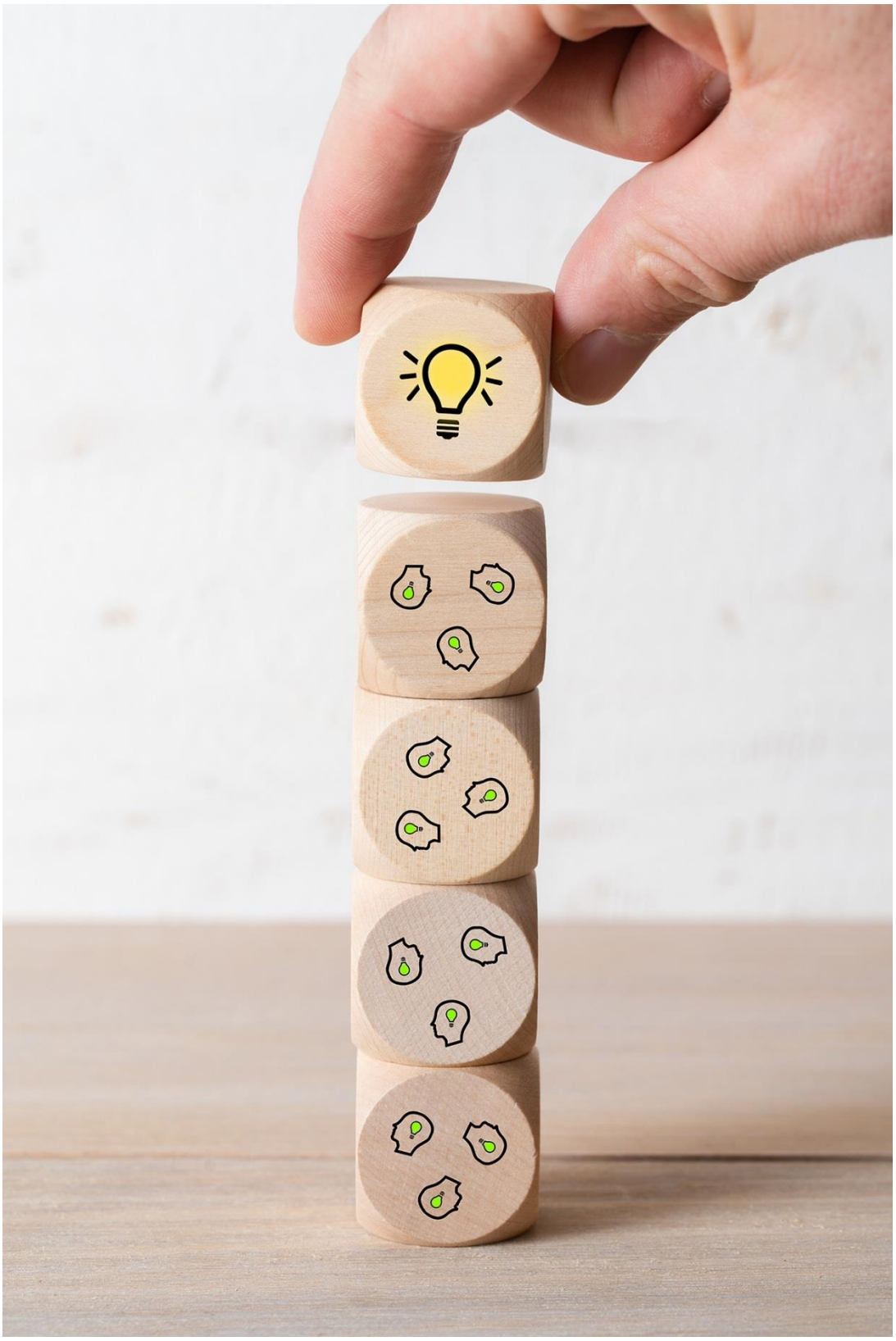
ILab - **I**nteractive **L**earning **A**ctivities **B**ook

MANUAL FOR ILAB TRAINER



Project *iLab PLUS – new training methods for adults* financed from European Commission Funds under the Erasmus + program

Table of Contents

Project *iLab PLUS – new training methods for adults* financed from European Commission Funds under the Erasmus + program

Project *iLab PLUS – new training methods for adults* financed from European Commission Funds under the Erasmus + program

Chapter 3. Planning of educational classes using the algorithm ICA (Interactive Curriculum Algorithm)

Chapter 4. Educational methods and tools proposed for the ILab environment

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Chapter 1. iLab - A space friendly for education

Introduction

Definition

The main goal of iLab is to create a place combining space, technological infrastructure and method. iLab Plus is to be a "user friendly" place, so ergonomics of use is to play a special role here. iLab is also a place designed to stimulate creative thinking processes and create an ecosystem for the proper conduct of cooperation processes, creation and exchange of information.

This type of place is intended to help you break away from the workplace and to create a different area from the workplace. However, this is not a place of relaxation - elements conducive to concentration or relaxation are not an end in themselves, but a means to an end which is to increase the efficiency and quality of work.

iLab is built as a space enabling full use of modality, mobility and senses, hence it is so important for us to properly diagnose the user's cognitive styles, and to later apply it in the selection of equipment and software for a given session.

In many cases, we will call ilab a "laboratory" space serving as a training ground for testing new ideas, areas for shaping innovation or simply exchanging skills and experience and sometimes only providing support. In this case, we will be talking not only about training facilities, but those where people meet to conduct joint research, solve problems, and open ideas.

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Case study – experience from existing iLABs

MIT Media Lab

The Media lab Massachusetts Institute of Technology is considered to be the first of its kind in the world. At its origin lies the school of architecture and urban planning at the institute. MYTH ML, founded by the now widely known media expert, technology philosopher, innovator Nicholas Negroponte in 1985. Today, ML is a powerful institution, comparable in structure and activity to what works at other universities as a faculty. The lab specializes in technological and multimedia innovations. The impressive number of patented inventions and implemented solutions or simply unusual ideas that emerged from under the roof of MIT ML brought him the right fame of a cult place, favorite by hackers and those who want to disrupt the ossified orders of the world of knowledge and technology.

Among the most interesting places in MIT Media Lab is the Affective Computing Lab, a group dealing with affective processing.

The media lab space is open. It is a place where you can work and discuss, exchange ideas, do things seemingly (or actually) not directly related to scientific research. Mixing of people, ideas, environments and specializations is specifically planned here. It is virtually impossible to function in a lab in isolation from the rest of the scientific community.

Copenhagen Game Lab

This is one of the most interesting places when it comes to researching games in Europe. The laboratory emphasizes the creation and testing of games in a more practical perspective. It's more about people than space and creating solutions (or their simulations).

This institution operates in the field of analog educational games (board games, simulation games) on the assumption that it is best learned through its own experience: "learning by doing".

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Brown University in Pittsburgh USA, the YURT in Center for Computation and Visualization

YURT is one of the most interesting innovative experimental spaces in the world. A kind of "virtual laboratory" consists of a system of 69 full HD projectors displaying the image on a system of 145 mirrors projecting it further onto the wall of the cylinder which is the interior of the room. Operator tracking systems (trackers) and manipulators enabling interaction with virtual objects are attached to the whole. As a result, a 360-degree, immersion "cave" is created in which various types of tests can be performed. Starting from data visualization, through simulations, training presentations etc.

YURT activity is an example of how the "interface effect" works. A properly designed immersion space is a separate quality not only at the level of user experience (UX, user experience) but may in itself be the key to opening alternative ways of thinking about objects, places or structures.

It is also extremely important that the CAVE interface, unlike VR helmets, does not cut off the user from interacting with other people in the room. YURT can be used by entire groups (with one person controlling the interaction).

The Media Archeology Lab, Boulder USA

MAL is an extremely interesting project due to the fact that it is proposed to act through an archaeological attempt to understand how they work and what the media are. In the American laboratory we get over 100 historical, working computer devices that we can test, use, program, try to understand.

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The essence of this idea is a return to physical devices with which contact is to promote creativity and analytical thinking.

Augmented Environments Lab, Georgia Tech USA

Augmented Reality or Augmented Reality is another way to approach an innovative idea.

The laboratory was founded in 1998. The concept of the Extended Environment (the creators use the term environment rather than reality) puts an emphasis on interest in systems related to being in physical space.

The AEL philosophy is fundamentally "labow" - it assumes that looking at, operating, modifying, hacking, sometimes even spoiling interesting objects is the key to discovering new things and allows you to take a fresh look.

iLab Uniwersytet Palackiego Ołomuniec, Czechy

ILab at the Faculty of Psychology at the Palacky University in Olomouc was completed in September 2016. As part of the "Erasmus +" project. The implementation of the new laboratory took over a year and was created thanks to international cooperation of teams and specialists from the Czech Republic, Germany, Poland and Sicily. Among the "regular" iLab devices, such as notebooks, data projectors, writing boards or wall paintings for washing, the laboratory allows working with Virtual Brainstorm (VBS) software. Working

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with this software supports participants of training programs in more effective work and group cooperation.

After the first training with the academic community and students, the iLab environment was assessed as very interesting for participants, ensuring greater and better interaction between participants than ordinary classrooms. The environment has been described as 'relaxing', 'creative', 'interesting', with 'a good atmosphere'. Participants suggested using iLab for the following purposes:

- relaxation for children with anxiety
- general work in groups (improvement of cooperation, team building)
- students preparing for exams
- brainstorming for students and teachers
- focus groups, start-up projects (to be developed and launched)
- alternative ways of learning, discussing, making plans
- student projects, workshops developing new skills
- work with / teaching people with physical or mental disabilities or students with special needs

There were also suggestions for improving the iLabs:

- ceiling modification
- relaxation zones
- modifiable for specific target groups

Ilabs in Croatia

To gain insight into the functioning of iLabs in the field of adult education, the "ŽENA" association has conducted research involving 25 institutions that provide adult education, vocational schools and universities. The research was carried out using partially structured questionnaires with questions about the term 'iLab', the use of innovative methods in the educational process and a description of the environment in which adult learning is provided.

None of the universities / colleges has a dedicated innovative class (iLab), and most respondents describe their adult learning environment as traditional. Innovations exist in the work methods they use, as well as in the implementation of new technologies, such as

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business simulation software, quizzes (Kahoots), LMS, portals (Studomat, portals for program participants and lecturers, Google class). When it comes to equipment, intelligent LCD boards and projectors are used, and all schools are equipped with computer rooms adapted to their adult education programs

Only "Algebra" has a work environment similar to iLab in its premises, used only to provide support to start-ups. Since "Algebra" is mainly a computer science school, most of the training is organized in computer rooms with high-speed Internet access, equipped with multimedia technology. Digital technology is the basis of all training programs, and some of them have introduced so-called "Reverse Class." In some classes, furniture can be used flexibly, i.e. desks and chairs can be changed depending on the needs of a particular class.

In addition to 'Algebra', spaces that can be identified using iLabs are mainly interacting spaces such as COIN in Zadar. The space is intended for entrepreneurs, but also for the implementation of various trainings. It has the necessary IT equipment and the desks in the classrooms can be changed depending on the needs of the training.

It is also worth mentioning the headquarters of the Europe Direct Information Center in Šibenik, which, in addition to informing the inhabitants of Šibenik and the Šibenik-Knin poviat, serves as a place for training.

All rooms are bright, i.e. the space itself and the furniture are in light colors (white, gray, pastel colors). The rooms are well lit and ventilated, and the partition walls are often made of glass.

Although most classrooms allow groups of at least twenty people to participate, a group of up to fifteen people would be ideal.

Labs in Poland

Recently, the concept of lab in the "western" sense of the term has also been used in Poland. One of the first events that heralded the creation of specific institutions and centers was Medialab Chrzelice organized as part of the Culture 2.0 project in 2010.

Interesting places that sometimes operate to some extent in the lab formula include:

NINA - National Audiovisual Institute (currently in conjunction with the National Film Archive as FINA)

LaCH - Digital Humanities Laboratory at the University of Warsaw

MediaLab Katowice

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Centrum of WRO art

A special kind of "lab" institutions are places where creative people can meet and act. Most often such spaces are called maker-space, hacker-space, DIY labs (do-it-yourself, DIY) sometimes "garages". Labyrinths of this kind are characterized by openness and attitude to creation in the literal sense - creating objects. Most often, maker-space are places where interested persons can use equipment that for various reasons is unavailable to them at home. By the way, creators can also meet people with similar interests or seek advice.

a) Hackerspace

"Hackerspace or hackspace (often also called hacklab, makerspace or creative space) - a place where people with common interests, usually IT, scientific or related to digital or electronic art meet and cooperate."

One example is the Krakow hackerspace.

b) "Garages", Exploratoria, Tinkerplace, Skunklaby

The concept of "garage" comes from the American tradition of "garage" workshops, in which - according to the mythology of Silicon Valley, the largest IT projects were to be born in the second half of the 20th century. Bill Gates and Steve Jobs and Steve Woźniak started their business in the "garage". Nowadays, "garages" are only in name - they are usually well-equipped laboratories, which from the old days only inherited the ideology of unrestricted operation on objects and scientific creativity.

There are at least two interesting "garages" in Krakow:

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"LifeScience Garage" is the first Bio.Hacker.Space project in Poland that responds to the expectations of Do-It-Yourself (DIY) environments, created by enthusiasts of natural and medical sciences, who - wanting to deal with innovative ideas as a hobby - face a basic barrier to develop their passions in the form of lack of access to infrastructure and apparatus enabling experimentation in appropriate and safe conditions
"Garage of Complexity" is to be a place that allows students and employees of the University to work on potentially interdisciplinary projects. He is the so-called academic makerspac. As part of its activities, we enable learning through practice, maintaining a dynamic work atmosphere.

Ephemeral forms: JAMs, hackatons Hakatons are meetings - most often programmers, engineers (not necessarily professional) but also artists and DIY enthusiasts during which a problem is problematized. Sometimes solutions are created, sometimes it only helps the way to the solution and sometimes an object referring to the problem is created. An example would be hackaton (hakaton, hackathon) devoted to the issue of smog in Krakow. One group can create a filtering mask that e.g. monitors the air level and informs the user about it. Another will try to make an online system that allows tagging particularly polluting places. Yet another will create an avant-garde poetry generator based on information on smog concentration. The idea is to combine the creative efforts of different people to look at an issue. Hackathons usually take place on weekends and holidays and last up to a few days. Sometimes, the creators of the most interesting prototypes are rewarded by sponsors or the community.Jam is a hackaton-like meeting. Most often limited, it is usually also a competition. The name comes from the slang term for improvised music sessions. The most popular types of jams are Game Jams, during which spontaneously created groups of participants within 48-72h create games on a given topic.

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iLab PLUS, Eurokreator, Kraków

In 2015, Eurokreator created iLAB Plus - an innovative training environment. iLab PLUS is a space technologically and ergonomically adapted to work on creative solutions. New technologies in iLAB are to improve training processes, provide evidence of teaching effectiveness and enable it to be objectified. The effects are enhanced by the unique atmosphere of the place where multimedia are intertwined with solutions friendly to man and the environment.

The designed environment is to provide participants with a sense of joint work. Leveling barriers, which are a kind of blocker of interpersonal communication, plays an important role in it. Arrangement of space is based primarily on leveling barriers in space (chairs, traditional tables, etc.). Training sessions in the iLab PLUS model assume cooperation between participants, require joint problem analysis (which automatically generates feedback), assume an element of relaxation during the session. It is worth introducing "props from childhood" into the environment that affect the activation of the imagination.

The target group are adults, and in the institutional sense - business.

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In June 2017, work with the Jagiellonian University was completed, consisting of user experience (UX) research in the quantitative space. These were comparative studies (some were at the university in the computer room), mainly qualitative. The focus was on eyetracking, affective and proxemic observations.

iLab is not a laboratory in a scientific sense. It is also not a R&D (research and development) space like the presented academic institutions. It is also not a maker-spacem where people would meet to produce physical items. However, iLab can successfully use the lessons from the above initiatives:

From the DIY movement, from the idea of garages, there is a lesson that, in general, people have a powerful rush to create - moreover, people generally like to do things together. Home space in its intimacy is to some extent an obstacle to such activities. The Lab opens people to action because it is a common place designed and interpreted as "where things are done".

Architectural guidelines.

Current styles and trends in interior design of work spaces.

Standard office work, performed in a sitting position, can become very onerous for the body. A long period of working with a computer can cause health problems. This work is very often monotonous and in the long run causes fatigue and reduction of commitment to its proper performance. To counteract these adverse factors, a space designed in accordance with the principles of ergonomics is necessary. It is very important to equip the office with tables and chairs, which can be adjusted and adapted to your needs. The access of fresh air and daylight is required, it is preferable to arrange the tables perpendicular to the window and not parallel, because looking outside can be distracting. Each office room should be equipped with filing cabinets to reduce their number within the workplace. You should also provide a separate place to take breaks and eat meals.

Functionalities that were once associated with open spaces are turning into features of the agile space. Agile space means creating space arrangement options and is intended to give the user the opportunity to choose: intimate zones, cooperation zones, etc.

Proportions and harmonization

In fact, all the art of designing, be it a building or its interior, is to play with the right proportions to achieve beautiful and harmonious works. Architecture, and interior design in

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particular, is largely an art of illusion. When designing, we rely on proportions - we play with elements of equipment, colors and light so that their mutual relationship is the right balance.

And what exactly is this proportion? You can safely quote the sentence of the Roman architect Vitruvius from two thousand years ago, who clearly defined the definition of beauty. "Proportion is a harmonious harmony between parts - the result of just and consistent agreement between them: height to width, and those to length and each to the whole." In a word, proportion is balance.

Moving on the topic of proportions, it is also worth mentioning the most famous in the world so-called divine proportion, i.e. the golden ratio, which has fascinated artists since antiquity to the present day. The golden ratio sets ideal proportions in many areas of art and craft, including architecture, painting, photography, design in the broad sense, and even music. The assumptions of the golden ratio boil down to maintaining the proportion between the length of the long and short sides of the rectangle - the length of the long part is to be the geometric mean of the length of the short part and the entire section.

The golden ratio principle can be used in interior design, for example by composing stucco divisions on the wall, floor layout, furniture size, and even the entire interior. And this is where the fun with composition and illusion begins. How to design tricks - color, light, texture - create a room with perfect proportions? In fact, any interior will be beautiful you only need to skillfully show it - to balance its proportions.

Functional layout of space, ergonomics.

Divide the long room into smaller zones in closed compositions, paint the long walls in a light color and the top wall in a darker color. The room will seem wider - this is a procedure often quoted on interior design portals. When we paint longer walls with a distinct color, we get the effect of a long and narrow corridor.

A low room will improve the proportion, if the ceiling will be bright and luminous, and on the walls you will apply the pattern in vertical stripes, they will direct our eyes upwards. Too high a room with a not very large floor area, we lower using a suspended ceiling. The second way is to paint its walls only to a certain height, in order to create the perfect proportion of this

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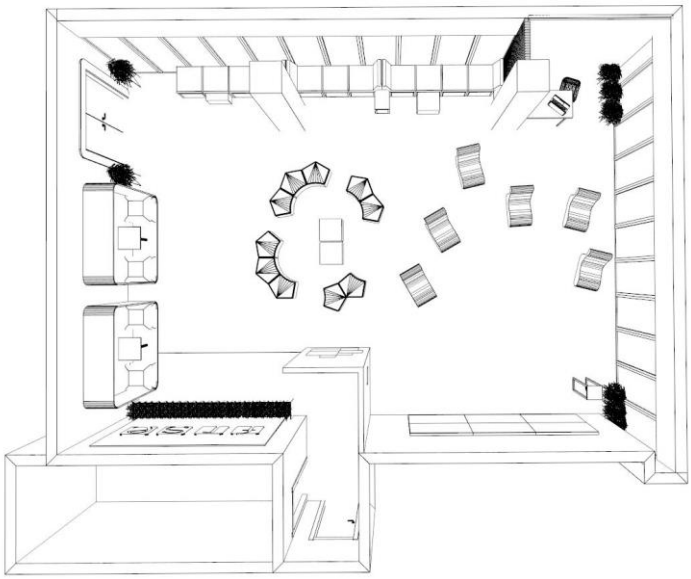
room with optical illusion, it will not seem too high in relation to the floor plan, thus it will look favorable.

