New Training Trends in High-Risk Technology Fields

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Abstract. *The more developed new and sophisticated technologies are, as in the energy sector, paradoxically, the more critical people are in terms of competences. A prophecy for 2020 was that machines and robots would replace people. It happened mainly for routine activities. Therefore, humans remain a crucial element in the technology world, especially in high-risk areas, such as nuclear. Companies developing, using high-risk technologies employ people with high-technical knowledge - not enough. Poor communication, failing leadership, improper management, decision reluctance, generation gap, lacking teamwork competencies were human errors that caused accidents. Besides technical competences, these people also need consistent training and workshops on soft skills, leadership, and strategy. Besides generic skills, requirements for training staff in long-life cycle technologies should consider: specific reaction patterns for various generations; the high-risk technologies are a combination of technologies with various durations, e.g., Silicon-based digital technology life cycle is about five years. However, the digital technology evolution to new ones, like quantum computing, may trigger unexpected interfaces with the underlying reactor technology, dominant in a nuclear plant, and requirements for training of staff. Extended use of the well-trained competencies can make the difference between life and death; Training? Because it is a combination of knowledge and practice; Coaching? Because it generates new behaviors in ordinary situations and improves the work-unit relationship; Leadership? Because there are moments when people need someone leading them to accomplish tasks efficiently. The methodology used to investigate such aspects was of team-group interviews for diverse generations involved in a nuclear project for risk analyses and master students, by using the same combination of training and coaching exercises. The paper presents the results of these investigations, considering the aspects mentioned and contributes to raising awareness of strategic development approaches for employees to aim at the emergence of new leaders.*

Keywords: training, coaching, leadership, digital technology, high-risk technology, life cycle of technology, generations.

Introduction

On the beginning of this century, it was saying that in 2020 the machines and robots will replace the people. Furthermore, the question arises: What are we going to do with people?

Today, in 2020, looking around, in the daily activities of our life, we are surrounded by all sort of applications – scheduling what is happening in our house when we are in one corner of the world, paying the bills through mobile while we are commuting or dictating an e-mail while walking on the street –, dedicated to improving the quality of life. It is easy to say that we are witnessing the digitization of life. By looking at these applications carefully, in addition to saving time, they replace people; in the above cases: a servant, a bank operator or a typist. What are we going to do with people?

Working with a group of specialists in the nuclear field, for training in Probabilistic Risk Assessment (also known as Probabilistic Safety Analysis), I understood that there are internationally recognized standards because safety is paramount in this area, that standard must be followed religiously. For the researcher, this is a convincing reason in accepting the specialists' point of view in being reluctant to accept a digital application to be used in the operation area of a nuclear power plant (NPP). While using applications, we can remember that at

some moment, the application was stuck and we needed to restart the device (mobile, tablet, laptop or even workstation). In the nuclear field, this is unacceptable. Any application should work precisely when it needs to: do what it needs, when it should, how it should. If digital applications are not reliable yet, that means that the importance of the operators in an NPP, meaning people, remain unchanged. However, in the digital area, a new kid in town began to make their presence felt: Artificial Intelligence - AI. From this point, there are a few other questions that arise:

- What are we going to do with people?
- What would be the replacement of nuclear power plants?
- Why do we still need NPPs? (Why we cannot abandon the building of NPPs'?)
- What are the AI's promises for the future?

Specific to this industry, to build an NPP, is the long duration from design to commissioning, about 15 to 35 years. Nowadays, the design of NPPs is to work 40 to 60 years. Adding the two time periods means that from the day the NPP project was approved, until the last day of its operation, 95 years will pass.

The people behavior has changed during the last 70 years, and these changes also influenced the employees' behavior according to their needs updated over time. This observation is valid for future generations too. People from different generations will work together. How will work these co-operations between generations?

Currently, in the control room of an NPP, 12 employees work. Soon (ten years) for new built NPP's from the new generation, only three employees will work. What are the competences they will need? How will these competencies be transferred?

Noticing the influence of the practical exercises inspired from coaching area during the PSA Training, the researcher decided to experiment the influences of the same exercises in a group of international master students coming from France, Iran, Iraq, Italy, Nigeria, Romania and Turkey.

