterized by the use of intuition to solve problems and teamwork. This method is very useful in finding solutions for problems arising, e.g. during system implementation, quality.

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The advantages of teamwork include:

- Greater group efficiency than individually working units,
- Fostering better detection of group errors,
- Greater incidence of results in the group,
- encouraging more creativity,
- Greater degree of humanization in group work,
- Learning cooperation and collaboration of group participants.

Two teams participate in the brainstorming:

Ingenuity team.

Task assessment team.

The inventive team consists of a maximum of 15 people, with 12 being considered the optimal number. The task of the ingenuity team is to develop ideas to solve the problem. The team is managed by the chairman and all ideas are recorded by the secretary. The team should be heterogeneous, it should include people of different sexes, ages, specialists and positions. It is unacceptable that there are people in hierarchical relationships, i.e. superiors and subordinates, in one team. This situation excludes, because presenting all ideas for fear of critical assessment of the manager. Team members should be characterized by above-average ingenuity - it is not about being "superman" but wanting and being able to find ideas. Some of them should be laymen in the area of the problem. Such people are the source of unusual ideas.

The task assessment team should consist of about 3 people. Their task is to evaluate ideas presented by the team of ingenuity. These people should be specialists in the field. In addition, members of this team should know the organization very well, its technical, financial and organizational capabilities. Ideas that are used further cannot conflict with the company's

capabilities as well as its goals and strategy. Members of the evaluation team should be open to new ideas; ability to distinguish between possible and impossible ideas.

Basic principles of brainstorming:

- Like unrestrained imagination.
- Provide as many ideas as possible.
- No criticism.

Like unrestrained imagination, ideas are extravagant, non-stereotypical, innovative, and that's what brainstorming is about.

It is important to have as many ideas as possible, because as the quantity increases, the likelihood of finding the best one as well as improving, developing and combining ideas increases. Obtaining new and better solutions. They must not be criticized.

The most important rule of storm is to avoid critical judgment when developing new ideas. Such criticism is to take place during the evaluation session. Therefore, phrases torpedoing, criticizing the idea and its creator, which undermine their sense should be avoided. The authors of ideas should also avoid self-destructive phrase.

Brainstorming should take place in three stages:

- Preparation for brainstorming.
- Session of ingenuity.
- Evaluation of ideas.

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Preparation for brainstorming. The first step in preparation is to create teams based on the criteria listed above. People participating in teams should be prepared to participate in brainstorming, therefore for people who are first participating in brainstorming, training should be conducted. It is also often necessary to train creativity, aimed at teaching people ways of creative problem solving, overcoming mental inertia. Encouraging team members to make public appearances is very important. Many people have problems with public speaking effect, which is passive participation in discussions. In the preparatory stage you should specify the time and place of the session and notify participants about the subject of the ingenuity session. Then the chairman of the session writes down the problem to be brainstormed on the board. Participants submit ideas that the secretary writes on the board. The desire to submit an idea is signaled by raising your hand. The chairman gives the floor according to the order of applications. Only one idea can be submitted at a time - this is to prevent more creative participants from taking the floor at the expense of others. In the event of a deadlock in the submission of ideas, the chairman should submit his ideas. At the end of the session, the chairman encourages you to submit your latest ideas. The ingenuity session should not last more than an hour. A day after the ingenuity session, the list of ideas should be copied and sent to session participants. They can also bring new ideas. This treatment allows you to use the so-called a synesthetic break (the mind relaxed after a period of pressure begins to think differently about the problem). Ideas are evaluated by a team of three specialists, who meet two days after the ingenuity session.

OTHER FORMATS OF PARTICIPATION

Over time, management and creative solutions specialists perfected or modified by brainstorming. The result of this are further methods that favor the emergence of new solutions depending on specific groups or the specificity of problems.

Crushing technique

A method otherwise known as reverse brainstorming. This method works in a similar way as brainstorming, but instead of giving ideas for solving the problem, we provide answers on what to do to make this problem worse or worse. Using this technique allows you to analyze the problem from a different point of view and facilitates the search for alternative solutions to real goals that we want to achieve. After an inverted brainstorming, you should determine what to do to avoid problems, aggravate them, and achieve the right goals.

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METHOD 635

Six people participate in the session, each writes three ideas on a piece of paper, and 5 minutes are allocated. Then the forms are forwarded to the next person. The situation is repeated, but this time it is advisable to, in addition to creating your own ideas, suggest other solutions and develop them. We finish when the form returns to the first owner. Later the assessment follows.

The advantage of this principle is the specific framework that makes everyone speak, and finally we get over 100 potential solutions. At the same time, forms help less communicative people express their views. We also don't have to limit ourselves to people at one professional level and we only need six people, which makes it easier to gather the right group.