In a narrow room, we set the sofa across the room again to improve its proportion, some element will visually divide the space, thus it will appear shorter, wider and reminiscent of a divine rectangle. In such an interior, order will prevail, and we ourselves feel comfortable and peaceful in it.

We don't paint too high a room in vertical stripes, it will seem even higher. Too narrow a room we do not arrange as a wagon, only placing furniture along the long side, we will only intensify the effect of its length and narrowness. Painting the ceiling in a darker color than the walls will lower the room and vice versa the white ceiling in combination with the walls painted in a dark color will seem farther from the floor. It is also worth remembering that the size of the furniture matters. Here, proportion will play an important role. Let's choose smaller furniture for the smaller interior, don't let the large sofa blow up the room with its size. In a large space, however, we can afford a squat sofa. However, we should remember that in a large room, the excess of furniture and accessories will give the impression that the room is smaller, cramped and uncomfortable.



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The role of architectural blockers

Architectural barriers are a problem that the disabled and the elderly face every day. But are they only them? Does the problem of architectural barriers only apply to these groups of people?

To answer this question, let's define this concept first. Architectural barriers, i.e. physical (technical) obstacles that prevent us (people) from getting to a specific place are various types of stairs, faults, steep ramps, but also narrow doors.

We can meet them both outside and inside public buildings (schools, banks, shops, hospitals) and private homes. Too high curbs, too steep stairs, too narrow passage, too steep driveways, too high thresholds - these are the architectural elements that make it difficult for us to move.

Now that we know what these architectural barriers are, now let's move on to the next problem - are only the disabled and elderly people having trouble overcoming them?

What if someone has limited mobility? For example, a person injured with an injury requiring immobilization for several weeks? People who are weak after surgery or need long-term rehabilitation? Pregnant women, especially those in advanced, also have trouble climbing a large number of stairs or steep climbs or ramps. We must also remember that the elderly will increase in our society every year, and as we know, the human body becomes less and less fit over time and requires support in overcoming architectural barriers. As you can see, this problem concerns a large part of our society. Almost all of us, even if they are not by definition a disabled person, may have trouble moving in certain conditions.

The fact of physical disability should not exclude people from social life, unfortunately architectural barriers can effectively hinder them. Schools, offices, clinics, banks, pharmacies, shops, stations - public places should be accessible to all people. In addition to these basic places, others should also be adapted to the needs of people with limited mobility - libraries, cinemas, theaters, museums, swimming pools. Where, for architectural reasons, driveways cannot be built (e.g. in old buildings), other solutions to remove barriers must be used

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Lighting

Lighting – types and ways of application.

To optically enlarge a room, we must - figuratively speaking - fool your mind. Small rooms are best painted uniformly to a light color, then almost corners and wall connections cease to be visible, which visually expands the space.

When playing on the proportions of the room, be sure to lighting. A large number of points of light will give the impression that the room will become multidimensional. Well-chosen lighting can work wonders.

As each of us is different, each room is different. Let's play with proportions in designing the perfect apartment. In the space created in this way, nothing will overwhelm us and upset us, we will feel perfect. To conclude, let us quote the thought of the ancient philosopher "All that is good is beautiful, and if it is beauty, it is the effect of proportion."

For workplaces with display units, for the sake of good vision, visual well-being and satisfactory working position, all users must be able to adjust their work place according to their individual needs (especially according to body height and activity) and daylight control.

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For most visual activities in upbringing and education facilities and in education and training facilities, the direction of daylight is required from left and top.

Daylight

Daylight is a factor that positively affects human well-being. Its use in i-Lab is very desirable. An element that fits the idea of dynamics in the method is the change in lighting during the session. The use of several types of light can affect mood changes that promote session efficiency. Light should provide participants with comfort. Subdued - in the relaxation part, while in the computer part - adequate to the needs. The synchronization of lighting and music can become an additional stimulating element during sessions.

Room lighting. Thanks to the presence of a large window (glazing half of one of the walls), the accent falls on the front of the room - closest to the interactive whiteboards. Multi-phase lighting enables adaptation to immediate needs. The need to muffle the light intensity during projection on an interactive wall can both have an adverse effect on the concentration of participants, and can also have a positive effect on creating an informal meeting atmosphere, and thus support positive motivation.

Artificial lighting.

In artificial lightning all objects that must be in the range of radiation emitted by another source to be noticed.

The ability to adjust the temperature and power of lighting to the time of day and the nature of the activities is inspired by the work of the University of Palacky in Olomouc, whose representatives

they used lighting presets in their ilab, creating conditions for night and day work.

The light source should suitable for the participant regardless of the position being taken. RGB LED lighting is ideal for precisely setting the color temperature. Stretch ceilings gives highly efficient shadowless lighting. In addition, the blind effect of participants looking at the ceiling is eliminated.

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The smart house management software should give the possibility of switching on predefined light scenes, e.g. "relax", "work in groups", "presentation", give the possibility of adjusting the degree of insolation of the room at some group or leader activities.

Intelligent lightning is also intelligent control. Typically, in such installations, classic switches are not used, but multi-functional sensory panels (e.g., tactile ones). In a classic installation, you can often meet rows of switches, which in a smart installation is replaced by one functional and aesthetic device. The management of such a room can take place through entire sets of settings called “scenes” instead of controlling individual circuits or devices.

Visibility of a task is generally determined by visibility of the most difficult element which must be detected or recognized so that work can be performed. This detail is known as critical detail. Visibility of the critical detail is a function of the difficulty experienced in order to discriminate it visually from the background on which it is seen, from other details found in its most immediate surroundings.

The artificial lighting parameters must be as follows: Select the color tone of the artificial light for values Ēm ≤ 200 lx warm white; 200 lx <Ēm ≤ 1000 lx neutral white; Ēm> 1000 lx cold white. The uniformity of artificial lighting in corridors and stairways must be greater than 0.2.

The whiteboard illumination must have at least the same level of illumination as the classroom.

The board must have a matte finish, which does not apply to chalkboards.

Mirroring of the luminaires on the blackboard must be excluded from all the workplaces in the direction of the board. There must be no light hole in the wall behind the board (window or sunroof), otherwise it must be covered with an opaque material whose light reflection factor is close to the reflection factor of that wall.

Workstations in imaging units must be positioned so that persons are not dazzled by the brightness of the lighting apertures, nor are they mirrored in the imaging unit.

The luminaires must be suitably spaced and have a distribution of brightness and aperture angles so as not to be reflected on the imaging unit and obstructing the visual task.

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Space for team work.

Teamworking patterns.

8 to 20 participants should participate in the session. When looking for rooms, we should choose those that will allow comfortable work for a group of such numbers.

Due to the usually long duration of the session, the room should have easy and quick access to toilets. Participants should not interrupt their participation in the sessions too often and for too long.

Noise should not disturb the session. Finding a quiet room will avoid the costs associated with silencing it.

The location and arrangement of i-Laba should take into account the needs of people with physical disabilities.

Vertical relationships, i.e. the location of individual persons in relation to each other on an up-down scale, in the iLab space can lead to particularly sharp asymmetries, i.e. uneven positions of individual participants.

The proxemic states that, generally speaking, people situated higher in the social hierarchy also demonstrate their position by means of positioning on a top-down scale in physical space. This phenomenon does not translate in a simple way into the fact that the one who is above is more important, although it actually looks that way in part. It should be noted that at the same time the opposite, seemingly contrary to the above rule applies - the one who is more important (older) has the right to sit while his interlocutor is standing. While in the animal world (and proxemics has its sources in ethology, i.e. science studying animal behavior), the basis of the vertical code is physical strength and power understood as an effect of physical advantage, while in relations between people these grounds should include the influence of the development of culture and rules related to it. This, in turn, often leads to overlapping different paths of interpretation of given behaviors in space.

The factor favoring the sharpening of asymmetry (in the physical dimension, but thus affecting the dimension of social relations) in the iLab space are low poufs and deckchairs - a person standing upright is located much higher than the person sitting on a deckchair (as the name suggests on a deckchair it's almost lying) than if the other one was sitting in a chair, for example. Similarly different height furniture used for sitting creates the possibility for sitting participants to place

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themselves higher or lower than other students also sitting (some sit higher and others lower) - due to a common task, this may cause a slight disproportion in attitude to the task being undertaken. Almost lying people may be suggested by the position associated with the prototype associated with relaxation and not get involved enough in achieving a common goal. People sitting higher (or standing due to the inconvenience of sitting) can automatically enter the role of someone who is a cut above the rest of the participants, which can result in playing the role of a leader.

Traditional lectures or even workshops mean that the roles of senders and recipients are also traditionally arranged - the sender speaks, the recipient listens. This configuration was favored by the prepared seating areas in the first part of the room, which participants, being the recipients, simply took over, not even using the possibility of rearrangement (the poufs were too heavy to move freely, the deckchairs are uncomfortably moved). During longer lectures, you need comfortable supported seating and equipment to put away objects that they use from time to time. The function of these elements did not fulfill the equipment present in the room - for example, one of the participants in the second group after the break changed the swing for a chair.

Determining intimate zones.

The proxemic distinguishes between three main types of interactive distance: public distance - above 3.6 m; social distance - over 1.2 m and personal distance. Within the personal distance, a distant personal distance is distinguished - from 0.75 to 1.2 m and a closer personal (intimate) distance - from 0.45 to 0.75 m. Each of these distances, taken between people, is suitable for specific social relations by these people. Because in addition to certain permanent social relations, momentary relationships specific to individual interactive situations play a much more important role in everyday communication.

The availability of various zones, the possibility of choosing a convenient place and position in space creates a large room for maneuver. There are not enough places so that the trainees are forced to interact too closely due to physical conditions. According to the proxemics, the course participants have the option of expressing their position in the group by positioning at the appropriate point in the iLab space or by moving within a selected part of the room or in the chosen direction (for example from the end of the room towards the front or vice versa, but also its left on the right, but also on any trajectory with a regular or chaotic course). In other words, the

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diversity, irregularity of the room and its furniture creates the potential to express the social relations of the group.

However, this potential can be limited by the use of static forms of work, i.e. those during which participants after taking some (often accidental) place in space remain in this place until the end of the class due to the tasks they perform during the class. Therefore, despite the fact that as relationships develop among the participants in the group, there would be a need to change the proxemic position due to the lack of circumstances (which dynamic forms of work would create), the participants do not change this position. Staying in one place, except that it can be simply tedious, lead to a decrease in concentration and intellectual performance, can also lead to a feeling of discomfort for students - and both physical discomfort (especially when they occupy a place on the pouf or on a sunbed in reclining position, which over time can even cause pain), as well as mental discomfort, motivated by the expression of social relations by appropriate spatial location (proxemic coding).

Communication of teams.

By design, the iLab space is intended to serve innovative educational methods, so it is important that the courses use such forms of work that take full advantage of the architectural potential of the room - all variants of work in pairs and small groups with goals that can be achieved thanks to free movement on the iLab, as well as any choice of workgroup location. The choice of a permanent place for the whole class can adversely affect the didactic effects. It is very important to introduce an element of movement in the iLab space, because static can favor the appearance of an adverse effect on the architectural layout of the room.

If the participants have to perform an unusual task that requires cooperation, enabling them to move around the room, occupy convenient places, the free space in the room works well. It gives a sense of freedom, because participants are not "attached" to their places, and being able to move, they willingly and often interact with each other, which allows you to observe different communication behaviors. In addition, the time at which they can leave their places is somewhat reminiscent of a traditional break, thus loosening the atmosphere, making it less formal, encouraging discussion and exchange of insights, and thus participants have the chance to leave the role of recipients only and become active participants in the teaching process - Learning.

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Sensory factors.

Sensory design in the workspace. Stimulation & relaxation.

Music or nature's voices are an element that can enhance session efficiency. Sounds can become a source of inspiration during work or a relaxation element. Equipping the i-Lab with sound recording mechanisms (e.g. computer microphone) can be useful by giving additional possibilities to the facilitator.

Some items such as toys for manual development, puzzles can act as stimulants giving a positive effect during the problem solving process. This increases session efficiency. Providing users with affordable gadgets and toys can help stimulate their imagination, thus allowing them to find custom solutions.

When planning activities in i-Lab, remember about meals for participants. The sessions lasting many hours should be separated by breaks in which participants will receive drinks and small snacks, as well as a dinner meal. Meal can be delivered to i-Lab or offered at a nearby buffet.

There are many factors to consider when choosing an i-Lab location. The right choice of location will avoid potential problems in the process of adapting the room and its subsequent operation.

The space intended for i-Laba should consist of two rooms / space: the first - intended for work and the second - having a recreational character. The work space should be equipped with appropriate furniture, computers and other equipment (desks, chairs, boards, flipcharts, notebooks, stationery, etc.).

In the relaxation space, seating furniture such as armchairs and sofas should be available. Their number should depend on the size of the groups participating in the sessions. The whole project, room lighting, sound system and used sounds are important elements of i-Lab, which determine the effectiveness of sessions.

A part of the relaxation area (a small annex is enough) should be intended for preparing and serving drinks and small snacks.

Communication between parts should be easy, and the whole give the opportunity to change the arrangement - depending on your needs enable teamwork or individual.

Participants should feel safe and cozy in a stimulating environment.

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An important element of i-Lab is the entrance symbolizing the transition to the "world of creativity". The location of the rooms should enable the arrangement to highlight the symbolism of the door.

The rooms should be adapted and equipped in a way that allows rearrangement. Furniture - desks and chairs - should be movable, allowing them to be moved and the room layout changed. Depending on the characteristics of the group, intended goals and techniques used, the layout of.

The role of non-visual stimuluses.

Multi-sensory stimulation is the primary task of ilab space. To accurately describe the properties and type of action of sensory functions, it's best to divide them by their impact on individual senses. At the same time, we should remember the effect we want to achieve. Is it supposed to be only bombarding the user with a maximum amount of sensory stimuli, stimulating him in a specific sensory area, or the other way round - to calm down, relax and unwind.

Sounds affect the work of the whole body: they change muscle tone, strength and pulse speed. They affect metabolism and even breathing. That is why we feel so good listening to the sounds of nature. The sound of the forest, the murmur of streams, the singing of birds puts the body in a state of full harmony, which allows you to truly relax and increases resistance to stress and other diseases.

Hearing stimuli used during training can be conducive to concentration and sense of security, or cause discomfort and stress.

Once we have a relatively isolated space, we can provide it with a selected set of sounds: - properly selected music (e.g. installation of speakers)

- Installation of devices that emit sounds (e.g. ringtones etc.) that are moved by the wind, or under the user's touch.

- sounds of animate nature: animals (birds - we can try to get them company by installing drinking troughs, feeders, booths; small farm animals - a more complicated option, because even those that do not require much care are a constant cost and the need to appoint a guardian). Plants - selection of species with leaves rustling in the wind, or their location so that they are moved by a passing man.

Touch (sensory system) is considered one of the senses. Sensations collectively referred to as touch are a combination of signals sent by cells responding to heat or cold, pressure and damage - pain. In the strict sense, we understand the sense of touch as the reaction of the nervous system to pressure exerted on various parts of the skin.

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Touching plants, especially walking bare feet on the grass, can be a pleasant therapy. It will improve our well-being and will strengthen our body. Pleasant tactile sensations can be caused by plants whose leaves have a nice structure, but can also be rough, soft as a sponge, rough.

In addition to plants, the illusion should pay attention to the surface. Natural wood or stones with a smooth or rough surface are suitable for this. Such materials can be used both as a covering for pavements, but also as seats or handrails - they will introduce additional surfaces with an interesting texture.

With the help of smell, a person can feel both smells and changes in air humidity. In the case of stimulation of the sense of smell with the help of water elements in illa, it is recommended to use water mist sprayers - then the user will experience changes in the humidity level. With the help of water mist it is also possible to spray fragrances, but it is important to select those that are commonly felt as pleasant (flower, herbal aromas, natural fragrances, essential oils, etc.) and to avoid their high concentration which can cause unpleasant sensations, shortness of breath, stress , headaches, etc. Places with odor exposure by means of water mist must be so concentrated that the odor spreads over a defined small area.

Smell is one of the most original human senses. Information about the smell is stored in long-term memory and has a strong relationship with emotional memory. Olfactory stimuli are the most volatile sensations, so to enable them to experience it is necessary to ensure appropriate conditions. The most important then will be to cover this space and deprive it of drafts.

However, too intense aroma may adversely affect the condition of a person staying in such a corner, so you should use plants whose aroma is not too intense, so that the comfort of use of the space is not reduced due to headache, discomfort in the form of runny nose or tearing.

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Textures, colours and design.

In learning environment, colour is believe to be able to cause positive or negative behaviour such as avoidance or withdrawal behaviour; affecting performance and stimulate senses. It is learned that visual stimulation contributes to improvement of attention span, develops cognitive abilities and refresh one's perception towards his environment but varied due to differences of gender and background. The entire interior should have a unique and pleasant style.

Each color treated separately has a different effect. However, in the case of interior design, this issue is more difficult because the color cannot be analyzed or evaluated by itself, because it depends a lot on the context and other colors accompanying it.

Too many colors in individual interiors, and thus in the whole apartment can cause an optical mess and make the interiors be perceived as "cluttered" and overwhelmed by the excess of various finishes.

If the same color is used everywhere, only individual, individual walls in individual rooms will be distinguished by different colors - the space of the whole apartment will become coherent and transparent. However, if a different color is to be used in each room as the predominant color, it is worth choosing max. two dominant colors for the whole apartment and possibly a third, which will complement them in the form of additions or details. If silencing is the intended effect - space should

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not attack the recipient with a multitude of colors and forms. Regular, static forms, rhythmic systems. Calmly flowing water.

Conversely, we should act to stimulate the recipient. Then a dynamic composition, varied and contrasted colors will be commissioned.

The space should have a uniform and harmonious character. The design should not resemble standard office or class-school rooms. The uniqueness of the interior plays an important role in the concept of the i-Lab method. The whole metaphor-based design should be understandable and consistent. It can be a visualization of a story, fairy tale or situation. The more creative and creative the better!

Examples: Maritime scenery, Forest, Alice in Wonderland, Toy Story (children's film), Airplane, Village, Spaceship.

Necessary Equipment Furniture: Chairs and tables should be mobile, not secured to the ground, giving them the possibility of moving.

The i-Lab concept refers to the perception of change as an element that develops creative thinking.

All floors must be easy to clean, matt and light in color. Rooms must be equipped with furniture that takes into account the different body heights of pupils and promotes good posture.
Workbenches must have a matte finish. When arranging the benches, care should be taken to ensure that pupils' muscle groups are not unilaterally stressed and that the light level requirements are met. Building solutions for educational and training facilities must be designed so that the surface temperature of the inner parts of the perimeter walls is not significantly different from the room air temperature throughout the year.

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Appearance of space

Creative space.

The standard office type promotes quick burnout. Innovation Laboratory is a modern space for any teamwork. Individual work is also much more pleasant here - the variety of equipment allows for frequent changes of space or adjusting the space to your needs.

I-Lab is an inspiring, innovative solution designed to move employees from their everyday 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 as well as work on the development strategy of companies. This place is distinguished by the coexistence and interpenetration of three elements: an inspiring environment, the presence of multiple technologies used during sessions, software for registering ideas, and a moderator who manages the participants' work process.

It is important that thanks to special software the participant can remain anonymous, which triggers the unfettered sharing of ideas on a given topic. There is no embarrassment, often found at traditional meetings, and the effects of work are even twice as good.

Adjusting space for people with disabilities.

In Poland, people with disabilities may still face many barriers, both architectural and social, which impede their normal functioning. People with disabilities moving in wheelchairs still face many difficulties, as is the case for the blind or deaf people. Evidence that Polish cities are not sufficiently adapted to the needs of people with disabilities can provide information that we hear, for example, about accidents of people with disabilities, related to impaired traffic on the streets or in public transport.

For many people with disabilities, every day is a challenge they must face in order to function normally and become actively involved in the current of normal life. It often happens that these barriers are the reason for the lack of active participation of people with disabilities in public life, their exercise of their rights, and even the lack of any exit, including for meetings with friends. People with disabilities, often discouraged by constant difficulties, withdraw from life, spending most of their time at home. For efficient people, everyday activities are a trivial matter, while for disabled people they can be a huge problem. Everyday obstacles in the form of obstacles include

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architectural, disorganize and inhibit disabled people from becoming independent or starting a satisfying life.

The most common barriers related to spatial architecture are: too narrow doors and entrances and corridors, too small areas of sanitary and hygienic rooms, level differences - i.e. stairs and steps, unsuitable elevators or their lack and insufficient sound and visual information. It should be noted that more and more new buildings are being equipped with facilities for the disabled, but unfortunately they are not always treated the same as solutions for the disabled. The only group worth mentioning, and in which there are rather no such problems, are large shopping facilities, the most common one-story (hypermarkets). These buildings are usually adapted to the needs and capabilities of people with disabilities, which indicates that there is no discrimination against people with disabilities.

Another barriers are social barriers, which is inseparably connected with the attitude of able-bodied people to disabled people. The role of stereotypical thinking about people with disabilities should also be noted here. Unfortunately, in today's world (although less and less often) one can meet with the perception of people with disabilities as those less productive, inefficient in life or incapable of work. It is worth noting that sometimes disabled people just need help, just like a fully functional person.

The last important barrier to which attention will be paid is the barrier related to the lack of material resources. Many studies show that for people with disabilities the only source of income are disability benefits or material resources obtained from social assistance. Unfortunately, it often happens that these funds are not enough to live a dignified life. It is advisable and desirable to employ disabled people, which can activate both professionally and socially. In addition, taking up work by people with disabilities will awake them more motivation and strength to overcome the barriers they encounter in everyday life.

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Educational assumptions of the ILab environment

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*.

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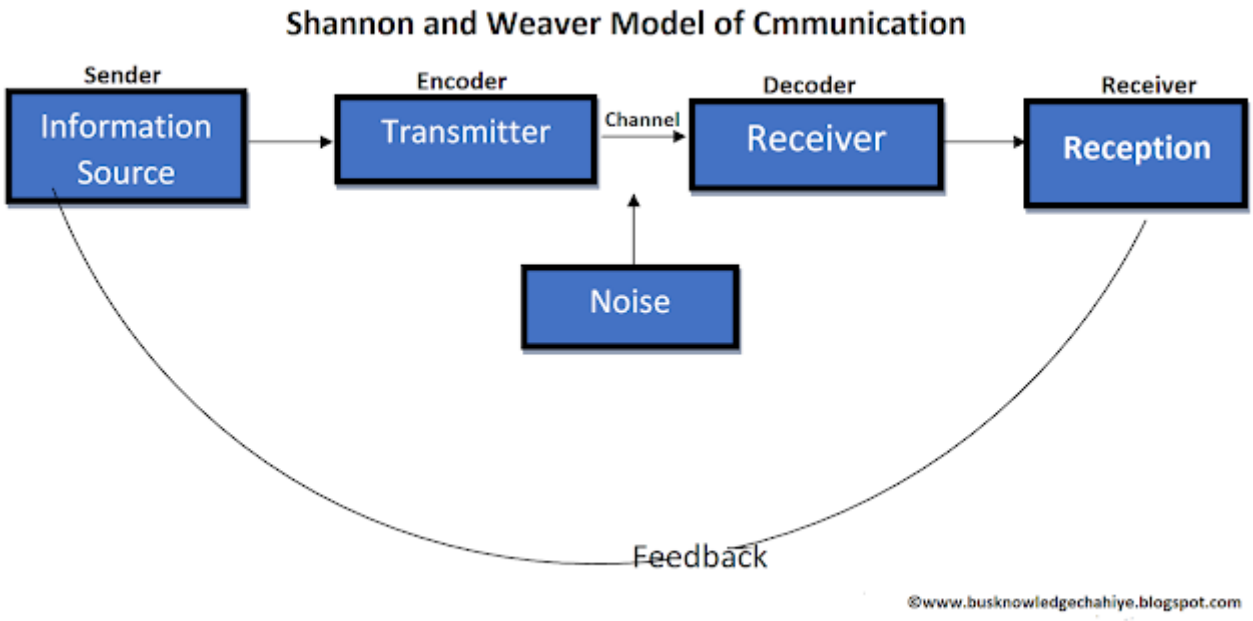
The model can be described with a simple scheme:



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*

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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.

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.

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Group dynamics and (in)famous effects

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

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

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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.

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

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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

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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

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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:

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- 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).

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Learning processes

a) 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

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to these needs. Existing curricula need to be constantly updated and adapted to real labour market needs.

b) Principles of adult learning

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.

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- 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.

c) 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 taht 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.

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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 verb 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:

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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:

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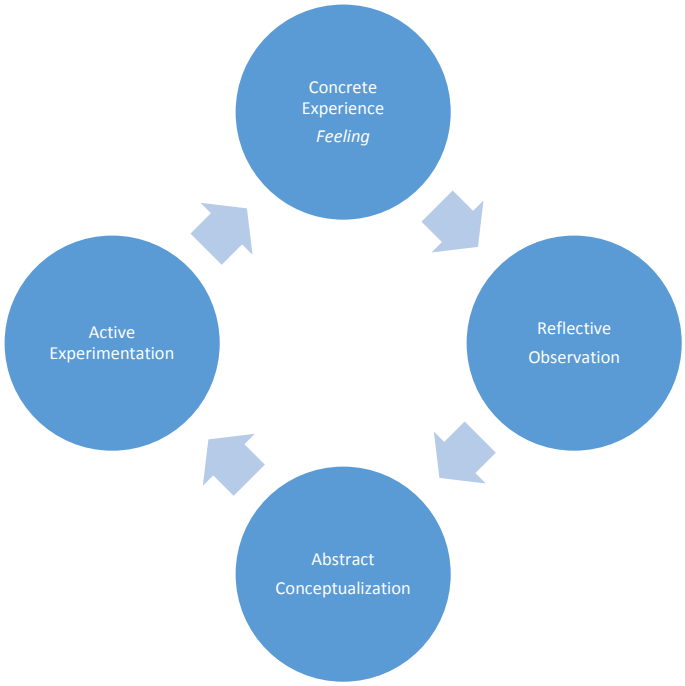

Constructivism

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.

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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*

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,

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- 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

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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.

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.

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- **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).

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- 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.

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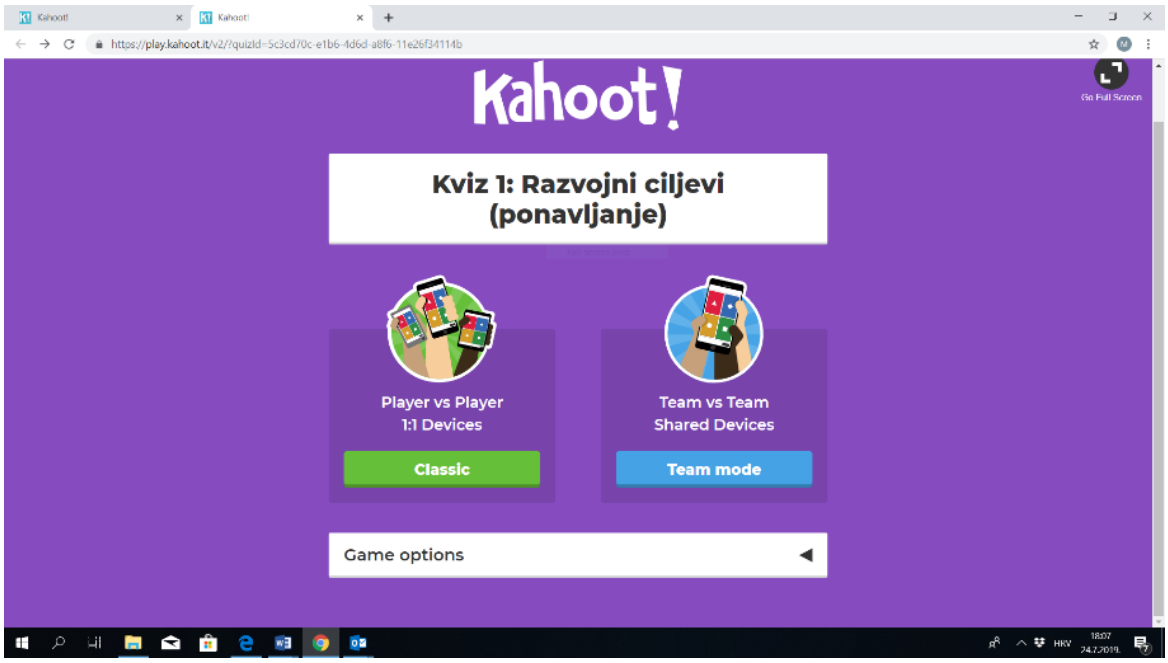

- **Hackathon*** is a framework or innovation process for creative problem solving and overcoming obstacles according to common rules in a short time frame. It is a participatory innovation method with the goal of creating an environment that makes it possible to not only innovate through hard work, 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.

- 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.

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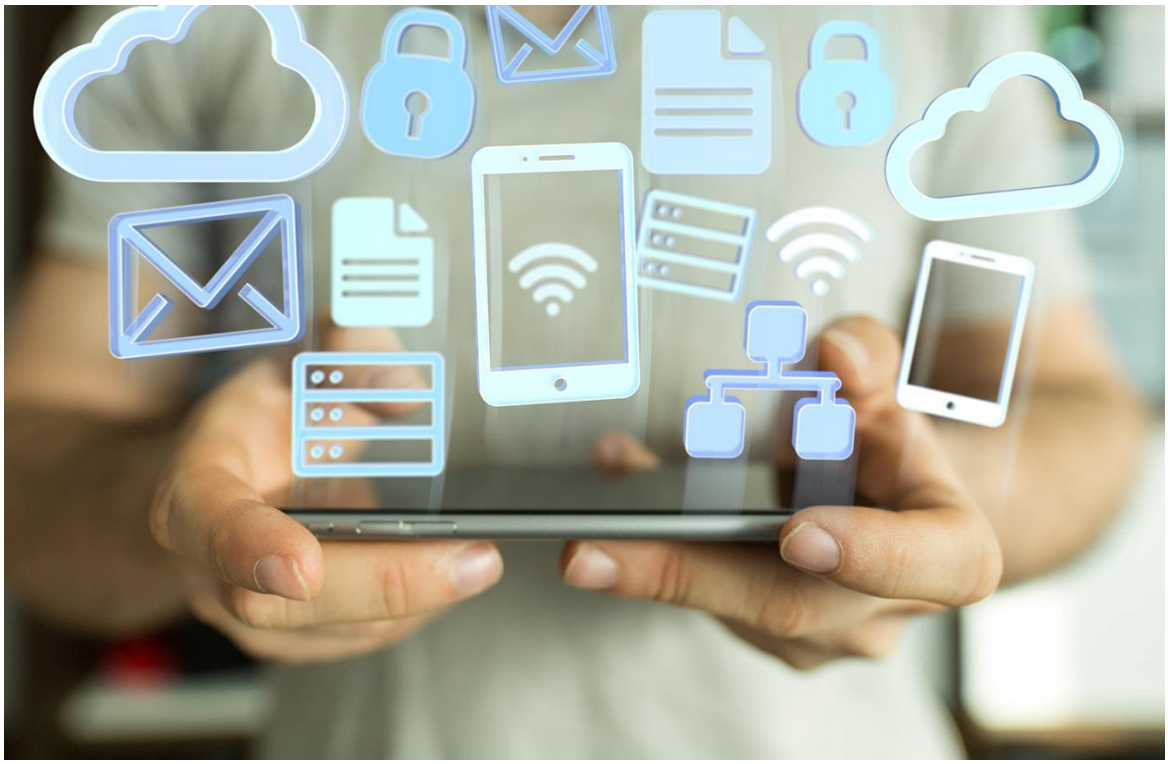

Mobile platforms

- **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

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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.

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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.

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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).

Machine learning

Self-learning systems (expert systems) are examples of artificial intelligence. Thanks to machine learning, computers are programmed to learn to do something new: discover patterns and draw conclusions from raw data.

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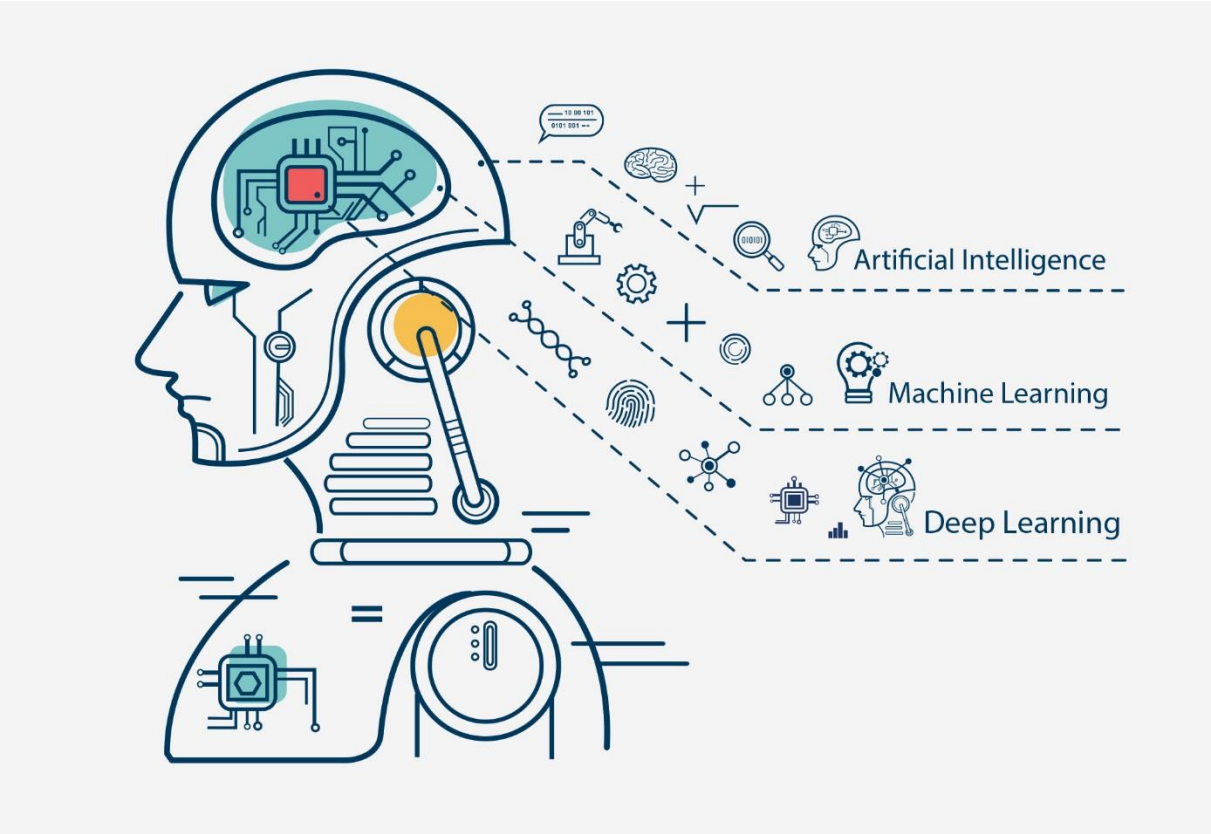

Within machine learning we can distinguish, for example, neural networks, natural language processing (NLP) and deep learning. Types of ML algorithms can be divided in terms of learning style:

- Supervised learning;

- Unsupervised learning;

- Learning through reinforcement (can be associated with feedback)

It's depend of autonomy we want to allocate to the machine when finding a solution to a problem.

For the programmer, the classes of problems will be important, for example: Classification, Regression, Decision tree, Clustering, Deep Learning.

In the context of ilab technologies, intelligent spaces, the practical application of ML processes will be much more important.

Self-learning systems are used mainly in:

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- collecting and analyzing data, eg from evaluation questionnaires or personality forms, which should allow, for example, to better adapt the methods of classes to the specifics of a workshop group

- recognition of faces and objects

- creating recommendations for the user, regardless of purpose: shopping suggestions (contextual advertising) or hints to the trainer how to choose tools and plan a break

- support communication with the machine: chat-bots, translating systems, speech recognition, translation interfaces (text-to-speech, speech-to-text)

- human resources management, optimization of team work

- trend detection

The consequence of using such systems could be, for example an app for designing classes - an expert system that helps to pass the course design process.

According to the machine learning logic, however, a large amount of suitable data for analysis will be needed. Such data may come from electronic classroom evaluation surveys, personality questionnaires from knowledge tests or be the result of affective studies (parameterized user reactions: ECG, GSR and others).

The classroom design application will allow you to design the use of space and technology elements in timeline and in connection with course events.

The teacher will be led through the course design process and will be prompted with the system components to be used. It is important to design an expert system that suggests the use of tools, methods or forms of evaluation.

The advantage of such a system can be remote use of the application and course design without physical presence in iLab. This is an advantage for guest lecturers invited, occasional and coming from far away.

The effect of the application may be a ready-made training scenario.

However, such systems are expensive and complicated, they can not become quickly a standard ilab procedure, but we recommend observing the educational market in this

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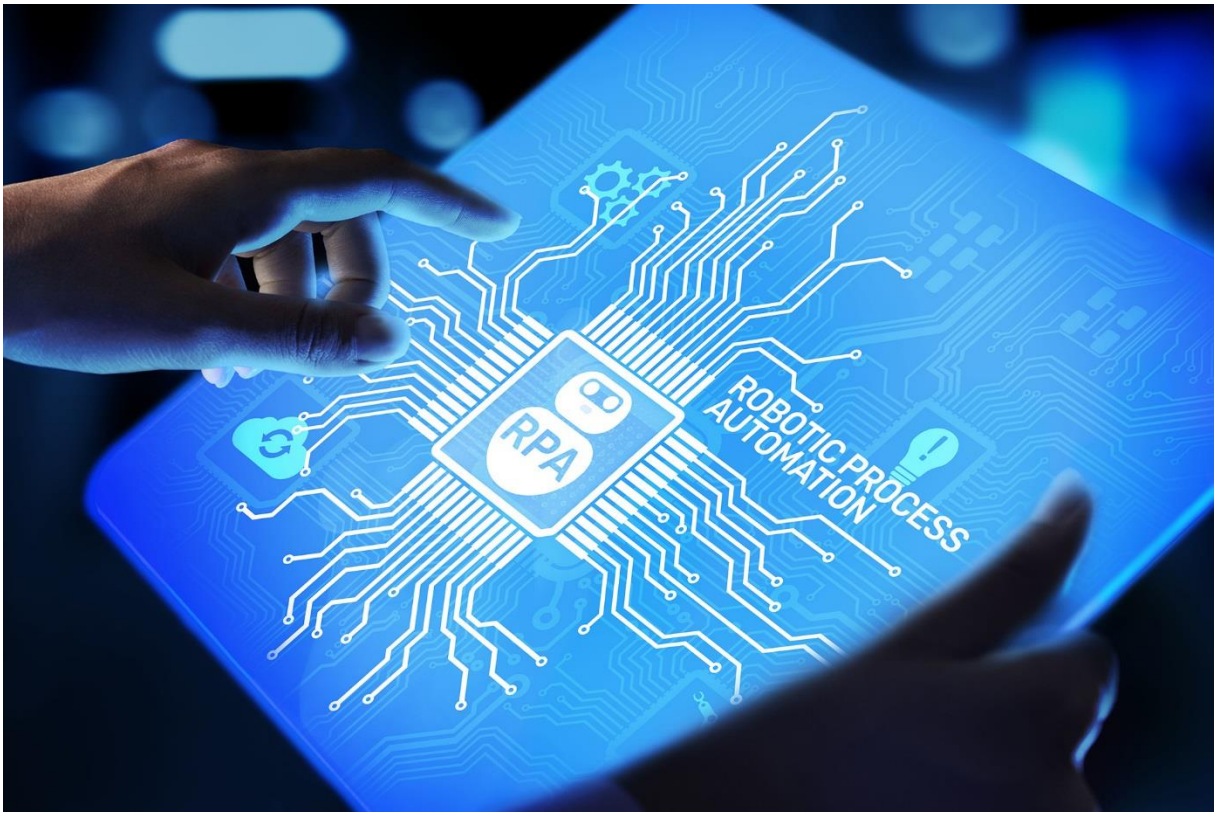
respect, because such solutions for education may become more widely available, eg as a result of the development of Google API or other large platform.



Robotic Process Automation

Robotic Process Automation (RPA) can be translated as: robotic automation of processes, using computer programs. This technology implies using software instead of human work. It is a set of certain algorithms that relieve people in works that are monotonous, repetitive and require a lot of time, but not necessarily intelligence or creativity.