QUICK THINK

Unlike the technique described earlier, nothing is planned here. What's more, the participants do not even know the problem that will be raised during the session. It is important not to think too much about formulating thoughts during it. We always deal with the assessment in the second stage.

This is a surprising approach because the popular opinion is that preparation is the key to success. In some situations, however, its lack will work much better. For example, when we

want to get a unique solution that no one has ever thought of before. Browsing websites for inspiration is not recommended.

Fewer people can participate in this type of meeting, but you must remember to choose them appropriately, both in terms of knowledge and character traits. The Quick Think method works great when we have little time to solve the problem.

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SNOW BALL

During each brainstorming, we try to give everyone the opportunity to express their views and that others can be inspired by it. If these are our priorities and we do not care about a huge number of ideas, the snowball method will work perfectly.

After presenting the topic, everyone writes down their idea on a piece of paper. Exceptionally, in this case you need to define it as accurately as possible. When everyone is ready, participants in pairs discuss solutions and create one in common. This happens until two groups form. Then each of them presents what has been developed, and finally both ideas are evaluated.

This is a method that is partly different from the traditional brainstorming. First of all, we give up the division into the stage of generating ideas and their evaluation, because they are already evaluated in pairing. At the same time, only two solutions remain as a result. It may be difficult to gather a lot of people. However, we cannot forget the great advantage of this technique, which is the emergence of ideas discussed and refined.

PHILIPS METHOD

There are situations in which we have a lot of creative, eager to discuss people, but we face the challenge of how to use this potential so that everyone really gives something from themselves. Traditional intensive exchange of ideas here definitely won't work, but the same activity in smaller groups is different.

The Philips method is brainstorming in 6-person groups for 6 minutes. After this time, everyone shares ideas, and the whole thing is repeated several times. In this way, we do not lose the opportunity to develop ideas of others.

This method is very similar to the classic brainstorming. It is designed to work in a larger group of people, like a snowball, but we do not have to give up a large number of ideas and other basic assumptions.

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SYNEKTICS

This is a method of solving problems, which involves looking for connections between seemingly unrelated elements, which allows creating new, previously unheard-of solutions. Its name comes from "synektadzo" (Greek: explore together). This method can be used in group discussions bringing together representatives of various scientific / professional groups. Each of the persons during the conversation presents their point of view in relation to the topics in which they specialize, and all together look for connections in various areas that can create a solution to the problem.

mind map

The recording method developed by British scientists: Tony and Barry Buzan, which engages both brain hemispheres - the left one, responsible for logical thinking, analysis, words and numbers, and the right one, responsible for imagination, rhythm, colors and spatial perception) . In the process of developing a mind map, two hemispheres work together, generating new ideas in an unlimited manner. The mind mapping technique is based on associations that lead from the main slogan through the general to the most detailed. Its task is to increase efficiency and ease of learning and memorizing.

All the methods mentioned above are perfect for using in a creative space that stimulates the mind of participants and eliminates mental barriers.

Everyone who conducts training sooner or later will encounter a situation in which the participant (or participants) behaves improperly, hinders the conduct of the meeting, their attitude goes beyond generally accepted norms.

The basic rule when working with a group is to ensure that this difficult participant is not generated. Very often they are trainers, they are an igniter for the "difficult" behavior of participants, and the list of provocative factors include things such as divergence of opinions, avoidance of discussion, too little knowledge, self-exaltation, inappropriate treatment of participants. You need a lot of awareness and attention to capture the moments when the participant did not like some behavior, and then simply, because all you need to do is bring the topic to the top and simply talk about this problem. In 99.99% of cases, as a result of ordinary human conversation, the situation resolves itself.

Sometimes, however, in the training process we can meet with a difficult participant or a difficult group reaction.

The most common types of difficult behaviors participants may encounter during the training are:

- domination, inattention,
- lack of commitment,
- intolerance,
- inappropriate laughter,
- excessive criticism,
- off-topic statements,
- interference,
- falling asleep.

Some of the participants' difficult behaviors can be predicted and prevented to prevent their most drastic forms from being revealed. Here are some tips:

- 1) Try to determine the participants' needs, their requirements and expectations. Put yourself in the position of participants, remember your experience as a participant.
- 2) Consider the degree of fatigue of listeners. Set first the number and length of breaks during the training. Try not to keep the monologue too long. Intersperse classes with interesting forms of exercises. Encourage participants to discuss.
- 3) Analyze previous trainings of the same type during which you were dealing with difficult behavior. Remember your reaction and its effects. Assess the accuracy of your behavior.
- 4) Be calm, patient and flexible. Try to meet the requests or proposals submitted by the participants. Try to work out a compromise solution.
- 5) Do not engage in personal battle with the participant. Individual conflict can put you outside the group. You are an outsider and the participants can take a joint and several front against you.
- 6) Don't be offended if someone makes critical remarks. They often help the trainer, signal the need to change the way of conducting classes and stimulate creativity.
- 7) Remember about all training participants. Mute the dominator, activate the shy and withdrawn.
- 8) If you feel personally affected by someone's attitude or words, say so. It will depend on you where and how you do it.
- 9) If you see behavior that can negatively affect the group, react in time, do not wait for the situation to develop.
- 10) In a situation where a significant part of the group demonstrates difficult or unacceptable behavior, you can interrupt the training. Use the break to develop a method to solve the problem and after resuming the training, present the solution for discussion to the group. Try to find a consensus together