Automated process:

- should be repeatable and based on clearly defined rules.

- should have structured input data

- should eliminate time-consuming work

- should support tasks characterized by high susceptibility to human error.

An important advantage of such a system is that it is personalized for a specific user, i.e. it can receive electronic lists (e-mails), extract specific information and on this basis create

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statistics, databases and even respond to clients maintaining full security and confidentiality of data. RPA bots do not require user intervention in their operation.

This issue is closely connected with another concept related to IT trends - Automating office tasks, that is, automation of office processes and work processes.

As can be surmised from the above brief description, such systems are also based on self-learning of machines, and sometimes to emphasize their greater complexity, the term RPA II is used.

It is worth asking yourself how this bots can be used in innovative educational environments. Such systems can be used, for example, in the case of:

- recruitment process (list of candidates, registration system),

- sending statistical data related to their progress to classes participants

- automatic setting of hours and meetings schedule

- equipment reservation

- use of the so-called Chatbot - a virtual advisor with a catalogue of answers and serving as a Q & A department

- Help Desk - automatic creation of accounts, reset of passwords, checking the status of submitted applications

Automation works, of course, at the level of management of the entire institution, especially in the context of:

- accounting processes, entering and booking invoices, making reports, tracking payments and reporting.

- logistics - shipment tracking, invoicing, debt collection, communication with the client

- customer service - support in manage correspondence, satisfaction test, status check, support in the complaint process

- HR processes - support in the processes of remuneration and benefits, commission settlement, monitoring of holidays and absences.

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Inthernet of Things

The concept consisting in the combination of material objects, such as: smartphones, computers, sensors, home appliances and electronics, meters, clocks, with each other and with online resources. These devices collect huge amount of data and are intended to use them to improve safety, health (e.g. telemedicine), reduce the consumption of natural resources (elements of smart Energy) and improve human-machine communication

Thanks to the Internet of Things, the first smart cities are being built. Its management is more optimized, traffic jams are unloaded, dynamically managed public transport optimizes passenger flow, exceeding the level of pollution restricts traffic in some areas. Traffic data is also useful when planning urban investments, urbanization plans. Heating systems use less energy, water and other resources are saved.

Internet of Things (IoT) is expected to bring major changes primarily in enterprises. The use of sensors in production equipment will allow for a better, often automated control of their operation. This limits production downtime. It will also allow quick identification of problems and failures. Thanks to the data available, the potential of machines will be better used, the safety of employees will increase, pollution and waste will be reduced.

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The Internet of Things is the basis for creating an intelligent space, but a separate chapter will be devoted to this issue.

Edge computing

Edge computing is a kind of architecture of distributed IT resources, in which data is processed on the edge of the network, as close as possible to the sources of origin. For example, data from smartphones could be processed on a home router. The value of edge computing is that applications respond very quickly, minimizing delays. The concept has already appeared at least a few years ago. The main advantage of this model is the ability to relieve Internet connections. The edge computing environment is more secure than other systems, because most of the information does not have to be transmitted in wide area networks and they remain close to the source. Edge computing allows limiting the amount of data generated and transmitted in networks and reducing the delays.
In the context of the popularisation of intelligent cars, drones, robots and other devices whose reaction to recorded events (for example: failures, specific tasks) must be immediate, delays associated with the transmission and analysis of data in the central system must be minimal.

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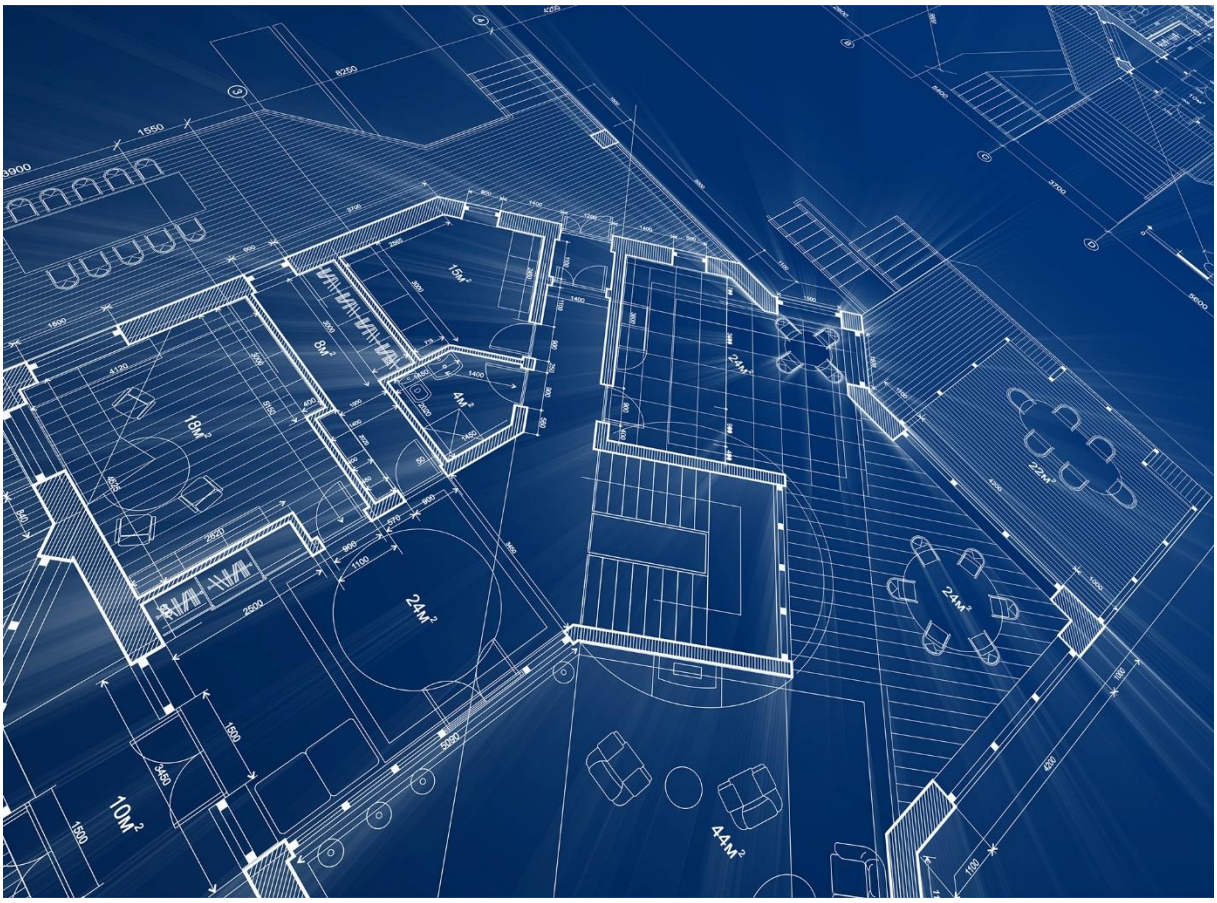

Smart space

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

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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.

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.

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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

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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.

Computer-aided facilities management software (CAFM) is used to help managers in organizing everything from correcting the schedule by monitoring the order and progress of performed works, to checking compliance with quality standards. It can also be used to control installations such as lighting, air conditioning or heating.

CAFM tools can also use extensive databases and modeling programs to give managers the opportunity to view a building or an object from, for example, a bird's eye view.

A wide range of CAFM solutions has become extremely valuable for those who are tasked with efficiently managing physical locations within a building or large space.

An example of using CAFM can be a system that collects data from seats concerning their position or settings relative to each other and creates a map ("heatmaps") of such positions distribution.

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

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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.

Smartwatches are the most popular wearables at present. These are mobile devices with a touch screen that perform the functions of a traditional watch, and some features of the smartphone such as receiving calls, using maps or playing music. One of the other functions is connecting the smartwatch to the phone via Bluetooth, which in turn allows you to view the message through the watch.

Fitness bands are another device quite popular. It is a small, comfortable device used for exercise. Depending on the model, the armband may be able to perform various activities, however, one of the most common is to measure steps, heart rate, and calories. Just like a smartwatch it can have additional functions like music player or GPS. They can also be used in medicine, for example by controlling the work of the heart.

Glasses that extend reality are an example of such clothing. Their task is to enrich the real world with computer-generated elements in order to diversify the user's experience by changing the view of the surrounding environment. They can be used in education, entertainment, marketing or tourism.

A similar device are glasses for virtual reality. Unlike an above mentioned ones, a computer image completely replaces reality instead of being an addition. They are used to a large extent in the computer games industry. In both cases, an important element is the interaction with the generated reality by the user. As a result, new ways to educate people in an interesting, engaging and attractive way, or create newer ways of spending free time are possible. They also allow people to shape professions that would otherwise be limited to theory, or would be expensive or dangerous, such as a surgeon, pilot or mechanic.

This virtual modelling is related to the concept of **Digital Twins**.

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DT It is a digital copy of various devices that allows you to simulate the operation of these devices before production and release on the market or in the course of action of physical objects. A digital copy and a "real copy" are closely related.

Digital twins integrates the Internet of Things, artificial intelligence, machine learning to create digital models with continuous updates.

Examples of the use of digital twins may be aircraft engines, locomotives, smartphones, spacecraft, rally cars or human organs and even whole cities.

Digital twins technology can also be used in schools and education. Some universities technically allow students to work on 3D models instead of on physical objects.

Augmented Reality

Augmented Reality can be called technology that enriches the real world with computer-generated elements, in contrast to virtual reality, which replaces the whole with a computerized image. These elements are designed to diversify the user's experience by changing the view of the surrounding environment as well as give the opportunity to interact

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with it, allowing the change of the generated image. This reality is created by various devices, such as glasses, helmets, monitors, or smartphones.

Where you can use this technology is completely dependent on ingenuity, because the extended reality allows any change in the environment. Such fields as medicine, aerospace or army have been using it for many years in exercises that would be dangerous, too expensive or impossible to make, such as complicated medical operations or trial flights.

An important area where this technology can also be used is education. Thanks to the interactive aspect of augmented reality, the user becomes more involved in learning by performing tasks, experiments or observing all sorts of presentations.

In June 2017 at the Faculty of Physics, Astronomy and Applied Computer Science (UJ), an experiment was carried out as part of the activity at the World Science Festival. UJ students attended a lecture by Brian Greene from Columbia University on string theory. The form of participation was unusual. People from all over the world have connected via the Internet in virtual reality using the HTC Vive technology. Participants saw each other's avatars, they could observe and visualize complicated physical phenomena (gravitational waves) and also participated in exercises and with the help of precise manipulators they could model and manipulate multidimensional spaces.

It seems that virtual telepresence and opportunities offered by the latest technologies open up a powerful didactic potential. Using head-based interfaces, you can not only make sophisticated visualizations but also allow you to participate in situations and conditions in which it is simply impossible (therapeutic, training, relaxation goals). Very precise and reliable simulations also enable conducting training with the use of very expensive, complicated, non-movable or dangerous equipment (in the virtual version).

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Technical possibilities of the ILab environment

Smart home equipment

- type of lighting

- color temperature

- lighting power

- shadowless lighting

- zone lighting

- temperature sensors

- CO2 sensors

- humidity sensors

- air conditioning controllers

- roller blinds, curtains

- motion sensors

- remote control of the projector, e.g. infrared

- "spraying" a particular fragrance

- control software (interface for managing the elements mentioned above)

The smell can give information about breaks or work steps; provide stimulation of activity or introduction of relaxation (through fragrances associated with activity or relaxation).

The ability to adjust the temperature and power of lighting to the time of day and the nature of the activities is inspired by the work of the University of Palacky in Olomouc, whose representatives

they used lighting presets in their ilab, creating conditions for night and day work.

The light source should suitable for the participant regardless of the position being taken. RGB LED lighting is ideal for precisely setting the color temperature. Stretch ceilings gives

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highly efficient shadowless lighting. In addition, the blind effect of participants looking at the ceiling is eliminated.

The smart house management software should give the possibility of switching on predefined light scenes, e.g. "relax", "work in groups", "presentation", give the possibility of adjusting the degree of insolation of the room at some group or leader activities.

Intelligent space is also intelligent control. Typically, in such installations, classic switches are not used, but multi-functional sensory panels (e.g., tactile ones). In a classic installation, you can often meet rows of switches, which in a smart installation is replaced by one functional and aesthetic device that allows both temperature measurement and thermostat function for the heating and air conditioning system. The management of such a room can take place through entire sets of settings called “scenes” instead of controlling individual circuits or devices.

Home control is also a visualization system that provides the functionality of controlling all elements located in the home through a mobile application available on a smartphone, tablet or wall panel. In this way, we gain a personal assistant who gives us a full view of what is happening in our home at any time, regardless of where we are at this moment. Such an "assistant" thanks to integration with, for example, Apple Siri, Amazon Alexa or Google home can also inform by voice and receive voice commands.

The next level of software is the integration of a smart system with AV devices (audio-video). For the training environment, such software can be very useful. The model of using such facilities enable the teacher prepare his own settings, for example, introducing a relationship between using a multimedia presentation and darkening the room, or changing the color temperature depending on the nature of the activities.

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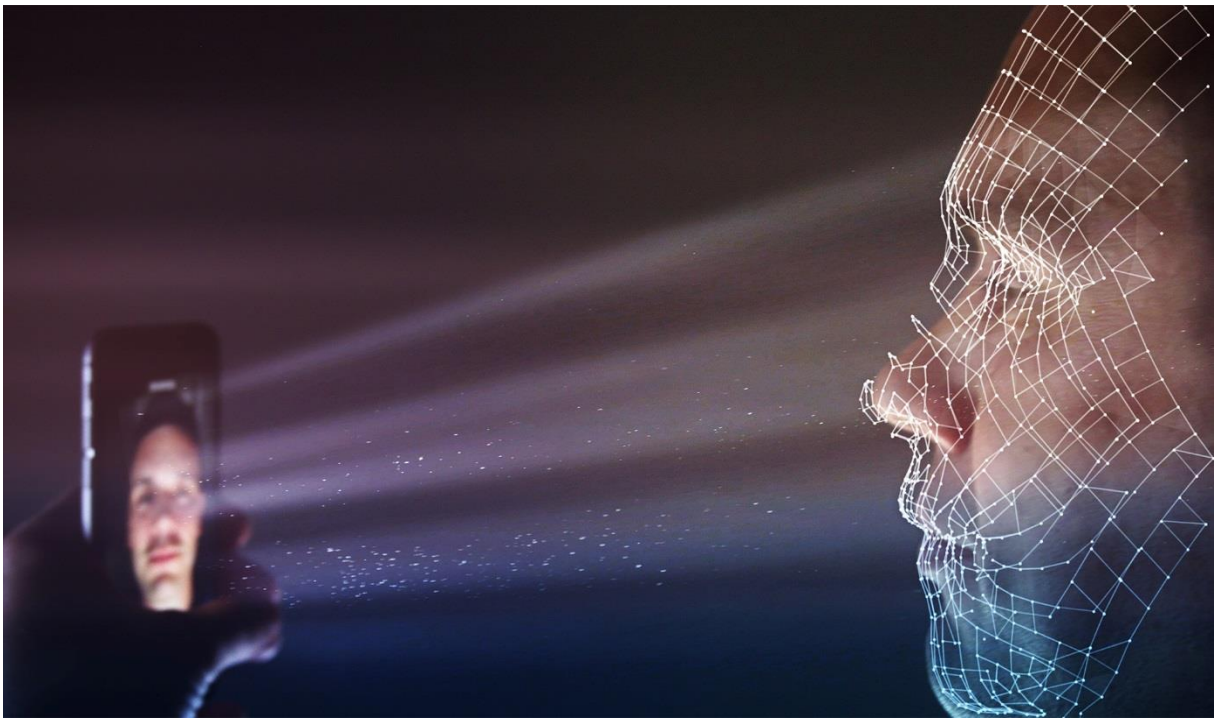

Sensors, sensors, biometrics (as additional elements)

- eyetracking tools with the possibility of preview on a big screen

- GSR, EEG

- sensor elements in seats, e.g. accelerators and motion sensors needed for CAFM software

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.

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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).

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.

The other is also an electrodynamic activity. The eccrine glands located in our skin (the most densely distributed on the hands and feet) perform thermoregulatory function, but they also react very well to stress and emerging emotions. It is a fast-reacting system that allows you to obtain information in a very good time about:

EDA: ElectroDermal Activity:

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GSR: Galvanic Skin Response;

GSC: Galvanic Skin Response;

The use of biofeedback

At the beginning, the wider use of biofeedback seems to be a promising path. This can be done in two ways.

1) The use of increasingly popular devices combining simple EEG with EMG and GSR (e.g. in the form of a band) in order to perform specially designed exercises to help relax, calm down, reduce stress.

2) Creating an intelligent system of constant monitoring of the elementary affective states of the participants of the classes. Thanks to this, the specialist conducting the training or workshops could observe the level of cognitive load of the pupils, check if they are not tired or if the exercises actually stimulate them effectively.

3) Lab equipment in a more serious system for tracking physiological stress correlates could enable conducting a completely new class of training, overcoming stress, support working in difficult conditions. Thanks to the use of sensors, the results of such activities could introduce individual development paths and provide a quantifiable basis for formulating training goals.

It is certainly worth following the development of technologies related to affective processing. It is a relatively young field, which, however, develops extremely dynamically. The whole, potentially powerful family of technologies and the discipline of knowledge related to affective learning has already formulated its demands and is waiting for its “five minutes”.

Neurofeedback devices available on the market:

- Emotiv Epoc with the TestBench application (Premium version with the possibility of analyzing raw EEG data) - 14-channel plus application enabling analysis of raw EEG data. The company provides many neurofeedback games for free.

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- NeuroSky MindWave - NeuroSky, one of the leading representatives of biosensor manufacturers for EEG, provides a device called MindWave. It has been designed to allow the use of an average computer as a monitor of brain activity. The headset, which is placed on the head, makes a safe measurement of brain wave signals from a place on the forehead called FP1. The special ear clip acts as a grounding and reference point. The whole can be adjusted to match the set to the individual dimensions of the user. NeuroSky MindWave exists in two versions: basic and expanded - mobile. The main difference is the transfer of collected data. Available software for testing EEG signal is compatible with Windows and Macintosh operating systems. The second version also supports iOS and Android. The headset connects to a computer or a laptop via WiFi equipped with a transmitter for a USB port. The mobile variant has a different connection, it is Bluetooth.

In addition to measuring the pure EEG signal, the attached working environment allows you to measure its power spectrum (alpha, beta rhythms, etc.), as well as show the level of concentration, attention during the command being executed. The device is very intuitive and less sensitive to interference than Emotiv Epoc. The undoubted advantage of the device is that it is quickly assumed, it is not required to wet the sponges in contact with the electrodes as it is in Emotiv, because they simply do not exist. This makes the device more convenient and faster to use.

Multimedia, content visualization, visualizations supporting the didactic process

- projectors
- sound system (possibility of use on the headphones only e.g. when the room is dark, silent party)
- camera connected to the projector (testing speeches, presentation abilities)
- interactive wall
- bluetooth / HDMI interfaces and others
- Virtual Reality ports
- frame reflectors enabling the display of inscriptions, arrows, etc. on the walls or floor.

a. the ability to display a logotype or other graphic elements on the walls

b. external façade lighting option

c. The possibility of 3D mapping inside

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d. the possibility of 3D outside mapping

e. the ability to display animations, 360 movies on the walls

- beacons supporting Augmented Reality
- remote voting devices (combined with a survey system)

Ilab visualization for the teacher as didactic support

- panorama 360 / virtual walk (VR)
- assisting the trainer with an online system containing visualization of space with active links containing descriptions

In the context of multimedia equipment, it is impossible to omit issues related to teleconferencing, online training and webinars.

One of the basic conditions that must be fulfilled for proper work in ilab is the possibility of streaming audio-video. These types of services are very widespread and we can choose between dedicated commercial solutions and free streaming channels. Among the free channels, Youtube and Twitch are very popular, the reason for this is the possibility of many settings including private sessions, the ability to register participants and moderate sessions. However, it may turn out that the needs of such a session will be greater. Particular importance have two aspects: the need to exchange files and subscriber channels. In this situation, ilab has to decide on two basic solutions: using a commercial webinar room or creating an original version of such a solution. Regardless of this, the webinar / conference room must provide:

- the ability to assign roles to participants
- chat moderation option
- options of many presenters
- file exchange system
- cooperation with, for example, Power Point and Youtube
- login data verification system
- the ability to save the session
- availability of a non-live session after its completion
- statistical report

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An important thing for the trainer would be the possibility of rearranging the room (setting of seats, tables, teaching aids) in a virtual environment or an online application that generates 3D visualizations and a room plan with the arrangement settings marked.

This application should be able to:
- arrangement of equipment (furniture)
- setting of lights
- setting of equipment activity (screens, blinds etc) – e.g. ready presets, scenes
- sound background setting.
- saving settings of smart house and preparing scenes, the inclusion of which will be done with convenient buttons on the teacher board.

The proposal of such an application is compliant with the digital twins trend and in this particular case allows you to recreate the digital image of real space, taking into account all its functional features.

You can use office software, similar on-line software, dedicated presentation systems or software that is part of a multimedia board, for presenting content. Regardless of what content presentation system will be used, it should have its basic features. Presentation of the content, due to the ergonomic assumptions, should take place using remote devices. The presented content should be available in formats supported by operating systems. The presentation system should allow for the sharing of content with users and enable them to intervene.

By presenting, we understand the use of different senses. Presentation of the content is not only a visual reception. The person presenting the content should use other stimuli e.g. auditory thanks to the use of speech-to-text and text-to-speech software. In the case of such solutions, it is about transcribing speech into text and the reverse process, i.e. changing the text into a spoken word. In the first case, we certainly have more freedom and a greater amount of possibilities.

Software that transcribes speech into text can be divided into certain classes: authorial soft, distributed by various providers involved in the study of colloquial speech, soft open source, virtual audio mixer. Authoring software may, for example, enable the recognition of the

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voice of individuals and, in this way, the creation of dialogue lists. If we need easy access and fast transcription, the Google speechnotes tools seem to be optimal. Googel's speech-to-text algorithms are good at national languages today. Software that converts text into sound does not have such a large application, although an interesting solution in group work can be a voice organizer. It is worth mentioning a group of programs which task is to manage the files of the operational program. These types of programs (like Cortana) can be used for remote access to the central unit when the physical access is limited.

Using of software in iLab will also be connected with:
- compatibility with various operating environments,
- network creation ability,
- facilities for the moderator
- hardware requirements,
- compatibility with other software,
- functionality in terms of the requirements of disabled people,
- various language versions of the software,
- knowledge of software among participants
- access to specialized training in the field of software operation and administration.

An interactive whiteboard or interactive wall is a combination of hardware resources and software. In principle, it is impossible to separate these two aspects. The current interactive walls are an image projected onto any surface, which thanks to sensors can become analogous to the touch screen. An interactive whiteboard is actually a transfer of available applications to the wall plus its own functions, which are already dependent on a specific manufacturer.

Functions that an interactive whiteboard should have in the context of using it in an ilab:

a) the possibility of creative work through:
- the ability to draw
- using colors
- commenting on an existing image (e.g. presentation)
- saving work results

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b) the possibility of teamwork through

- multitouch functions - enabling work for more than one person at a time
- making work available to others through the Network
- operation mode analogous to the touch screen

An interactive whiteboard can be a module attached to a short-range projector.
The surround wall screens are to be used as a multifunctional video screen. In the case of ilabs, the solution is useful for combining group work, presentations, data searches e.g. on the Internet and simultaneous videoconferences with co-workers of session participants.

When designing this type of solution, one must take into account the number of projectors working in surround mode and precisely determine the size of the projected image in relation to the wall surface that we have.

The use of mobile devices in ilab is mainly associated with:

- work on a document, project
- using cameras mounted in devices e.g. to use Augmented Reality
- using gyroscopes e.g. for VR tests
- remote control of the desktop, e.g. using Team Viewer
- use them as panels for remote voting and quizzing

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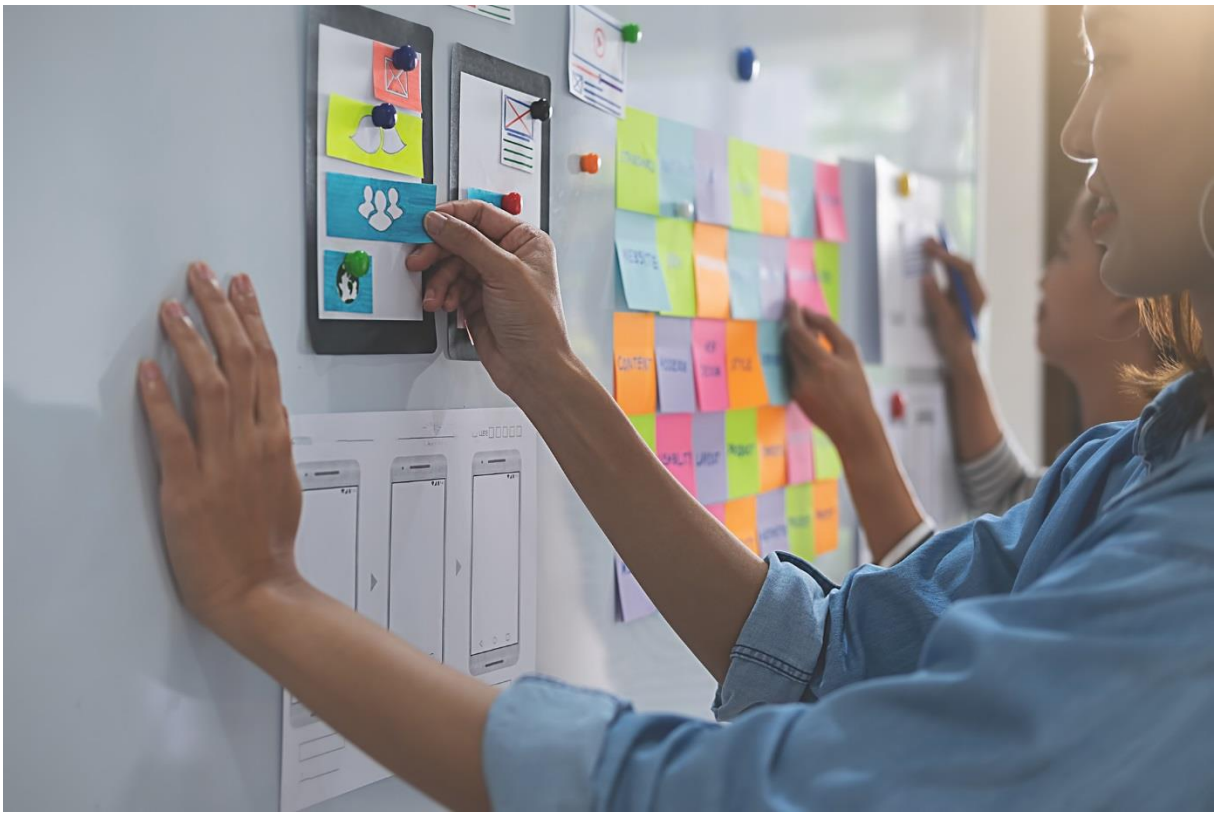

Teamwork software

- database, operating systems
- teamwork software
- interactive whiteboard with desktop / document sharing software
- interactive table (creativity exercises, business events)
- VR glasses - support for simulation games, integration activities
- mental map software and brainstorming

Ilab is a place where users have to solve problems in a creative way and without patterns. This should be made possible for them by the appropriate selection of tools. Problem-related tools will be needed to enable communication in a group, sharing work, illustrating ideas, and segregating ideas. The ideal workspace in this case should consist of an interactive central system such as a multimedia wall and software that allows you to work simultaneously on a single document. Practically: it can be one system connected, for example, with the interactive whiteboard network software, which allows you to divide the image from the table into mobile devices and vice versa - transfer the effects of work from these devices to one common display. For this purpose, you can also use dedicated

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commercial software, as well as use solutions that are based on different software, but give the same effect. An example of such a situation is, for example, the use of Google Docs tools, combining them with mobile varieties of these tools, projecting on the wall and adding comments, or using available on-line mental map wizards and working on one group's shared account.

The result of these activities should be a simultaneous insight into the creation of the solution and the possibility of recording progress. Moving this work into a "cloud" has a basic advantage - the effect of the work can be consulted by people from outside the local group ("openness" is one of the main features defining the idea of ilaba)

During creative work, various tools and props are used - it depends on the method. In the category of "analog" tools can also be infrared markers that work with the multimedia wall. Ilab's role is not digitization at all costs, but the effect of any work must be "scalable" digitally, i.e. the effect of the work must be suitable for further processing by third parties.

An element of creative work is access to information and information retrieval. Participants should have space on the repository of their files. The issue of exploiting information is first of all searching for information on the Web and in local collections. These operations should be "non-invasive" in relation to the course of the session, i.e. they should not interrupt it. This can be achieved by using a different screen for browsing resources or dividing the work screen so that these activities do not overlap.

Another area of group activity is e.g. gamification. Serious games should be created with a view to a specific application, so in this case you should rather talk about author's software. Of course, the planning of this type of software should be in the "checklist" of each ilab, but it will be different, depending on the basic activities carried out in the ilab. Generally, serious games can be a source not only of gamification, but they are a carrier of knowledge and can themselves create a test and behavioral environment. In the latter area, their planning should be combined, for example, with planning the use of sensors and measuring instruments in ilab.

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Support for people with disabilities

- a sign language translator that will be displayed on one of the screens during the lecture
- beacons
- sound, gesture and kinetic interfaces (natural language interfaces)

Chapter. 2 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).

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.

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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

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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"

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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.

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

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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).

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 prejudge 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

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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)

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.

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- 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 dinamics

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.

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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

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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:

• 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.

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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.

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.

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• 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.

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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

Useful tips

Keeping Discussions on the Track

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 votes), 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.

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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.

Tools for Increasing Participation

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.

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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

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.

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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,

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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.

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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.

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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.

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.

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• 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.

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Brainstorming should take place in three stages:

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

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 synestic 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

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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.

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.

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,

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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.

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,

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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.

Coping with difficult group dynamics

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.

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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;

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• Social conformism;

• Resistance to the leader, resistance to the Other;

• Some consequences of social facilitation (ie worse performance of more difficult tasks, better - easier)

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

Good advice for the trainer

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- 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.

Chapter 3. Planning of educational classes using the algorithm ICA (Interactive Curriculum Algorithm)

Formulation of goals I propose to combine the formulation and verification of goals

The proposed solution for planning classes in the iLab environment takes as a starting point the definition of objectives. The trainer conducting classes at iLab defines the goals or purpose for the subject of the class. It can set goals for the entire training or for individual modules that make up the whole. The proposed application suggests a record of the goal in a generalized formula without reference to a specific topic, the goal is created by the trainer. The trainer can also opt out of using the application hints and enter their own goals by selecting the "other" option. Goals are the most important element of class design, each trainer aims at the end result they specify. That is why it is worth devoting some time to this planning stage and specifying exactly where we are going with the class participants. For specific purposes, the scope of content is selected that allows them to be implemented and the procedures for their implementation, i.e. the forms and methods of work. Then, bearing in mind the goals, we determine which help we will use to achieve the assumed results. The description of the purpose included in the application is a proposal to which the trainer creates a detailed description of his expectations towards training participants.

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It is important and very timely to distinguish between learning goals and learning goals. Teaching goals refer to the lecturer's activities and learning goals relate to observable effects in the behavior of the participants. The purpose of teaching can be, for example, transfer of knowledge about the 5s planning system. Evaluation of this goal is a statement that the teacher discussed 5s during classes. However, learning objectives can be formulated as follows:

Participant

- explains the importance of the 5s system in providing a well-organized and safe workplace

- describes the assumptions and phases of the 5s system

- uses the 5s system to plan a well-organized and safe place or jobs

Therefore, the achievement of learning goals is checked in a different way than the learning goals - we have to check whether the participants remembered and understood the 5s system, or whether they can use it. Since learning objectives are more important for the contracting institution, the trainer must not only include the content in his classes, but also ensure that the participants learn specific knowledge and skills. To verify the achievement of learning objectives, it is no longer enough to simply determine the presence of the topic in the course cycle. There must be a method of assessing the knowledge, skills or changing attitude of the participant (depending on the type of goals). Such methods, tailored to the type of purposes, are proposed by the ICA (Interactive Curriculum Algorithm) algorithm

Types of goals - taxonomies

Goal building can be based on the taxonomy chosen by the trainer. Selected goal sharing proposals are described below. In the application, functional goals are proposed referring to Bloom's taxonomy, improved by Anderson and Krathwohl, and Niemierka's taxonomy.

Bloom taxonomy

The most famous taxonomy of educational purposes was proposed by Benjamin Bloom in 1956. The basic premise for his work was to create a system of goals that could serve as a benchmark for assessing student progress. Bloom distinguished three areas of educational goals: cognitive, emotional and psychomotor. Within these fields he distinguished several

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levels of goals. For the cognitive field, they were: knowledge, understanding, application, analysis, synthesis and assessment. In theoretical assumptions, achieving goals from a lower level was a condition for the possibility of achieving goals from a higher level.

Niemierko presents a unified taxonomy of goals, adapted, as he writes, to Polish conditions. Unification consists in the consistent introduction of four levels in each of the fields of objectives. Niemierko defines these goals with the letters A-D. The author distinguishes four areas of goals: cognitive, emotional, practical and ideological. In the cognitive field, it distinguishes the levels: A- remembering, B- understanding, C- use in typical situations, C use in problem situations. The last of these levels is also associated with the creative use of knowledge.

Modification of Anderson and Krathwohl

Lorin Anderson, a former student of Bloom and his former associate David Krathwohl in 2001 published a proposal to change the taxonomy of cognitive goals. Instead of six levels of goals related to teaching using 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 their attention and construct meaning by themselves using this selected information and their previous knowledge. Anderson and Krathwohl's proposal takes into account dimensions related to the cognitive and metacognitive activity of the student during the learning process. However, this change relates mainly to the constructivist perspective from which cognitive processes are described, and the change is made at the level of reformulation from noun terms (knowledge, understanding, application, analysis, synthesis, assessment) to verb (the student remembers, understands, applies, analyzes, evaluates , creates). The change at the language level also applies to the old dimension of synthesis, now renamed "student creates", but after a closer look at this dimension, it turns out that this is only a cosmetic change. The newly introduced dimension of cognitive processes, referred to as creation, can be included at the general level in the question "whether the student can create new products or find new points of view". The authors also specify examples of cognitive processes used in this dimension of purposes. They are joining, constructing, creating, designing, developing, formulating, writing. An important change, however, was the introduction of the type of knowledge dimension that is

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constructed in the learning process. Anderson and Krathwohl distinguish four general dimensions of knowledge.

Wymiar wiedzy Wymiar Procesów poznawczych	Fakty	Pojęcia	Procedury	Metapoznanie
A. Pamiętanie				
B. Rozumienie				
C. Stosowanie				
D. Analizowanie				
E. Ocenianie				
F. Tworzenie				

Dimensions of cognitive goals, modified Bloom taxonomy. Based on Anderson and 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 the learning process takes place and to solve problems within it, is knowledge of terminology and specific elements of the field. The next dimension is conceptual knowledge, which concerns the creation of connections between the basic elements within larger structures, allowing these elements to function as a coherent whole. In this dimension of knowledge there is classification and categorization. The next dimension is procedural knowledge of the "how" type. This knowledge is related to the ability to do something by methods of obtaining information, criteria for the adequate use of learner-specific skills, algorithms, techniques and methods. The last type defines metacognitive knowledge, i.e. knowledge about how, at a general level, human cognitive processes function as well as awareness and knowledge about one's own cognitive activities.

Germany's Taxonomy

Bolesław Niemierko (2004, 2007) presents a unified taxonomy of goals. Unification consists in the consistent introduction of four categories in each of the four fields of purpose. The author

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distinguishes four areas of goals: cognitive, emotional and motivational, practical and worldview. Objective categories within each field are marked with the letters A-D. In the cognitive field, he distinguishes the categories: A- remembering (the student remembers), B- understanding (the student understands), C- use of knowledge in typical situations (the participant solves typical tasks), C use of knowledge in problem situations (the participant solves unusual tasks). The emotional and motivational field includes categories of goals focused on the involvement of participants in school activities and self-development. In this field, Niemierko distinguishes category A - participation in the activity (the participant takes part in educational activities), B - taking action (the participant actively takes actions during classes), C - Action-oriented (the participant has a relatively persistent focus on taking action), D - system of activities (the participant plans its own educational activity). Another area includes practical goals. Category A - imitation of action (the participant imitates activities performed by others), B - reproduction of the activity (the participant repeats the activity), C - efficiency of operation in constant conditions and D - efficiency of operation in changing conditions. The fourth field of goals includes worldview goals. The basic category in this field (category A) is the belief in the truthfulness of knowledge. Learning to believe that we are learning false knowledge causes resistance. An example would be the resistance to learning about biological evolution in people convinced of the falseness of Darwin's therapy. Category B - belief in the value of knowledge (we learn more effectively when knowledge is useful to us), category C - focus on the use of knowledge (the participant's activities are focused on the use of knowledge) and category D - the system of application of knowledge (the participant incorporates knowledge into complex systems cognitive and uses them as a permanent element of its own knowledge structure).

Creativity as a separate field of goals

In literature, the idea of treating creativity as a teaching subject prevails (cf. Nęcka, 1998, 2001; Szmidt, 2003, 2007). The concept of creative competence described earlier is strongly associated with the postulate of developing creativity also outside of specific, dedicated classes. And although the authors urge to support creativity in everyday educational work (Krzysztof J. Szmidt collects and presents a wide range of postulates for teachers who want to develop the creativity of students: Szmidt, 2007), so far there is still no consistent taxonomy of the goals that a teacher should set in field of creativity. Moreover, this field is practically

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unnoticed. This situation leads to the fact that the teacher in daily work, when planning the lesson, does not pay attention to the development of creative competence, if only sporadically and only when the topic of the lesson is to stimulate creativity.

In other words, the postulate of introducing the field of creativity for teaching purposes will result in teachers setting these goals not only in the case of creative workshops (creativity as a subject), but also other activities. Thanks to this, teachers should see the possibility of stimulating creativity in various educational situations. At the same time, we emphasize that creative lessons should, in addition to goals in the creative field, also achieve goals in the field of cognitive, emotional-motivational and action.

Distinguishing the field of creativity as a separate ability that requires special treatment has been appearing for a long time (see Marland, 1972; Renzulli, 1977; Torrance and Myers, 1970). For example, the popular talent development model of Joseph Renzulle (1977) distinguishes creativity as a separate dimension without which talent is incomplete. This means that teachers, for the overall development of the student, should pursue goals not only within the development of disciplinary skills and motivation, but - which is important for our proposal - within creativity. The direct, theoretical basis for distinguishing the creative field of goals was the concept of succesful intelligence by Robert Sternberg and the educational conclusions he derived from this concept (Sternberg, 2004). According to his model, achievement-oriented intelligence requires the development of three types of intelligence: analytical, creative and practical intelligence. Analytical intelligence can be equated with general intelligence measured by intelligence tests. Creative intelligence is the ability to creatively search for and solve problems. The student in an unusual way solves tasks or finds untouched problems within a given field of knowledge. Practical intelligence characterizes people who deal with the problems of everyday life in a natural social and situational context. Based on this model, Sternberg proposed the WICS education system aimed at holistic and interdisciplinary combination of elements supporting the development of all types of intelligence. The abbreviation WICS refers to four educational principles that develop achievement-oriented intelligence. The first of these is the development of wisdom (Wisdom), associated by Sternberg with practical intelligence. Wisdom implies not only the ability to reason but conceptual knowledge and intuition. Another rule concerns the development of intelligence (Intelligence). Of course, this is about analytical reasoning. The next rule is to develop

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creativity (Creativity). The last rule - Synthetize refers to the combined application of all of the above principles to influence the development of achievement-oriented intelligence.

Sternberg also proposes specific areas of educational activities related to the WICS model. These activities should be directed primarily at remembering. Typical tasks in this area are "recognize" and "remember". Then, analytical thinking should develop using "compare", "rate", "explain" tasks. In turn, develop creative thinking have "invent", "imagine" and "propose" tasks. On the other hand, tasks requiring use, implementation and application appropriate to the situation may help in developing the area of practical activities.