While working with a group, negative group behaviors may appear alongside the individual behavior of individual participants. These include: the possibility of premature decisions, an excessive tendency to defend one's own position (fight for position in the group), "pressure" and "previous involvement"

- In addition, other phenomena that may appear at different times of training are: Group thinking;

- Social conformism;
- Resistance to the leader, resistance to the Other;
- Some consequences of social facilitation (ie worse performance of more difficult tasks, better - easier)

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The phenomenon of group thinking occurs when we are dealing with a very coherent group, closed to external criticism and influence. There are no procedures in the group for assessing alternative courses of action, there is an authoritarian leader and the group is in an emergency or stress situation

The trainer must timely catch the first signals of negative phenomena and counteract the most important actions of the trainer that prevent negative processes in the group:

- Ensure open communication
- Respond to problems (ongoing discussion)
- Provide feedback
- Provide praise
- Demonstrate faith in the group's progress
- Provide structure, norms, rules
- Give everyone a chance to get to know each other
- Define your role, norms and tasks
- Perform integration exercises ("search for similarities")
- Set expectations - a "contract" with the group

What to absolutely avoid in contact with the group

- One-way communication (lecture, lack of space for participants to speak, lack of feedback communication)
- Command, command (you have to do it)

- Warning, threatening (if you don't do it ..)
- Moralizing, preaching
- Interrogation, interrogated
- Avoiding answers by distracting or changing the subject

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Good advice for the trainer

- Be aware of your intentions, why you say what you say.
- Be aware of your own body and feelings.
- Speak precisely and to the point.
- Think first, then talk.
- Remember that 90% of content is nonverbal communication.
- Everything is communication.
- The value of communication is the reaction of the recipient.
- Poles don't have geese and they have their own language.
- The word has power.
- To know does not mean to understand - always check if the group understands you.

DRAMA

Purpose:

drama enables various experiences in situations that are safe for participants, which allows them to consolidate certain behaviors, beliefs and to reformulate their own judgments or opinions in a friendly and interesting way for participants. As an experience method, it leads to remembering the content as if despite the will.

Materials: the materials needed depend on the selected drama technique and subject matter, any images, illustrations in traditional or virtual form. Often, no additional materials are needed to work with this method.

Space

Possible versions:

- placing chairs in a circle, tables under the walls where participants can work. A separate part of the room for the participants' physical activity.
- setting up a chair in a semi-circle, tables against the walls where participants can work. A separate part of the room for the participants' physical activity.
- chairs under the walls, the middle of the room designed for the participants' physical activity. In one part of the room secured tables for work in groups or pairs.

Time: using one drama technique can last up to 20 minutes, full drama up to 4 hours or more.

Method

Drama, as a training method, is based on the assumptions that experiment is an important stage in the learning process. John Dewey proposed a new approach to teaching and learning, whose guiding slogan was "learning by doing" or "learning by doing". Dewey implemented his theories in elementary schools by using the drama method. The use of drama in adults was first presented in the 1920s. It was done by psychologist Jacob L. Moreno, the creator of psychodrama. Moreno has shown that using role plays can lead to constructive changes in the behavior of individuals and groups. Drama is a method of learning for both children and adults, which uses creativity and enables the improvement of interpersonal, social and civic skills. All drama activities involve the participants' emotions and personal experience.

The use of drama, unlike psychodrama and dramatherapy, has no therapeutic purpose. The task of the drama host is to initiate a fictitious situation that will allow participants to enter different roles and improvise in safe training conditions. Drama engages on many levels - activates the body, emotions and mind of the participants. By pairing techniques and dramatic strategies, the trainer challenges the participants, gives them the opportunity to experience and express, leaving them considerable freedom of action. Drama is not a theater, which is a closed work of art, a product made collectively by theater artists to provide viewers with a variety of experiences.

The most important differences between drama and theater:

there is no division between actors and spectators in drama;

in drama, the most important thing is the full, comprehensive development of the individuality of a person participating in a fictitious event, in the performance the actor performs the function of a medium, liberates the feelings of viewers;

in drama, participants improvise, i.e. work without a script; in the performance, the actors recite the text from memory, and also act in accordance with the developed script and choreographic arrangement.

in drama, the role is an attempt to look at the problem from another person's point of view. Not presenting this person in his external qualities, but thinking and acting from his point of view.