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

Piotrowski's proposal (2010b) expands the taxonomies of Bloom and Niemierka's goals to include a separate, creative field of goals, equal to the field of cognitive or emotional-motivational. One of the basic advantages of the idea of Niemierka is an uncomplicated and homogeneous system of goals, supportive and at the same time simple to use. The field of creative goals, like in Niemierka (2004), includes four categories of goals. The first category (A) defines the goals related to sensitization to creative activities. We have goals related to personality development, curiosity, imagination and cognitive skills. This category also includes knowledge and the ability to use strategies to increase fluidity and flexibility of thinking (Guilford, 1971). The goals in category B refer to social skills specific to creative people. Creating new ideas and solutions always takes place in a social context. Category B goals are to prepare students for creative functioning among other people, which is why we call them the courage to create. Category C includes goals related to the ability to combine distant ideas. At this level, goals are set to develop mental operations such 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 goals (D) are goals that include learning to consciously use creative problem solving techniques. These goals are most closely related to teaching creativity as a subject, but creative techniques also have variations and specificities depending

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on the subject. The use of creative methods in the creation of essays will be somewhat different, in the selection of techniques or composition in visual arts, and still differently in the natural sciences.

Kategoria A:	Otwartość (wyobraźnia, tolerancja na różnorodność, otwartość na nowości, płynność i giętkość myślenia)
Kategoria B:	Odwaga tworzenia (podtrzymywanie cudzych pomysłów i oddawanie swoich pomysłów grupie)
Kategoria C:	Łączenie odległych idei (skojarzenia, metafory, synteza pojęciowa)
Kategoria D:	Świadome stosowanie technik twórczego rozwiązywania problemów

Classification of goals in the field of creativity.

As you can see, the classification of Piotrowski's goals is not based only on setting cognitive goals (and those goals that are cognitive are also specific to creative thinking), so you can't reduce it to classic concepts. The above taxonomy is closely related to the concept of Bloom, but regardless of what approach we take, whether we are supporters of a rigid division of goals or plan goals based on more dynamic models, we should include creativity as a learning goal.

Taksonomia Structure of Observed Learning Outcome (SOLO)

Taxonomy SOLO (Structure of Observed Learning Outcome) or in Polish SOWU (Structure of Observable Learning Outcomes). SOLO taxonomy (Structure of Observed Learning Outcome) was described over 30 years ago by John Biggs and Kevin Collis and seems 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-structured, in other words: "I don't know what's going on!" - learners do not have the knowledge and skills necessary to complete the task.

2. monostructured, in other words: "I remembered one thing from what we were learning!" - learners know a single fact or concept. At this stage, verbs are used to define goals: it names, describes, recognizes and implements simple procedures.

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3. Multi-structural, in other words: "I remember what I was learning!" - learners know a lot of facts and information. Verbs used at this stage to create goals: organize, define, group, classify, formulate questions, deal with algorithms.

4. relational, in other words: "I know how to connect everything that I know!" - learners can connect information they possess. When creating goals, verbs are used: generalizes, predicts, interprets, finds analogies, compares, compares.

5. extended abstraction, i.e. deep reasoning. Learners treat acquired knowledge as the basis for generalizations, speculation, summing up and building new knowledge. Verbs used to formulate goals: imagines, proves, creates theories, justifies, analyzes, hypothesizes, explains causes, questions, looks for analogies.

Competence levels according to \ SOLO taxonomy (based on: Biggs, n / a).

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

In this approach, it is not important how many facts the training participant knows, whether he lists two principles of proper teamwork or presents much more principles. A higher level of competence is achieved when it determines the importance of these principles in effective group work,

Regardless of what approach we use when determining expectations for training participants, remember not to overlook skills at higher levels sometimes called complex

Operationalization of goals

To be able to achieve the assumed goal and to be able to assess the extent to which the goal has been achieved, the goals should be operationalized. The word operationalization means formulating a goal to define the effect of educational activities. For example, the phrase "the purpose of the course is to familiarize participants with the Excell program" is too general, because it does not carry any information about what exactly participants will learn (will they only see what Excell looks like, will they learn to use only a few basic functions, will they they learned to program complex computational algorithms etc.) or what will be subject to assessment (will we ask the participants if they have seen Excella, will we give them specific tasks and what knowledge and skills will these tasks require). The operationalized goals should

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be more detailed than the general goals and verifiable. The wording 'participant calculates descriptive statistics of a datasheet' gives specific information about what participants will learn and what effects they can expect at the end of the class. The general goal of "getting acquainted with the Excell program" should be broken down into operational goals in such a way that individual blocks of classes achieve one or several well-defined goals and that it is possible to verify the effectiveness of training by measuring the degree of achievement of the objectives.

Of course, in the example given above, we are dealing with practical material that can be precisely determined. However, in the case of training "Soft" goals can often be difficult to verify. Nevertheless, we should try to operationalize these goals as well. For example, "sensitizing participants to emotional needs" can be operationalized for several purposes: "the student recognizes behavioral indicators of basic emotions", the student recognizes behavioral indicators of shame, pride, jealousy, etc. postponement, after a while. Similarly, in the case of assumed goals in areas such as worldview or motivation.

Formulating training goals and measuring their achievement in the ICA algorithm

In the ICA algorithm, the person designing the classes should specify the training objectives. To facilitate the selection of goals and the subsequent assessment of the degree of achievement of goals, the ICA algorithm displays a cafeteria of terms related to various fields and categories of goals.

The terms proposed by ICA are intended to guide the operationalization of goals in such a way that the ICA algorithm can generate hints as to the tools for verifying the effectiveness of training. Plots proposed by the ICA algorithm are content-neutral, which means that the person constructing the classes can use them regardless of the content of the classes. Terms and goals defined with them refer to thematic blocks of classes or to entire classes. Due to the possibility of more precise verification, in the initial version of ICA we propose definitions related to cognitive goals (regarding the structure of knowledge and efficiency of tasks). Social goals (regarding cooperation / rivalry of participants and group activity) are no less important for the efficient conduct of classes. However, the assessment of their implementation is slightly more demanding. Below we suggest some examples of operationalization of social goals.

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In the ICA algorithm, it is also possible to select the Long-term goal. Such a choice will require clarification of the goal completely independently. Due to the huge variety of content and forms of teaching, the ICA Algorithm gives you the opportunity to define your own goals by choosing the Other option. In this case, you will be able to choose the assessment technique from all available options, without any preselection by the ICA algorithm.

Verification of goals

The key information for the teacher and the person ordering the classes is the effectiveness of educational activities. This effectiveness can be estimated by measuring the degree of achievement of learning objectives. Assuming the learning objectives of the participants, we can check whether and to what extent these goals have been achieved. Appropriate verification tools for the intended purposes will help in measuring the effectiveness of classes.

The assessment of learning outcomes carried out with appropriate tools can serve as valuable feedback for training participants, for the contracting authority but also for the teacher. He can indicate which parts of the course are optimally prepared for achieving the objectives, and which should be further modified and improved.

Of course, the assessment of the effectiveness of the classes should take into account the specificity of participants. An internally conflicted group can direct its activity and attention of members to activities other than those related to learning. Participants who consider a topic to be unnecessary or evaluate lecturers as incompetent may resist and, as a result, close themselves to knowledge. However, such situations should be recognized before the start of classes. This will allow you to enter additional goals that allow you to work effectively. For example, when a group is in conflict, it is worth setting one goal of group integration or organizing classes in such a way that the conflict does not affect the participants' work. If the topic is considered unnecessary, you can set yourself a goal in the field of ideological goals, and devote the time to show the values of the transferred knowledge. This sometimes happens in the case of OHS classes. Taking the time to become aware of threats (including legal ones) and lack of knowledge of how to behave participants causes interest in this topic. If it is not possible to obtain prior information about the participants (the institution commissions the subject without informing about the training needs and the composition of the group, or the classes are open and we do not have knowledge about persons applying for

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classes), we should also interpret the results obtained using evaluation tools in relation to behaviors of individual participants.

Verification of learning objectives at iLab ICA.

Depending on the terms used in constructing the objectives, the ICA algorithm offers evaluation tools to choose from.

The proposed methods are complemented by the selection of specific tools. It is also possible to ask participants about their subjective assessment of the implementation of individual goals. In this case, select "Questionnaire for Subjective Goal Assessment" (KSORC) from the ICA's proposals. This proposal will be visible regardless of the stated purpose. It can also be selected as an additional evaluation tool. For example, when choosing a closed task test and a subjective questionnaire for assessing the achievement of goals, for the same purpose, the ICA algorithm will propose a closed task test template and at the same time create a KSORC. The panel will ask whether the questionnaire for subjective assessment of achievement of objectives is to cover all the objectives entered in the ICA system or not. If all goals are selected, ICA will create an appropriate questionnaire with questions about specific goals (with a five-point scale). If the answer "no" is chosen - ICA will create a questionnaire containing questions only for those purposes for which the KSORC tool has been selected.

Tools to verify cognitive goals

Closed task test

The closed task test contains questions with a list of answers. The examined person chooses answers. The criterion criterion is the number of correctly selected answers in the whole test. Question scoring can be the same for each question or you can score questions for you can be important. The scale of points for a good answer depends on the author of the test. The most common form is the scale: good = 1 point, wrong = 0 point. But other points are also possible. Sometimes authors use negative points for a wrong answer. This is to prevent the test subjects from choosing answers randomly. However, this method can only give a response when the tested person is absolutely sure. Less confident people will use a risk avoidance strategy and, as a result, the test result will be lower than their actual knowledge.

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At ICA, we offer several variants of the closed task test, which differ in the form of presentation of ready-made answers to choose from.

- Single choice from the suggested answers. Of the few answers presented, only one is always correct.

- Multiple selection of the proposed answers. The number of correct answers to the questions in the test may vary. In extreme cases, all the answers may be correct or none of them will be correct.

- Assignment tasks. The answers are structured so that they can be matched in pairs.

- True-false tasks. This is a variation of the test of closed tasks with a single choice, with the number of possible answers narrowed to two (yes vs no or true vs false)

Open task test.

Open task test is a list of questions with no ready answers to choose from. The test person must enter the answer to the question themselves. At ICA, we offer several variants of the open task test.

- Tasks with a gap. The question is allowed to enter the answer. Usually it is one word or concept. Task with a gap can take the form of work with a text in which some words were cut out and the task of the test persons is to fill in the missing fragments.

- Short answer tasks. Tested persons are to give a short written answer to the question. It can be, for example, a definition of a concept.

- Extended response tasks. Test subjects are to answer the question exhaustively through a longer form of response, e.g. an essay. Questions in this form of the test must be open and fairly general.

Case study

Case analysis is about putting a problem task. Tested persons should recognize the type of task and apply the acquired knowledge to solve it. The problem in the case analysis should be described as accurately as possible.

Questionnaire

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The questionnaire (closed questionnaire questionnaire; multi-item scale) is a set of statements with which the test person can agree or disagree. We create statements for each issue that can be helpful in assessing the achievement of the goal. In the questionnaires, a scale of several degrees is often used to determine the degree in which the subject agrees with the statement. An example of such a scale is a five-stage Likert's sac, in which the examined person can choose one of five answers: 1. I strongly disagree, 2. I disagree, 3. I have no opinion, 4. I agree, 5. I strongly agree (1 Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree). When choosing a questionnaire to verify the training goals achieved, we must remember that the participants' responses are subjective and reflect their current beliefs. We will not check in this way if the participant has learned something, or if there is any change caused by the training according to him.

Questionnaire for subjective assessment of the achievement of objectives (additional tool) KSORC

The questionnaire for the subjective assessment of the achievement of objectives is a tool with which we can examine the subjective sense of participants related to the implementation of our duties. Such a questionnaire should be carried out regardless of other techniques for verifying the achievement of individual goals. This questionnaire is created in a relatively simple way. Having operationalized goals, we can present them as questionnaire surveys and ask the participant to specify to what extent, in his opinion, these goals have been achieved. We can use the Likert scale. For example, if the objectives of the class block were formulated "The participant recognizes the types of social behavior in the group", a single item regarding this goal in the KSORC may be "I can recognize the types of social behavior in the group". The participant may specify on the Likert scale how much he agrees or disagrees with this statement. Despite the fact that the questionnaire measures only a subjective sense of achieving the goal, in some cases it may be the only tool informing us about the receipt of training.

Tools to verify social goals

Observation

Observation is based on obtaining information from the participants' behavior. Observations can be qualitative, i.e. only the absence or presence of some type of behavior or

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phenomenon is recorded, or quantitative if the observed phenomenon or behavior is subjected to measurement using numerical values (e.g. we can observe and record the number of aggressive or submissive behavior of the participant).

Nomination

Nomination is a tool for subjective assessment of phenomena or behavior based on generalized observations. After the block of classes or after the class, the teacher can subjectively assess changes in the group or in individuals. Similarly, participants can undergo a generalized assessment of observed changes resulting from educational activities. Observation requires recording of observed phenomena and situations on a regular basis, the nomination is a generalized summary, without having to record all observed phenomena. Thus, the evaluation by nomination can be affected by emotions, individual events and subjective interpretations of the situation.

Interactive Curriculum Algorithm

Ilab is a training environment with many possibilities. One of them is Interactive Curriculum Algorithm (ICA). This algorithm is intended to facilitate the creation of a training program by suggesting automatically available preset suggestions for evaluation tools, teaching materials and room settings. The ICA system introduces a uniform curriculum standard. Regardless of the content, people who make curriculum should follow the below presented phases. Unification of the curriculum gives the possibility to evaluate and compare didactic activities in the iLab environment and guarantees training prepared with care for the training effects.

The process of creating a training program

The training preparation process assumed in the iLab environment consists of several steps that the person who creates the class scenario must take. The iLab ICA algorithm can help in this process. The arrangement of individual stages is dictated by the focus on training effects. Hence, before we enter the topic of the class block, we enter the operational goal for the given class block. In other words, we first think about what we want to achieve as a result of educational activities and only then we think about what content and what methods we should use. However, if the person creating the curriculum wants to start by defining the

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content of the class block and then enter the appropriate operational goal, he can do it in the ICA panel also in this order.

1. We examine training needs. We define what changes in knowledge and behavior are needed by participants (general goals). These steps are necessary to organize the training, but remain outside the ICA algorithm.

2. We assume what specific changes in knowledge and behavior should appear as a result of the 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 supposed to learn (what changes in knowledge and behavior should occur in the educational process) and how to evaluate learning outcomes (how to check if the assumed changes in knowledge and behavior appeared as a result of the educational process) . The iLab ICA algorithm proposes a list of terms that are the basis for formulating operational objectives (see chapter: Objectives). The view of the panel that allows to formulate operational goals is shown in the figure below.

4. We choose educational content => what scope of knowledge and skills will ensure sufficient changes in knowledge and behavior of participants to meet training needs (scope of material). When defining the material that participants are to learn, we need to know why participants are to learn this material (determine the usefulness of changes in knowledge and behavior) - general objectives.

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

5. Based on the formulated goals, the ICA algorithm proposes possible evaluation tools (see description in the section Verification of goals). The teacher chooses the evaluation tool appropriate for the given purpose. In the ICA panel, proposals for goal evaluation tools appear next to the stated goals. Settings for content, objectives and evaluation tools can be printed as part of the class scenario. The view of this part of the panel is shown in the figure below.

6. The algorithm allows you to print prepared tools or perform evaluation evaluation using a projector or on mobile devices.

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7. Prior selection of goals and evaluation tools by the teacher, together with filling them in with relevant content, will allow iLab staff to prepare evaluation tools for the group. Changes can also be made during classes at iLab (e.g. deleting questions from the knowledge test when the teacher decided to skip some of the material during the classes).

Facilitating the use of the ILab environment

1. the lecturer has the opportunity to choose educational methods and techniques from among those proposed by the Algorithm.

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

3. The teacher can also create his own default room settings needed for a given form of work in iLab. The lecturer has access to a range of possible table and chair settings as well as materials needed for the classes.

4. Prior selection of the setting will allow iLab staff to prepare all necessary utensils and tools ordered by the teacher using the iLab ICA algorithm.

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Chapter 4. Educational methods and tools proposed for the ILab environment

Lecture

Purpose

Providing information, providing data, changing views, introducing new knowledge
Materials

A well-prepared multimedia presentation is a good support for lectures. It should gather the most important information provided during the oral lecture. The multimedia presentation may contain short, ordered texts, graphics, short audio or video illustrations. Avoid text, graphic and other elements that distract listeners because they do not illustrate spoken content. To increase the activity of listeners, you can apply questions to the auditorium using voting systems such as Kahoot, Mentimeter or Klaxoon

Space

The arrangement of chairs and tables should be such that participants clearly see the board and the leader. Arrangement of the assembly hall or semi-circular, facing the teacher.

Time

Not longer than 1.5 hours, however, it is best to do several minutes of lectures by interlacing them with other activities.

Method

A lecture is a verbal transmission of content. In order for a lecture to be successful and not monotonous, you need to master several skills. Before the lecture, familiarize yourself with the space it will be held in and, if possible, ask for an attendee list with short descriptions so that you can adapt the lecture accordingly. However, always be prepared to improvise “on the spot” depending on specific expectations. Introduce yourself at the beginning of the lecture and leave room for participants to do the same and state their expectations. Also define the goal, schedule and rules of the lecture at the very beginning. The lecture can be made more interesting by using a whiteboard or smartboard. The lecturer’s voice cannot be monotonous. Emphasize important parts, tell a joke or anecdote if participants lose focus, and avoid using filler words (like, uh, etc.). Don’t focus on a single person and look at the entire audience. Also pay attention to your body language and movement throughout the lecture (don’t be motionless). And finally, don’t be afraid to admit you don’t know something. If you are not immediately able to answer a question, try to find the answer together with the participants or say that you will answer the question later.

Possible Pitfalls

A poorly constructed or poorly conducted lecture can discourage and dismantle participants. Be very careful about the language of the lecture. A language that is unmatched by the group and its expectations can discourage participants. The most common language errors

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are too colloquial language, which leads to discouragement of participants, or too scientific language, which causes a lack of understanding of the topic. The problem may be too general content (the risk that the lecturer will be considered incompetent) or too detailed the material (most participants may lose the thread during the lecture). PLEASE pay close attention to non-verbal messages - body posture, timbre, adequate loudness of the speech, gestures or moving around the room. All these elements, used incorrectly, can irritate students and cause distraction from the content of the lecture.

Notes (if needed):

Problem solving

Purpose

It allows you to improve the ability to work with the research method, formulate a problem and plan their solution

Materials

Large sheets of paper, markers, A4 sheets, sticky notes, aids needed to implement a specific topic, instructions, multimedia boards for groups - in the case of modeling using virtual elements

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 in pairs. Secure a place on each small table, bench or floor for each pair.

Time

90 minutes (time may be shorter or longer depending on the extent of the problem and the participants' independence in solving it)

Method

The laboratory method consists of the participants themselves conducting experiments.

It can occur in two versions:

- traditional - the trainer gathers the necessary aids and properly prepares classes, enabling participants to perform specific experiments

- problem-based - organization of the participants' work consisting of noticing, formulating and solving specific theoretical and practical problems. The laboratory method can be qualified as practical and problem methods. The training participant notices the problem caused by the content of the task, formulates the problem and tries to solve it on his own. In order to solve the problem, experiments (practical activities) or theoretical analysis based on available sources can be carried out.

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The use of the laboratory method ensures active participation of participants in the process of creating something, searching for answers to asked questions, assessing formulated hypotheses or theories. The participant becomes a researcher, scientist, discoverer, and thus acquires knowledge by "experiencing" specific situations.

Laboratory work includes:

• proposing a research problem to solve;

• theoretical preparation of participants in the field of knowledge covering the subject of an experiment or problem,

• preparation for performing an experiment or solving a problem,

• developing proposals for the division of tasks,

• developing instructions for the proposed activities,

• conducting experiments or theoretical analysis of available sources in groups

• support during the participants' work, provided by the trainer

• developing a form of documentation of conducted activities

• assessment of task performance in all groups;

• combining documentation of all groups if the activities concerned the same subjects

Possible Pitfalls:

attention should be paid to the correct formulation of the problem in the event that participants create it

proposed by the leader of the problem should be interesting for the participants, so you should acquire knowledge about the group in advance

experimenting requires time and permission to make mistakesNotes (if needed):

……
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Discussion

Purpose

Problem analysis, exchange of information in a group

Materials

To organize the discussion, it may be useful to have a ball or other item passed on to the person who wants to speak in the discussion

Space

Arrangement of chairs in a circle

Time

From a few minutes to about half an hour. The content and course of the discussion should be monitored.