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Drama is a theater without theater, i.e. without one of the most important elements, namely without a viewer. There is no viewer in the drama, they are the creators themselves. Therefore, drama is much better suited for educational tasks. Drama is for everyone, the theater, at least in the part we see from the backstage, is not for everyone, because it puts forward specific psychological and physical requirements that it eliminates if not met.

Before the training participants will implement the so-called It is worth proposing to them proper drama from lower levels that introduce drama methodology. Sometimes the trainer does not use activities from higher levels of drama, so the situation occurs when he is not prepared to work with the use of drama and when the training is short and the time frame does not allow the use of dramatic techniques and strategies, and we remain only at the stage of short exercises.

Classification of drama levels due to the complexity of class organization according to Gavin Bolton.

LEVEL A

The easiest level includes simple exercises, no drama specialist is required. At this level:

simple exercises and uncomplicated forms using the senses (e.g. listening to the sounds outside the window, receiving olfactory sensations with eyes closed)

dramatic drills to stimulate the imagination (e.g. participants remember the arrangement of the desk space and then repeat it without props)

drama exercise - simple situations containing conflict (improvised, spontaneous dialogue between mother and daughter; the initial situation - the girl (14 years old) was to return at 19.00, returned at 22.00 from the birthday of her friend).

games - independent of drama, focus on development. The use of games is to lead to the development of physical and intellectual fitness

other artistic forms - drawing, dance, singing, painting, writing, poetry, photography, sculpting.

LEVEL B

Drama games - developed and open form. The teacher outlines the initial situation of the game, writes roles, sets the time and place of events. He writes all names and markings on small pieces of paper and spreads them on the floor, for example. Participants choose goals and roles for the initial situation. The next participants themselves create and describe in groups the further course of the initial situation.

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LEVEL C Theater

Classes at level C are solely for the development of theatrical and aesthetic dispositions of the participants, they are oriented towards making a show, a spectacle, a form serving the development of acting, stage design, dance ...

LEVEL D

The proper drama - the trainer's tasks include:

planning the topic, goals, strategy, techniques and initial situation, determining the place of events, roles for participants and the trainer

conducting classes to discover hidden meanings in situations and conflicts improvised by participants,

achieving goals - discovering a deeper understanding of social reality being explored

Selected drama techniques:

- passwords
- freeze-frame
- sculpture
- image
- entering and leaving the role
- bait
- use of the symbol
- stopping the action for reflection

Drama strategies:

• "Five levels of awareness in a freeze frame" (from highest to lowest). The participants realize scenes on a specific topic. The password "Start" come into play. At the password "Stop" they stop the scene in a freeze frame. Then each group is successively released from the "stop" to see the effect of the other groups.

The trainer asks questions. Questions bring an increasingly higher level of awareness:

1. Activity level (What are you doing now?)
2. Level of motivation (Why are you doing this?)
3. Level of expectations (What do you invest? What do you want to achieve by doing the activity?)
4. Level of models and designs (How do you know that this behavior is appropriate in your situation?)

5. Belief level (What are your principles?)

- "Anticipation and retrospection" (overtaking and looking back). The groups show a situation in the form of a still image (e.g. meeting with a homeless person). After looking at the still image, the analysis follows. Participants try to determine the reasons. Then they move into the past with this event, e.g. a year before the meeting, and show this situation in a freeze frame. Participants wonder if homelessness must have occurred, how could it be avoided? Then they move the event to the future (e.g. a month after the meeting). They analyze changes, think about the consequences, guilty.
- "In the expert coat". This strategy involves learning and requires participants to accept fiction - a contractual belief that they are members of the Institute, a specialist organization whose goal is to fulfill customer orders. Participants perform the tasks assigned to them, read, write, draw, carry out projects, discuss, make decisions, negotiate.
- "Forum theater". A strategy suitable for implementation in large teams of participants. It can be a preparation for the "Five levels of freeze frame" strategy. Students prepare a picture in a freeze frame, which is to symbolize the drawn concept (e.g. love, betrayal, tolerance, forgiveness). Groups sequentially present their passwords. During this time, the other participants are watching. positioning itself in a place where this monument can be best viewed. The trainer asks questions about the reason for choosing this place. Then, Participants give the image titles, which are saved on the board. They are compared with the correct password, you can choose those that form a group of synonyms. After analyzing and discussing, you can choose a problem that will interest them the most.
- "Helpline". The strategy is that participants try to come up with advice for people who find themselves in difficult life situations. Example: the trainer gives out illustrations showing various people in difficult situations. The participants of the drama in pairs reflect on finding justification for selected situations, define the past and seek a way to help the hero of the illustration. The participant in the role of "hero from the illustration" calls the helpline. A person in the role of a "psychologist" answers calls and gives him advice.

Possible pitfalls

It should be remembered that participation in the drama is voluntary. Participants may be reluctant to work with this method for a group of people who do not know each other.

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ISHIKAWA DIAGRAM (FISHBONE DIAGRAM)

Purpose

Wizualne przedstawienie struktury materiału (problemu, przyczyn problemu, sytuacji, powiązań między informacjami).

Materials

Flipchart, kartki papieru z naniesionym schematem lub tablica multimedialna z programem do generowania

Space

A semicircle with a view of the board, or space for smaller groups (when each group creates its own graph).

Time

45min - 90min

Method

The fish diagram technique allows a visual representation of the causes of a problem situation. In complex problems, to understand it well we have to comprehensively deal with it. The basic method of reasoning in this technique is abduction, i.e. searching for probable explanations. Looking for the reasons (explanations why the problem is a problem), we gain much more knowledge about the problem than we had before. And even if we don't find anything new, ordering knowledge will be a significant value. This arrangement will help us later formulate the problem and focus on the most significant disadvantages of the situation.

We organize the information on a fish skeleton diagram (hence the commonly used name: fish diagram). In the place of the fish's head should write the problem. It's best to enter the general version, because we are not yet looking for solutions, we do not need to have an exact wording. In addition, the general form of the record will help us find many different causes and will reduce the viewpoints less.

Then we look for the main reasons for the problem. We write them on the main "bones" departing directly from the horizontal line - the "spine". If there are too many of them, you

must select them by selecting the most important ones. The next step is to ask about the causes of these main causes. We write these derivative causes on the smaller bones of the diagram, parallel to the "spine". For example, for the problem of inadequate achievements of a talented student, we can find several main reasons. The most frequently cited are laziness (often harmful), but also: anxiety, conformist attitude towards colleagues, out-of-school student problems, hostility towards the teacher or lack of time. Each of these causes can be developed. It turns out that leaving explanations at this level does not bring anything new to understanding the problem. But noticing that the lack of time can be the result of the inability to plan it, can directly affect the idea of solving the problem, by introducing classes on strategies for organizing time. Similarly, searching for the causes of anxiety or laziness can make us look at the problem differently and our solutions will be more relevant and therefore useful and thus more creative.

Possible Pitfalls

The key to a good use of the fish diagram is to properly address the problem and describe the main "bones". It is worth spending time on this.

Notes (if needed):

.....
.....
.....

5W+H

Purpose

Problem situation analysis

Materials

Flipcharts or multimedia board

Space

Arrangement of chairs around the table in a circular direction

Time

30 - 45 minutes

Method

5W + H is a problem analysis technique based on six types of questions for a problem situation.

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Who?

- is involved in solving the problem?
- helped create the current situation?
- Will he have to help me deal with the situation?
- is most interested in resolving this situation?
- can disturb you in dealing with this situation?

What?

- has it been done so far?
- could help me? What do I already have and what will I need?
- I want to achieve? What is my goal?
- Would I do if I had a "magic wand"?

Where?

- a problem occurred?
- someone had a similar situation?
- is it best to start solving this problem?
- I would like to work on this problem?

When?

- realized my interest in the problem?
- I think about him most often?
- do I have to act?
- it's best to work on the problem

Why?

- did this problem occur?
- has not been solved yet?
- I really want to solve it?
- someone else might not want to be solved?

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How?

- I think about this problem? What is my attitude towards him?
- I would like to make changes?
- will the situation look like in the future if I solve this problem?
- how did it happen that the efforts made so far were ineffective?

Possible Pitfalls

During work, sharp differences of opinion may appear among the participants.

Notes (if needed):.....
.....

JIGSAW

Purpose

Learning in cooperation

Materials

Flipchart, sheets of paper, source material

Space

Tables and chairs arranged for work in expert groups.

Time

60 min

Method

Jigsaw is a collaborative learning method. It is used when the participants work with the source text and become familiar with a specific topic. Each team absorbs a certain amount of material, which has been divided into coherent parts. Each member of the group becomes an expert in the field developed by the team. Then experts share their knowledge with members of other groups.

How to work with the Jigsaw method?