Method

Group discussion is also encouraged during class because it enables all participants to actively participate and exchange knowledge and experience. The trainer / workshop leader should encourage everyone to participate in the discussion, but it is not recommended to directly call on inactive participants. The group needs to be controlled in order to avoid conflict about certain topics and off-topic discussions. The trainer also needs to have good time management skills and ensure that everyone has enough time to express their thoughts and opinions.

Possible Pitfalls

Discussion participants may have initial difficulty speaking. They can be encouraged by asking open questions.

Due to the topic of discussion in the group, strong strong negative emotions may appear. He should moderate the group appropriately or prepare in advance for communication and sensitization to the feelings of other participants. Make sure you have the right language for discussion.

There may be dominant people in the group who take the time to speak to others. In this case, you can enter the rule of limited speaking time.

There may be digressions during the discussion. The group departs from the topic. It is worth to write down the main topic of the discussion or prepare additional questions to help bring discussions on the main topic. However, sometimes digressions are useful, e.g. in getting to know group members.

Notes (if needed):

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Simulation

Purpose

Understanding the structure of the problem and learning how to solve problems in practice

Materials

The type of materials needed for the simulation depends on the particular simulation

Space

Space for group work, but depends on the type of simulation.

Time

From 45 min to several hours (for simulation games)

Method

A simulation is an imitation of real-life activities and processes in a realistic environment. This method enables participants to practice technical, mechanical and operational skills. It is used in experiential learning, which raises responsibility and active involvement of participants in the learning process. The use of simulations in class develops communication skills, increases confidence and helps with adapting to real-life situations. If a simulation is to be tailored to individual needs, participant evaluations need to be conducted ahead of time. This method often requires additional equipment.

Possible Pitfalls

Sometimes there may be very strong entry of participants into roles, which can cause difficulties associated with the appearance of strong emotions or too strong competition.

Notes (if needed):

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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 dramaterotherapy, 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

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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.

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

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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.

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.

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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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Role playing

Purpose

Understanding the structure of the problem and learning how to solve problems in practice

Materials

The type of materials needed for the simulation depends on the specific game

Space

Space for group work, but depending on the type of game.

Time

From several minutes to several hours (for complex Role Playing Games)Method

A method in which participants act out real-life situations through interaction with other participants and practice new forms of behaviour that they can later apply at work or in life. Participants learn from scenarios and directions on how to act in specific situations. This increases engagement and makes them view the world from a different perspective, which is the best way to learn how to develop their skills and take different positions. Role-playing is done by dividing participants into roles and giving them a specific scenario, without them being familiar with scenarios of other groups. Some participants only take notes as observers. At the end of the exercise, it is very important to allow everyone to express their feelings, problems they encountered, etc. Observers are the last ones to share their observations. This method is well-suited for cases that include human interaction and communication. During the exercise, it is necessary to keep participants from becoming too engrossed in their roles. Results often depend on the creativity of participants. Some may feel uncomfortable with this method due to shyness and they have the right to refuse to participate.

Role-playing stages:

- Defining the goal, i.e. what should be achieved using the method,
- Creating a scenario,
- Division of roles and a short explanation about what is expected of participants,
- Practicing roles,
- Enacting roles,
- Discussion.

Possible Pitfalls

Sometimes there may be very strong entry of participants into roles, which can cause difficulties associated with the appearance of strong emotions or too strong competition.

Notes (if needed):

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Case study

Purpose

Problem analysis and application of appropriate ways to solve the problem

Materials

A case report

Space

Space for group or individual work

Time 30-60 min

Method

A tool used for in-depth analyses of phenomena, institutions, people, groups or events. In this method, learning is based on real-life examples. Cases can be varied, but they need to contain enough information for analysis. The goal of each case study needs to be clearly defined. This is usually done by trainers, but can also be done by students. The fundamental question for case studies is “What would you do?”. Case studies present a text or story that provides the basis for the following student activities:

- Defining problems based on information provided
- Examining all problem solving possibilities
- Developing strategies
- Suggesting solutions to specific problems.

Possible Pitfalls

It may happen that the participants find a case study solution other than expected by the teacher. You have to be flexible in such cases.

Notes (if needed):

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Creative Problem Solving

Purpose: Crearive problem solving

Materials: Paper sheets, flipcharts, markers, Post-it cards

Space: common space, arranging seating in a circle or semi-circle so that you can see the board on which ideas are saved.

Time: from several hours to several days

Method:

The CPS (Creative Problem Solving) method described by Treffinger, Isaksen and Dorval (published in Poland as part of the TERM program from the PHARE fund, 1997) is a very capacious and flexible, when it comes to the choice of techniques, phased problem solving model. It consists of three main phases and six main stages. These stages are: Understanding problems, Gathering ideas, and Planning for action. Within the individual main stages, the authors distinguish a different number of main stages. Each of these stages has its own rules and goals. The CPS model uses, as problem-solving processes, the alternate use of divergent and convergence thinking. Divergent thinking should be used in CPS according to the principle of quantity breeds quality. At each stage, these two types of thinking lead to the generation, evaluation and selection of ideas.

Understanding the problem (1):

1. The first main phase was defined as Chaos. This term indicates the initial, unstructured state of the problem situation: initial premises and premonitions that something is "not right", or a sense of need for change. The divergent process, in this phase, consists in seeking opportunities in a problem situation, "starting points", noticing the existence of a problem. The convergence process is based on the determination and selection of one general purpose of action. This is not a well-worded problem yet. For now, this is only the definition and selection of the general framework of the problem situation.

2. Data analysis is the phase of looking for information needed to specify what the problem is in detail. All information may be needed, because it can cause that at the initial stage we will see the possibility of treating the problem in an unusual way. In the process of divergent thinking, all possible details related to the problem situation are determined. We also try to look at the problem from different angles. Convergence thinking organizes information - we choose the elements that are most important to us.

3. The final phase of the understanding of the problem is the formulation of the problem. It involves the use of data generated and evaluated in the previous phase in such a way as to obtain a problem that we will solve. Divergent thinking is used, in the formulation phase, to generate many possible formulation of the problem based on data. Thanks to convergence processes, we evaluate them and choose the best, the most promising or the most accurate wording for the problem.

Idea collection stage (2):

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4. This stage includes one general phase - the production of ideas. However, it is very extensive and can use many detailed techniques. Using divergent processes, we create a wide variety of ideas, which we then selectively converge, selecting the most promising ones. The authors of the CPS model describe the brainstorming technique as a model ideal.

Action planning phase (3):

5. After creating and choosing the most interesting ideas, the solution selection phase follows. In this phase, we focus on choosing the right criteria for assessing ideas. Divergent thinking will be used again to create the criteria, which will help us generate improvements to individual ideas. Convergence processes will help to limit the criteria to the most important and to choose one solution.

6. Acceptance of solutions is the last phase of the CPS model. Using divergent thinking, we try to identify potential obstacles and look for ways to solve them. We are also looking for sources of help and the possibility of using them in implementing the solution. We use convergent thinking in this phase to create a detailed action plan.

The phases and stages are schematically shown in the diagram below (Figure after: Treffinger, Isaksen and Dorval, 1997).

The authors of the CPS model postulate developing skills of working with this method, gradually passing through three levels of efficiency. The first level is the practice of basic techniques of analysis and problem solving. This level is necessary for good use of problem solving tools, it is often based on practicing divergent thinking techniques. Level two is the acquisition of proficiency in using these techniques. Problem solving tools are based on certain heuristics, mastering them requires repeated practice in various conditions and on various types of problems. Only after such "practice" can you assess what will be the most appropriate technique for solving a given problem. Level three is solving real problems.

Possible Pitfalls:

- It is worth ensuring the most accurate analysis of the causes and nature of the problem. The direction of searching for solutions depends on the formulation of the problem. The 5W technique can be used to analyze the problem field. Good results are brought by setting the problem in the form of the question: what to do to ...; how to get ...

- Creative group work may be associated with group thinking syndrome - group members lose the ability to rationally evaluate their own ideas.

Notes (if needed):

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Design thinking

Purpose: Crearive problem solving

Materials: sheets of paper, flipcharts, markers, post-it cards, internet access. Other materials needed to create prototypes - depending on the type of problem being solved.

Space: space divided for gerups working on a problem, depending on the number of groups. Part of the method (empathizing and testing, sometimes prototype) goes beyond the figure. It is also necessary for the whole team to be able to work on generating ideas, assessing them and presenting prototypes).

Time: from a few hours to several dozen days

Method

Design Thinking, like Creative Problem Solving, is a multi-stage method of creative problem solving. Each of the stages is also a preparation of the material for the next stage. Below we describe the stages of Design Thinking, in terms of the Institute of Design at Stanford University.

1. Empathize. The first stage of Design Thinking is an attempt to understand and describe the needs, problems, expectations and behaviors of users of products that are on the market. The techniques flavored at this stage can be diverse, from careful observation, through surveys, conversations, to experiments and own experience.

2. Define. At this stage, the participants of the inventory group define the problem based on the data collected in the empathize stage. This stage is worth taking very deeply, because further stages and the final success or failure of the project depend on the correct identification of the problem.

3. Ideate. The stage of solving the previously defined problem. At this stage, you can use various types of creative problem solving techniques. One of the most frequently used techniques is brainstorming. Then, ideas are selected that can best solve the problem

4. Prototype. In the Prototype phase, product visualizations and mockups are created. Selected ideas take on physical shapes so that it can be assessed in this form.

5. Test. Testing of the selected product design must be done in the environment in which the product is used. The basic parameters to be met by the product should be determined and tests performed on the product matched to them.

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Possible Pitfalls:

- The choice of tools and areas of empathization affects the conclusions, so it would be worthwhile for persons with different experiences and knowledge to participate in empathization.

- It is worth ensuring the most accurate analysis of the causes and nature of the problem. The direction of searching for solutions depends on the formulation of the problem. For the analysis of the problem field, the 5W + H technique can be used. Good results are brought by setting the problem in the form of the question: what to do to ...; how to get ...

- Creative group work may be associated with group thinking syndrome - group members lose the ability to rationally evaluate their own ideas.

Notes (if needed):

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Theory of Constraints

The Critical Thinking method uses simple graphic tools to develop skills;

- determining cause-effect relationships in the subject matter

Treści content analysis, creating new knowledge, creating hypotheses, argumentation, assessment - i.e. critical thinking

- work planning

- making decisions and anticipating their consequences

- proper communication

- conflict analysis and finding solutions

Logical branch

Purpose

The proposed techniques serve the development of critical thinking, reading comprehension,

Materials

Large sheets of paper, markers, A4 sheets, sticky notes, multimedia board with graphics or a graphic diagram of text analysis on a large sheet of paperSpace

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 in pairs. Secure a place on each small table, bench or floor for each pair.

Chairs arranged in a horseshoe, in a place intended for the trainer set a flipchart frame.

Time
45 minutes

Method

The use of a logical branch enables:

 discovery and naming of causal relationships: "if ... then ...",

 determining the logical consequences of events,

 anticipating the consequences of your own behavior or decisions.

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Rectangle 1 - initial event. If event one occurred, event 2 occurred. So 1 was designated as a cause and 2 was designated as an effect. In the same way we refer to the next floors of the branch so effect 2 is the cause for effect 3.

X, Y, Z - is a description of the conditions in which a given cause-effect relationship occurred, e.g. event 1 caused effect 2 because (X).

It is worth checking the correct structure of the branch by reading it from above.

Cloud

Purpose

Understanding and analyzing the causes and nature of the conflict (but not its solution).

Materials

Large sheets of paper, felt-tip pens, small colored sheets of paper, sheets of paper with graphics or a multimedia board with graphics or an interactive carpet

Space

Chairs arranged in a semicircle

Chairs and tables arranged for work in groups - as many groups as the lecturers specify

Time

60 minutes

Method

Individual steps taken while creating the cloud:

STEP 1. IDENTIFICATION OF THE CONFLICT - describing the request of the parties involved in the conflict. The request is usually an emotional message of what I want. The conflict may be external - the colliding requests relate to at least two people or the internal collision occurs between the requests of the same person.

STEP 2. DEFINING THE NEEDS. Which gave rise to the request

In the TOC philosophy, we think that:

- all needs are good;

- all needs deserve to be met, not unnecessary

- all needs are equally important, i.e. there is no way to prioritize them

NEED is a form of strong motivation that causes each party to insist on fulfilling its own request.

We can use the following questions to determine your needs;

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- Why does each party want to do or have the item?
- Why is this request or action important?
- What need does each party try to meet through a particular request, action or decision?
- What does this demand, action or decision give each page?
- What important needs may be at risk if the parties fail to comply with their requests?
- What will one side not have if the other side gets what it requested?

STEP 3. COMMON OBJECTIVE - We try to verbalize a goal that is common to us, wondering what will happen if the conflict is resolved and both needs are met. The stated goal is general, so that the needs of both parties can fit into it. A person's goals can be: being accepted, living in a friendly society, or being happy. The goal is not a solution to the conflict, but it will be the result of its resolution. It only indicates that both sides have something in common that each side wants to achieve. According to the TOC approach, the way to permanently resolve the conflict is win - win. This situation allows you to solve the problem by finding a way to meet the needs of both parties and achieve a specific goal

TOC Metaplan

Purpose

It allows you to solve the problem, plan specific actions leading to a specific and expected effect

Materials

Large sheets of paper, markers, colored sticky notes, sheets of paper with a diagram of individual stages or an interactive board with graphics

Space

The room should be prepared depending on the decision of the teacher, you can work with the whole group then arrange the tables in a circle or divide the participants into groups. When working in groups, tables and chairs are arranged so as to enable work by the number of groups specified by the teacher.

Time

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About 45 minutes

Method

This technique can be an example of the creative process of solving a problem in a nutshell. Precisely because during this process we go through the stage of problem formulation, goal, problem field analysis and generation of ideas. This technique can be used both individually and in group work (in the forum or in subgroups). On a large piece of paper (preferably horizontally oriented) we write the problem at the top of the page, formulated in the form of an affirmative sentence. The problem should be preceded by a discussion. This written sentence answers the question "How is it?". Then we discuss how to formulate the goal we are striving for. It is to be the answer to the question: "How should it be?" Save the formulated result at the bottom of the page. Now we return to the top of the sheet and write the causes of the problem next to each other, answering the next question: "Why is it as it is?" The next step is to look for solutions. We try to remove these causes, while remembering what we set ourselves a goal. We write ideas under the causes but above the goal. Listing the reasons makes it easier to look for solutions.

Possible Pitfalls

When working with a metaplan, remember to eliminate causes that we have no influence on. Participants often involve forces in the description of such metaplan elements that do not depend on them.

Notes (if needed):

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SWOT

Purpose

Problem analysis. Analysis of the current situation.

Materials

Large sheets of paper, felt-tip pens, PostIt cards, or a multi-media board

Space

Chairs arranged in a semicircle in front of the blackboard

Time

Method

SWOT analysis is a diagnostic method, helpful in searching for solutions and making decisions. This method involves team analysis and assessment of a specific problem or situation. Analysis of the situation or problem using the SWOT method involves four stages.

Strenghts - participants determine what is the strength of their or their organization. What they do well. Which gives them a competitive advantage.

Weaknesses - participants determine what is the weakness of their or their organization. Which needs improvement.

Opportunities - Opportunities for change, peace, and success offered by the external environment.

Threats - Factors that can threaten success in solving a problem

While working on individual stages of the SWOT analysis, you can use the prepared table

Strenghts	**Weaknesses**
Opportunities	Threats

Possible Pitfalls

Sometimes participants may have difficulty distinguishing between Strenght and Opportunities or Weakness and Threats. It is worth using the example to explain the individual stages of SWOT analysis.Notes (if needed):

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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

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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):

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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.

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?

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- 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?

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):……
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Brainstorming

Purpose

Troubleshooting

Materials

Flipcharts, felt-tip pens, A4 sheets

Space

In a spoken brainstorm, the system should be in a semi-circle facing the board. In a silent brainstorm

Time

Method

Brainstorming is the most recognizable technique for creative problem solving. Its principles were developed by Alex Osborn. For about seventy years, this technique has undergone many variations and modifications. However, basic laws remain the same, as does the main principle that quantity turns into quality. Brainstorming consists of two phases that differ in terms of conduct and goals. The group is managed by a moderator. A secretary should be chosen in the group, i.e. a person whose task is to write down ideas quickly, efficiently and legibly.

The first phase of brainstorming is the green light phase. Its goal is to create as many ideas as possible. In this phase, participants must follow several rules to enable efficient work and collaboration. The first rule is to suspend criticism for the duration of it. Participants can submit any idea and it should be written on the board by the secretary. It is not important at this stage whether the idea is good or bad, stupid or wise, realistic or fantastic. There are several reasons for suspending criticism. Firstly, it is about weakening internal censorship, secondly - about being able to be inspired by a variety of ideas, and thirdly, emerging bizarre and humorous ideas relieve tension and build a good climate to create. The second principle

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of the green light phase is to be inspired by someone else's ideas. The moderator encourages participants to maintain and develop ideas that have already been saved. The third rule is to give as many ideas as possible.

In the red light phase, previously generated ideas are evaluated. Usually two criteria are used - idea evaluation sieves. The first is an ideological sieve. Using this sieve - we remove ideas that we cannot accept for ethical or ideological reasons. The second criterion is a practical sieve, which rejects ideas that are not feasible within the set parameters. These parameters are usually costs, time and organizational possibilities. Before starting this phase, it is worth creating such criteria for rejecting a practical sieve. The ideas that remain will most often require refinement in a smaller team.

There are many varieties of brainstorming. Due to numerous criticisms of the classic version described above, related primarily to the negative impact of the group, written versions are gaining popularity. There is no such danger of criticism or fooling around.

Variant of the craziest idea. This variety is about creating unreal, fantastic or perfect ideas. Then, each of the ideas becomes the subject of brainstorming until the idea becomes real. After this stage you can go to the classic phase of red light.

Brainstorming on and off. In this version, the moderator introduces a break every few minutes. During it, participants can relax or work individually on solutions. The introduction of breaks gives the opportunity to incubate ideas.

Written brainstorming. The written version can be carried out in at least two ways. They differ in the way ideas are shared between participants. In the first version, after saving the idea, the participants give it to a neighbor in a circle. In the second, the idea card goes to the center. There, the cards are mixed so that the participants can draw them in a moment. In both written modifications it is particularly important to read someone else's ideas and be inspired by them.

365. This variety is a structured form of written brainstorming. The numbers are arbitrary (it is easy to remember the technique) and determine the number of ideas generated during one round (3), the number of rounds, i.e. passing cards to a neighbor (6) and how many minutes

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one round can last. Initially, the work goes smoothly, but the later the round, the more time it takes to read previous ideas and to come up with your own. Initially, it makes no sense to follow these five minutes, taking care of the right pace of action. With this treatment, you can get 216 ideas in less than 30 minutes in a group of twelve! What's more, this type of brainstorming can be done using instant messengers.

Brainstorming in a circle. This brainstorming variant involves a kind of "forcing" to submit ideas, because instead of spontaneous reporting of ideas, participants do it in turn. In this way, this "round" is repeated several times until the ideas are exhausted.

Trigger stimulus method. In this version, initially the participants work individually, recording ideas that come to their mind. Then someone from the participants reads all their ideas, and then the whole group tries to improve them, looking for as many variants of solutions as possible. This is how the ideas of other participants are dealt with.

Possible Pitfalls

A possible problem is not using the full creative potential of the group. People who are shy or anxious may refrain from giving ideas by launching an "internal censor" more strongly than others. Theoretically, self-censorship is supposed to be counteracted by the principle of suspension of criticism, but the pursuit of positive self-presentation or fear of group judgment (even if it is unspoken) are very strong factors inhibiting ideas. The mechanism of self-censorship is particularly visible in groups that are just forming and in groups in which in some way some people are lower in the organizational hierarchy than other participants (boss and employees, teacher and students, etc.). A silent brainstorm can help.

Notes (if needed):

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Scrums

Purpose

Agreement on current work directions between cooperating teams.

Materials

none

Space

For scrum meetings, a separate table, away from the workplace, where the whole group can gather can be useful.