1. Participants are divided into groups of 4-6 people (ideally, the size of the group corresponds to the total number of groups, i.e. 5 groups of 5 people or 6 groups of 6 people). Each group receives one part of the text being processed.
2. Participants work in expert groups. Their task is to analyze, discuss and discuss the received text among themselves. During the conversation about the content contained in the received material, they together explain incomprehensible fragments, share the understanding of the content they learn. Each person in the group must understand the issue well enough to be able to explain it to another group of participants.
3. The second division into groups follows. Each participant within their group receives a number (or color) assigned to it, and then subsequent groups are created in which the members of previous groups gather in accordance with the received number (or color). In this way, each new group includes one representative of each of the previous ("expert") groups. These representatives sequentially report what they have learned in previous groups, at a previous stage.
4. Experts return to their groups and confront the acquired comprehensive knowledge. They check if everyone has learned everything. This system forces cooperation, - to obtain a positive result, each participant must use the help (knowledge) of another participant.
5. Checking the knowledge obtained by participants - answers to questions prepared by the teacher or the participants themselves.

Possible Pitfalls

The prepared source text should be closely related to the topic discussed. Watch the time allocated to each stage of work. Notes (if needed):

.....
.....
.....

RCA (ROOT CAUSE ANALYSIS)

Purpose: allows you to determine the causes of a given risk. Conducting the RCA method analysis, we can reach the source of the problem. RCA uses the right tools, examines the problem from different points of view

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Materials: large sheets of paper, markers, A4 sheets, sticky notes, large sheet of paper with graphics or multimedia boards with the possibility of generating a board diagram leading through the stages of analysis

Space:

A room prepared to work in groups: tables arranged in the iLaba space in such a way that there is free passage between them. Chairs for participants are arranged around each table. The number of tables depends on the number of groups expected by the trainer.

Preparation of space for work with the whole team. Chairs arranged in a circle or horseshoe. Placemats for participants so that they can write their proposals freely. A place to hang and collect information from participants.

Time: 90 minutes

Method

Working with this method, we can search for the answer to the question: Why, something can go wrong? RCA.

How does the RCA scheme work?

RCA is a comprehensive analysis - from the general to the detailed. The analysis follows the formula described below:

- Description of symptoms, what we can see, measure, hear ...
- Description of apparent causes, visible in the first place and combined with we reveal
- Description of the root cause - primary (primary, real)

The leader can work with this method with the whole team or divide participants into groups. Each time, however, descriptions developed in individual groups should be shared.

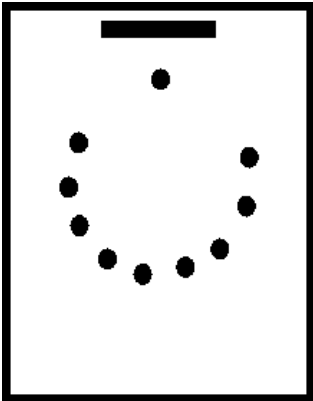
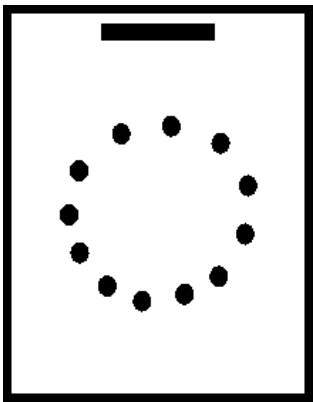
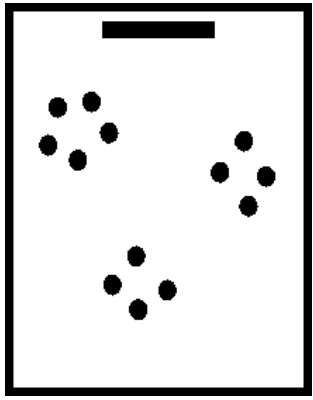
EXAMPLES OF THE USE OF ILAB SCENARIOS

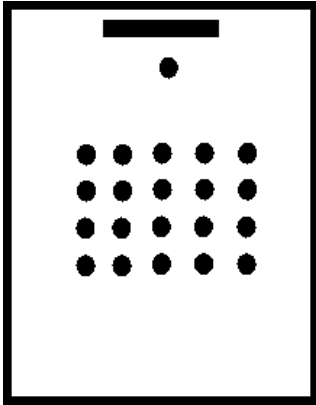
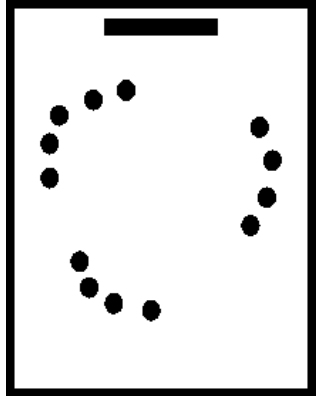
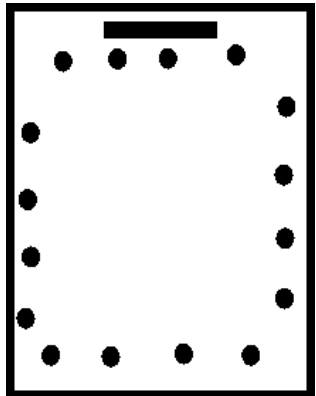
Training record
 Subject of the course: Activating methods in working with adults
 Number of participants: 15
 Date: 07.01.2020
 Start time: 9.00 End time: 13.45
 Duration: 360 min
 Leader:
 Training Code:

stage	Topics of the stages of classes	Time	Defining the training purpose	Specifying the purpose	Evaluation of goal achievement	Didactic method / technique	Ilab materials	Initial room configuration + equipment needed	comments
1	Meeting participants, group integration	20 min	The participant takes the floor	Group forum	observation	Back to back	identifiers A4 cards pens flipchart Project or laptop PostIt cards Indexing tabs	Circle of chairs 5 tables on the side	Tables will be needed for stage 5
			The participant listens actively	Statements of other participants	observation	Back to back			
2	Getting to know the participants' previous knowledge and exchanging experiences between participants	70 min	The participant exchanges	Known activating methods	answer tasks	Group discussion			
3	Division of methods according to the selected classification	15 min	The participant groups	Known activating methods according to the known classification	Task for choosing	Interactive lecture			
4	Development	190 min	The participant	Known activating	Short answer	simulation			

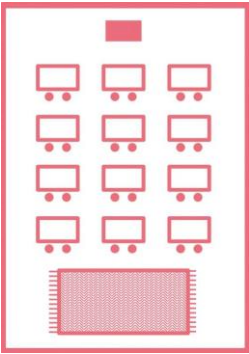
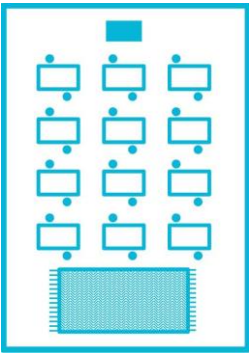
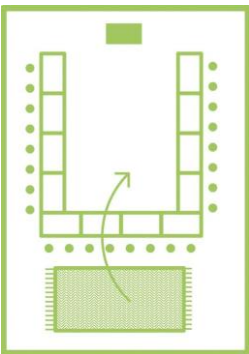
	t of the selected method (Metaplan, SWOT Analysis, Mindmapping, Brainstorming, Drama) in 5 three-person subgroups and conducting a short demonstration of classes using this method	(with break)	ant exchanges	ng methods	tasks				
5	Reflection on factors influencing the choice of method for the needs of classes	40 min	The participant describes	factors affecting the effectiveness of activating methods	Short answer tasks	Ishikawa			
6	Summary	25 min	The participant enumerate	Known activating methods	Short answer tasks	discussion			

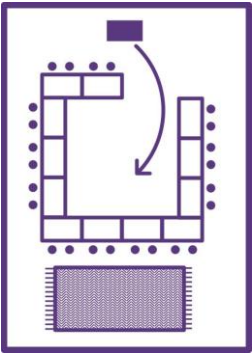
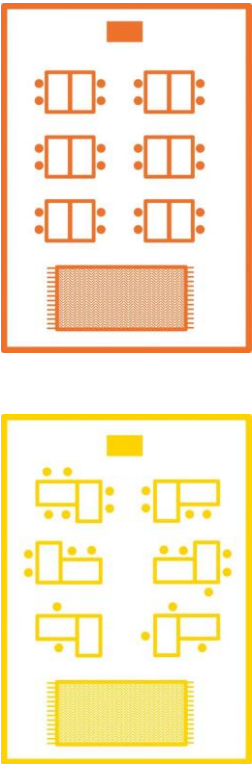
Default iLab settings

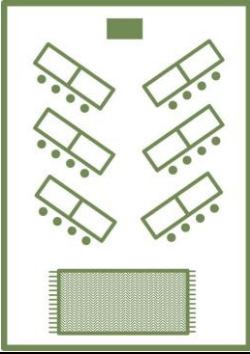
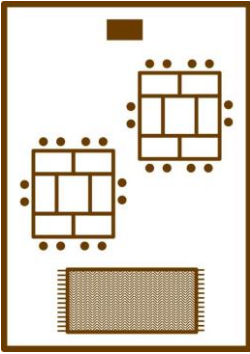
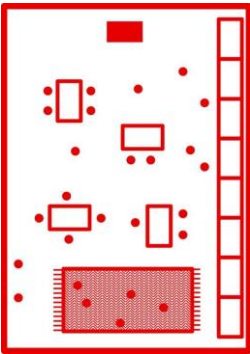
Description of chair arrangement	illustration	Examples of situations
<p>Semicircular arrangement - chairs (poufs) are arranged in such a way that each participant can see the board and the leader</p>		<p>Most situations in which the lecturer presents something to a group (e.g. multimedia lecture), or situations in which student statements are recorded and presented on a blackboard (e.g. Brainstorming).</p>
<p>Arrangement in a circle - the chairs are arranged in a circle, in such a way that each participant can see other participants and be well heard by the whole group.</p>		<p>Exercises that use group discussion Exercises in which information is passed to the people sitting next to it (e.g. Silent brainstorming)</p>
<p>Settings in circles - chairs arranged in subgroups so that people in subgroups see each other, and that groups do not disturb each other</p>		<p>Discussions or inventory activities by group</p>

<p>Auditorium - chairs arranged in straight or semi-circular rows. Participants from further rows can see the backs of people in front of them.</p>		<p>Lecture - participants listen to those facing the teacher.</p>
<p>Discussion groups - chairs arranged in groups so that people in each group are directed to the center of the room and can see participants from other groups</p>		<p>Exercises in which groups discuss with each other.</p> <p>Exercises that use rivalry between groups.</p> <p>Presentation of products and ideas that are the result of group work.</p>
<p>Ballroom - chairs arranged against the walls in such a way as to obtain the largest possible space in the center of the room. Participants see the center of the room</p>		<p>Drama</p>

Description of chair arrangement	illustration	Examples of situations
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<p>Traditional table arrangement - arranged in three or two rows. Participants sit facing the teacher. one or two people are sitting at each table.</p>	<p>Rys. 1</p> 	<p>Lecture - participants listen to those facing the teacher.</p> <p>Exercises requiring independent work or in pairs.</p> <p>Comment:</p> <ul style="list-style-type: none"> - Access to the lecturer should be given to each participant - if using the multimedia instructions presented on the board or when using other multimedia equipment, each participant must have free access to it
<p>Laboratory - participants sit alternately opposite each other. They see themselves and use materials placed on the table. One of the people has difficult eye contact with the teacher.</p>	<p>Rys.2</p> 	<p>Exercises that require direct cooperation during their performance.</p> <p>Comment:</p> <ul style="list-style-type: none"> - poor eye contact with one person from each pair may be an obstacle, so you should signal the need to contact all participants so that they can change the position of their chairs - a setting conducive to work in a large room due to the use of a large number of tables or with small training groups
<p>Podkowa – wszyscy uczestnicy widzą się oraz jest pełen dostęp do prowadzącego.</p>	<p>Rys. 3</p> 	<p>Dyskusja , wykład- podejmowanie zagadnień omawianych na forum grupy szkoleniowej.</p> <p>Prezentacja, pokaz – prowadzący lub uczestnik prezentuje swoje rozwiązanie, model, propozycje wykonania zadania lub rozwiązania postawionego problemu.</p> <p>Komentarz:</p> <ul style="list-style-type: none"> - prowadzący ma bardzo dobry dostęp do wszystkich uczestników - uczestnicy mogą intensyfikować kontakt z prowadzącym oraz ze sobą na wzajem

<p>Square - a setting similar to a horseshoe, but some participants are sitting with their backs to the board</p>	<p>Rys. 4</p> 	<p>The setting can be used in situations such as horseshoes, but it excludes the use of an array.</p> <p>Comment: the setting enables conversation, however, it hinders the presentation of work effects or has an illustrative function.</p>
<p>Two-table islands - two tables arranged along the edges create work places for four people in each group. The setting can take the shape of the letter L.</p>	<p>Rys. 5, 6</p> 	<p>Exercises that require collaboration in accordance with the instructor's instructions. The setting allows any type of activity.</p> <p>Comment: during the presentation of work effects, participants can move from table to table or to the presentation you need to move the chairs so that anyone can participate.</p>
<p>Herringbone - two rows of tables arranged by two short edges arranged in a herringbone pattern,</p>	<p>Rys. 7</p>	<p>Lecture, presentation - good visibility and direct contact between the lecturer and the participants.</p> <p>Exercises that require group work combined with a lecture or presentation.</p> <p>Comment:</p>

		<p>Four people can work at the tables. The trainers and training participants are very clearly visible. access to participants is easy</p>
<p>Large groups - a larger number of tables (e.g. 6) are put together to form large groups.</p>	<p>Rys.8</p> 	<p>Exercises that require more people to collaborate.</p> <p>Comment:</p> <ul style="list-style-type: none"> - the trainer should pay attention to whether the task is progressing in the right direction, in large groups work may be more difficult and requires good organization - tables can also be arranged then when the whole training group will sit around them
<p>Free arrangement - individual tables are dispersed, enabling participants to work in various configurations. Part of the room is left for individual work or gathering of participants in a circle</p>	<p>Rys.9</p> 	<p>Exercises that require collaboration in a variety of configurations.</p> <p>Comment:</p> <ul style="list-style-type: none"> - the setting allows changing the activity of participants during the training without changing the entire arrangement of the training space - free space allows you to conduct relaxation exercises and change the activity of participants