Time

Few minutes

Method

In rugby scrum is a method of resuming the game and it consists in the fact that the players line up closely with their heads down and then try to get the ball. In education, the Scrum method is used when working in subgroups on one task. Scrum is a short, several-minute meeting of the whole group so that each group can report to others at what stage of work they are and what problems they have encountered. Due to the dynamics of operation, it seems that standing up is a good idea. As a result of the scrum, the work of all or part of the subgroups can be modified.

Possible Pitfalls

The time for working meetings should be strictly defined so as not to interrupt work by subgroups by surprise.

Notes (if needed):

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Modeling

Purpose: detection of cause-effect relationships, learning about the operation, course of a phenomenon (process)

Materials: flipchart, aids necessary to create a given model or a multimedia board with elements for constructing a model

Space:

- tables and chairs arranged in such a way as to allow q to work in groups

- setting chairs in a circle, tables under the walls where participants can work. A separate part of the room for the participants' physical activity.

- Arranging the chair in a semi-circle, against the walls tables at which participants can work. A separate part of the room for the participants' physical activity.

Time: 45min - 90minMethod

Modeling

allows to study and learn about complex systems, processes and phenomena. It consists in making a model based on in-depth knowledge and understanding of the modeled phenomenon, process, system. Model creation can have different purposes:

• transforming your knowledge into a specific effect that visualizes your understanding of the operation, dependence, role of individual elements in the model

• supplementing knowledge by constructing a model and checking the importance of individual elements in action, what else should be checked for the model to work properly,

• attempting to modify a phenomenon, process, system in order to obtain a more favorable effect

• consolidation of possessed knowledge, better understanding thereof,

• putting the knowledge into practice

• mapping and experience of dependencies existing in the modeled process, phenomenon, system in order to identify threats or propose more favorable solutions

During the training, you must take care of the necessary materials to make the model. The teacher can present the model and ask for its reproduction, but it can also leave participants the freedom to decide how the model will be created.

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Modeling is an opportunity to:

• develop creativity

• teamwork skills,

• use of knowledge in practical operation

• experience of the usefulness of possessed knowledge in practice

• inference and modifying activities depending on the result obtained

• keep modifying based on patterns

possible

The instruction should be prepared very carefully to get the intended results. Collect the necessary materials in the right amount.Notes (if needed):

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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.

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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):

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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

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.

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5WHY

Purpose: determining the cause or causes of the problem being solved

Materials: large sheets of paper, markers, A4 sheets, sticky notes, large paper sheets with graphics or multimedia boards with the possibility of generating individual stages of cause analysis

Space:

- setting chairs in a circle, tables under the walls where participants can work.

- setting tables so that work groups are created

Providing space for placing saved documents has answers to subsequent questions Why?

Time: 45 minutes - 90 minutes

Method

By using this method based on a specific cause or causes, we can plan actions to prevent the problem from recurring or weakening its impact.
The 5-WHY analysis must include two elements:
• First, it answers the question: Why did the problem arise? So it leads to the detection of the causes of this problem
• secondly, he wonders: Why didn't we notice the problem before?
Stages of using the WHY method 5:
1. Gathering as much information as possible about the problem under consideration. In-depth analysis and gathering as much knowledge as possible about the problem increases the chances of finding the actual cause or causes.
This stage is seeking answers to the questions:
• What actually happened and when did the problem occur?
• What is the scale of the problem, how many problems do we have etc.?
• What threat does this problem pose to the customer, user, company?
2. Creating a working group.
The group or groups should have a well-defined problem, clear records, and make sure that all group / group members understand the problem in the same way.
3. Asking the question Why? The question will be asked five times. There is often a situation that the answer or answers to the fifth question describe the actual cause or causes of the problem.
At each level, the answer to the question: Why? It should be discussed whether we can influence the reason given. If participants propose a cause or reasons beyond their control, it is worth proposing to omit them at the next stages of answering the question why.

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After completing 5-WHY, check whether the final answer / answers obtained is logically linked to the problem (on a cause-to-effect basis).

Although the 5-WHY method assumes asking five "why" questions, this requirement can be treated flexibly. The facilitator should decide whether the participants given are already at such a level of detail that it is necessary to stop by, for example, three questions why. There may also be a need to ask more of these questions to actually investigate the problem.

Only by getting to the real causes can you plan actions to deal with the problem.

Possible Pitfalls:

Attention should be paid to the correct formulation of the problem, if the participants create it

It should be interesting for the participants proposed by the leader of the problem, therefore you should acquire knowledge about the group in advance

Attention should be paid to emerging reasons that we have no influence over so that we do not deal with them at later stagesNotes (if needed):

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Possible Pitfalls: Ensure that participants use different points of view when analyzing the problem and not stop at determining symptoms. Notes (if needed):

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Group building techniques

Alphabet game

Purpose

• Energizer

• Demonstrate the concept of synergy in a group

Materials

• Flipchart paper and markers

• A text to read from

• Paper for participants to write on

Time: 20-30 minutes

Method

1. Write the letters of the alphabet A through Z down the left-hand side of a piece of flipchart paper, one under another.

2. Ask participants to write this in the same way on their paper.

3. Choose a sentence or two (which has 26 letters) from any text, and beside each letter of the alphabet, write a second letter taken from your text so that you end up with 26 pairs of letters; e.g., AT, BH, CE, DC, EA, FT [the text chosen here is "the cat sat on the mat"]. Read these letters out as you are writing them so that participants can also add them to their first list.

4. Explain that these pairs of letters could be the initials of famous people, living or dead, real or fictional. Tell them they have 5 minutes to think of as many names as they can of people with these initials and write them down.

5. Give them time to do this and then ask them to swap their list with someone else in the group. Their partner will now review the list and agree or disagree with the names written down—whether they are in fact famous people. If they agree, then their partner scores one point; if they disagree, then their partner has to try to convince them that they are right. If they can convince them, they score another point, but if they cannot, they have to cross out that name and score nothing. Allow enough time (about 5 minutes) for both people to look at each other's list.

6. Go around the group and make a note of the scores of each person.

7. Divide the group into subgroups (about six maximum) and ask each group now to repeat the process of finding names of famous people using the same letters. They can offer the

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names they have already thought of individually or find new ones; it doesn't matter. Give them the same time (5 minutes) and a sheet of flipchart paper to prepare their list.

8. While they are doing this, you can calculate the average by adding together all the individual scores and dividing by the number of people in the group.

9. At the end of the time, each group presents their list, and the other group(s)—or the trainer if there is only one group—has the right to challenge as before.

10. Look at the score(s) for each subgroup and write the average for the group you calculated earlier (see #8 above). On almost every occasion, you will find that the scores achieved by people working together in groups are greater than that achieved by each individual.

11. This can lead to a discussion or further exercises relating the importance of effective teamwork.

Suggested Explanation

[After writing the pairs of letters]

"Each of these pairs of letters could be the initials of a famous person, living or dead, real or fictional. What I want you to do in 5 minutes is to think of as many famous people with these initials as you can. You only need to find one person for each pair.

"Now share your list with a partner and see if they agree with you. If they do, you score one point; if they don't, then you have to try to convince them that you are right and, if you can convince them, you score another point.

"Now I want you to do the same thing, but as a group this time."

Possible Pitfalls

In the very unlikely event that you arrive at a group score that is smaller than the individual average, you will need to explain what usually happens.

Notes (if needed):

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Back – to – back

Purpose

To introduce one another. To become aware of the importance of feedback in communication (both nonverbal and verbal)

Materials

None

Time

20 minutes

Method

1. Ask participants to pair up, preferably with someone they don't know. (If you don't have even numbers in the group, you may decide to join in yourself. The exercise is difficult to do with an odd number.)

2. Ask the pairs to decide who is going to be A and who is going to be B (i.e., who's going first and second).

3. Ask each pair to place their chairs back-to-back so that they can't see each other. Tell them to spread out as much as possible to avoid being distracted by other pairs.

4. Ask A to speak to B for 3 minutes. A should introduce themselves during that time, say where they work, and tell something about themselves, e.g., interests, hobbies.

5. At the end of 3 minutes, B should briefly confirm what they heard with A so that they will be able to introduce A later.

6. The pairs switch roles so that B now speaks to A for 3 minutes. A confirms what they have heard from B.

7. The group reforms a large circle, and each participant introduces their partner to the rest of the group.

8. When all introductions are completed, ask participants what it was like:

a) As a speaker

b) As a listener

You can draw many learning points from the difficulties most people encounter in listening attentively when they cannot see the other person.

Suggested Explanation

"As a way of introducing ourselves, I'd like you to pair up with someone you don't know and decide who is going to be A and who is B. Move your chairs so that you sit back-to-back, and I'd like A to start introducing themselves to B, saying their name, where they work, and something about themselves (e.g., hobbies or interests).

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"I'll stop you after 3 minutes and ask B to quickly check what they've remembered from A so that they can introduce them at the end. Then we'll switch roles and do it the other way around."

Variation

Participants can specifically be asked to talk about their expectations of the course rather than hobbies and you can write these on a flipchart during the feedback session.

Notes (if needed):

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The magic box

Purpose

To help participants clarify their own expectations

Materials

One box wrapped in colorful paper

Space

Circle of chairs

Time

30 minutes

Method

This activity is particularly useful when you will be expecting participants to do other small group activities during your workshop. In this activity, one person serves as the group's facilitator. In other activities, you will ask other individuals to serve in this role.

Procedure for Conducting the Activity

1. Begin by stating how we often come to workshops with unstated wishes for what will happen while we are there. Give some examples: "I wish I could be a better leader" or "I wish I knew how to deal with my boss."

2. Show the wrapped box and explain that it is a magic box. Explain that as the box is passed around the circle, each person is to hold it briefly and make a wish out loud.

3. As the box goes around, allow people to pass if they appear uncomfortable, but ask them to make their wish silently. Do not allow discussion or judgment of anything that is stated.

4. Divide the total group into smaller groups of five people. Ask each group to select a facilitator. The task of each small group is to select one wish for the group. Take 5 minutes to do this.

5. Ask each facilitator to share the small group's wish with the larger group.

6. Relate the groups' wishes to your workshop objectives.

7. The trainer shares his or her own wish for the workshop.

Variations

• Post the individual participants' wishes on a flipchart as they are spoken in the circle.

• To save time, skip step 4, in which participants share their wishes in small groups.

Possible Pitfalls

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When you are conducting a closing activity, refer back to these wishes.

Notes (if needed):

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Deliveries

Purpose

To gain an idea of people's expectations and what may be issues for them

Materials

Flipchart paper and markers

Time

30 minutes

Method

1. Explain that training is like going on a journey (see Suggested Explanation). Ask each participant to spend 5 minutes thinking for themselves and writing down what they hope to learn on this journey (i.e., expectations) and what they are hoping to deliver (i.e., dispose of, contribute to the group, and so on).

2. Ask each participant to introduce themselves and explain their deliveries and collections.

3. You could write on two separate sheets of flipchart paper what is said.

Suggested Explanation

"I would like you to consider for a moment that we are going on a journey. Training is always a bit like a journey—you may be going down a new route, hoping to discover new things, or perhaps going over ground you've traveled before but for once wanting to make sure you notice the side roads and turns.

"What I'd like you to do is to consider for about 5 minutes what you are hoping to collect on this journey and what you are hoping to deliver—in other words, what do you want to gain from the course, what do you want to change about yourself, and what can you contribute to the rest of the group? It might help to write these things down.

"When you've finished, we'll go around and I'll ask you to introduce yourself and tell us about the collections and deliveries you hope to make while we are together."

Notes (if needed):

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Chapter 5. Examples of the use of ILab ICA

Scenarios created using the ICA iLAb algorithm

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 Projector 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 chosing	Interactive lecture			
4		190	The	Known	Short	simulat			

	Development 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	min (with break)	participant exchanges	activating methods	answer tasks	ion			
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	discusion			

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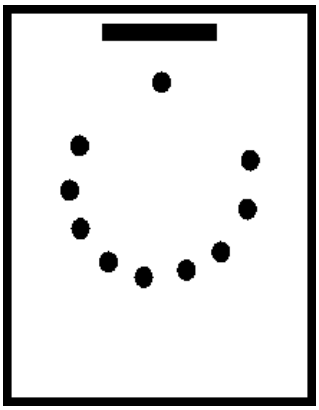
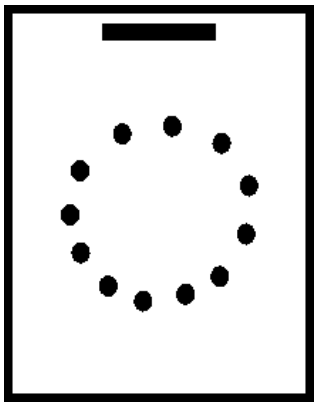
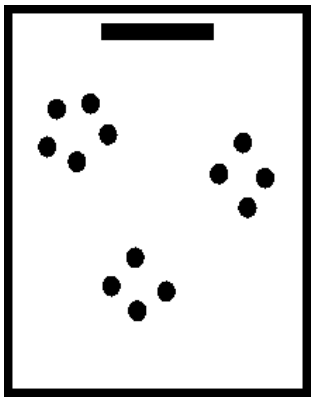
Default iLab settings

Description of chair arrangement	illustration	Examples of situations
Semicircular arrangement - chairs (poufs) are arranged in such a way that each participant can see the board and the leader		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).
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.		Exercises that use group duskus Exercises in which information is passed to the people sitting next to it (e.g. Silent brainstorming)
Settings in circles - chairs arranged in subgroups so that people in subgroups see each other, and that groups do not disturb each other		Discussions or inventory activities by group
Auditorium - chairs arranged in straight or semi-circular rows. Participants from further rows can see the		Lecture - participants listen to those facing the teacher.

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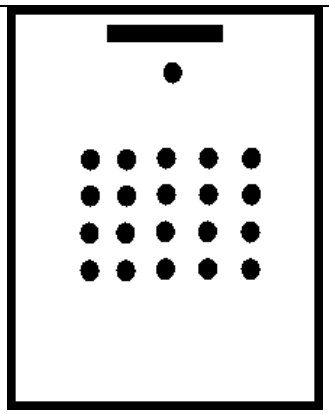
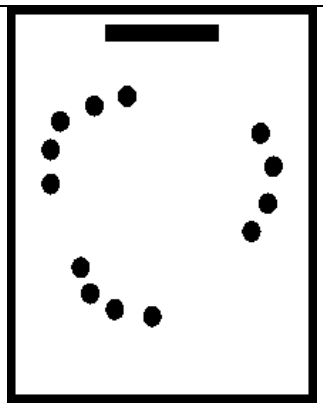
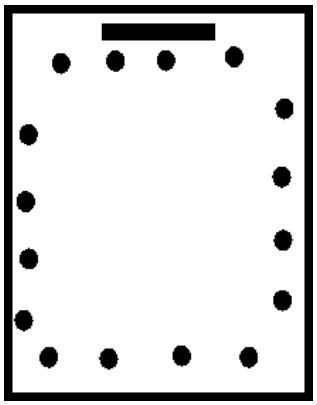
backs of people in front of them.		
Discussion groups - chairs arranged in groups so that people in each group are directed to the center of the room and can see participants from other groups		Exercises in which groups discuss with each other. Exercises that use rivalry between groups. Presentation of products and ideas that are the result of grpach work.
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		Drama

Description of chair arrangement	**illustration**	**Examples of situations**
Traditional table arrangement - arranged in three or two rows. Participants sit facing the teacher. one or two people are sitting at each table.	Rys. 1	Lecture - participants listen to those facing the teacher. Exercises requiring independent work or in pairs. Comment:

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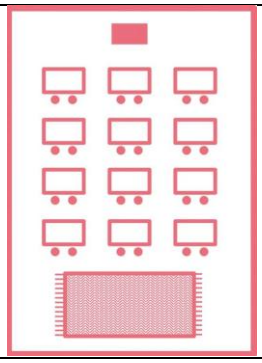
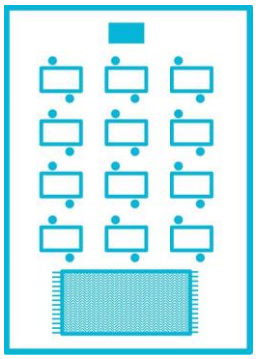
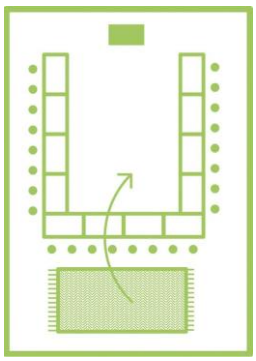
		- Access to the lecturer should be given to each participant - if using the multimedia instructions presented on the board or when using other multimedia equipment, each participant must have free access to it
Laboratory - participants sit alternately opposite each other. They see themselves and use materials placed on the table. One of the people has difficult eye contact with the teacher.	Rys.2 	Exercises that require direct cooperation during their performance. Comment: - 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
Podkowa – wszyscy uczestnicy widzą się oraz jest pełen dostęp do prowadzącego.	Rys. 3 	Dyskusja , wykład- podejmowanie zagadnień omawianych na forum grupy szkoleniowej. Prezentacja, pokaz – prowadzący lub uczestnik prezentuje swoje rozwiązanie, model, propozycje wykonania zadania lub rozwiązania postawionego problemu. **Komentarz**: - prowadzący ma bardzo dobry dostęp do wszystkich uczestników - uczestnicy mogą intensyfikować kontakt z prowadzącym oraz ze sobą na wzajem
Square - a setting similar to a horseshoe, but some participants are sitting with their backs to the board	Rys. 4	The setting can be used in situations such as horseshoes, but it excludes the use of an array.

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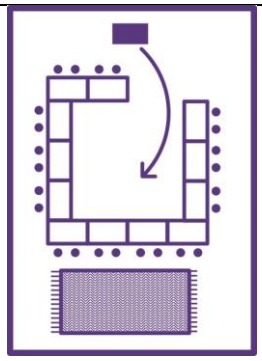
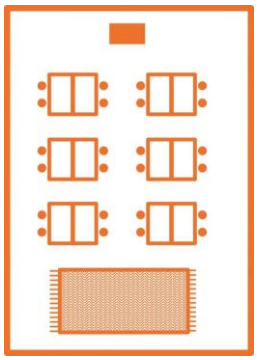
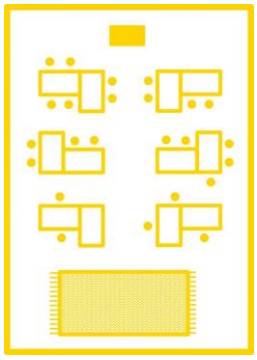
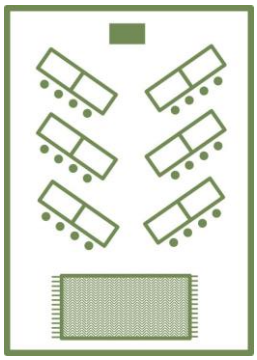
		Comment: the setting enables conversation, however, it hinders the presentation of work effects or has an illustrative function.
Two-table islands - two tables arranged along the edges create work places for four people in each group. The setting can take the shape of the letter L.	Rys. 5, 6  	Exercises that require collaboration in accordance with the instructor's instructions. The setting allows any type of activity. 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.
Herringbone - two rows of tables arranged by two short edges arranged in a herringbone pattern,	Rys. 7 	Lecture, presentation - good visibility and direct contact between the lecturer and the participants. Exercises that require group work combined with a lecture or presentation. Comment: Four people can work at the tables. The trainers and training participants are very clearly visible. access to participants is easy
Large groups - a larger number of tables (e.g. 6) are	Rys.8	Exercises that require more people to collaborate.

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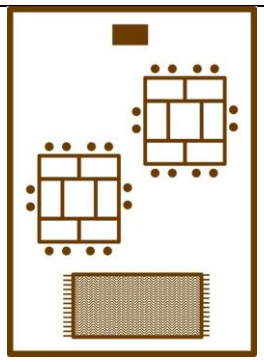
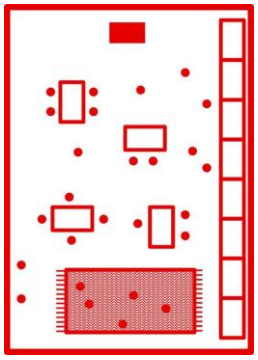
put together to form large groups.		Comment: - the trainer should pay attention to whether the task is progressing in the right direction, in large groups work may be more difficult and requires good organization - tables can also be arranged then when the whole training group will sit around them
Free 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	Rys.9 	Exercises that require collaboration in a variety of configurations. Comment: - 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

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