This article will answer the above questions, without wishing to be by any party, but only to serve the people with the desire to estimate their needs for future development.

Literature review

Existing Predictions

Stephen Hawking (Hawking, 2016) and Elon Musk (Clifford, 2017) told us that many jobs would be performed cheaper by A.I. An article in The Wall Street Journal has reviewed the technological improvements that have led to the progress of humankind (Ip, 2017). One of these improvements, for which there is information, was the creation of the spreadsheet. Between 1987 and 2015, one of the effects was the decrease in the number of bookkeepers, accounting, and auditing clerks. Another was that employees with higher education, financial managers, and management analysts, almost quadrupled their number (statistic is valid for the U.S.).

World Economic Forum's issue on the future of jobs (the last one available until the publication date), estimates that until 2022, "75 million jobs may be displaced by a shift in the division of labor between humans and machines, while 133 million new roles may emerge that are more adapted to the new division of labor between humans, machines and algorithms." ("The Future of Jobs Report 2018 ", 2019, p.viii)

What are the needs that an NPP can meet

Reading the article about Switzerland's exit from atomic power (Revill, Depetris, & Fenton, 2019) the questions about the existence of NPPs seem to be logical, in a logic of avoiding high risks technologies. Understanding risk implies understanding probabilistic thinking and the knowledge dynamics phenomena (Bratianu, 2015; Bratianu & Bejinaru, 2019, 2020). However, usually, the reasoning on risks is biased by subjective emotional perception, and it does not consider the whole picture of the overall risks on the planet. In the logic of carbon emissions limitations, which would also balance the taken risks to solve the problem, nuclear is a major solid contributor having a balanced manageable risk. If considering the ecological and whole production lifecycle risks of renewables, they are not at all the best options. As the Physics laws (see the second principle of thermodynamics) impose, by limiting the production of energy and defining a set of by-products, the planet entropy will increase and degrade it fundamentally for long and very long terms. Starting from here, the debates on the best energy options balancing manageable risks are open. On the other side, the promotion of fundamentally new forms of energy requires very high amounts of energy which cannot be provided at all by renewables, as Physics laws tell everyone, who wants to listen to them. Back to the candles in the caves is not a desirable option for humankind. We wish to progress on all areas including in producing high energies, and the source for that is not the renewables in the original format, simply because Physics laws limit them.

The frequency changing technology - a factor influencing the continuous training of employees of NPPs

The changes in the silicon period of the transistors and actual chips are closing to an end. In the evolution, so far of those techniques the fundamental law was that technology becomes obsolete in 5 years. However, the quantum computing era will change that because the technology will get obsolete now at an unforeseeable speed. The aforesaid is going to lead to sharp, abrupt changes in man-machine interface, in the needs for training of the human designers and operators of all the technologies, as the computing one is the basis of our future development.

The triad for a living future – Safety, Trust and Competencies

If it is evident, we still need powerful energy that could be obtained only through NPPs; the next step is to focus on safety. This aspect is the focus of risk analysts and is the scope of The Probabilistic Risk Assessment (also known as Probabilistic Safety Analysis - PSA).

Taking into considerations that the technologies are rapidly changing we, as human beings, need to trust. To trust that the nuclear technology – a dominant technology – is updated, improved continuously and, of course, sure for humankind. To trust that the technologies that support the dominant one must be sure that they are reliable. Trust is essential for both NPPs' employees and all other people. Trust is generating for every one of us tranquility, productive actions, focus on our own life, happiness as we can rise above the fear of a complex and continually changing world.

International Atomic Energy Agency (IAEA) as an institution and NPPs, as organizations, need to generate trust. Caproni (2004, p.98-9) listed The Organizational Strategies to create trust. Together with Dan Serbanescu, nuclear energy expert, risk and safety analyst, the author assessed each strategy in the table from below.

Table 1. Generations Defined

No.	Name of the Strategy	Skills	Applicability in the nuclear field	Observation
1	Develop a collective identity	Soft	Yes	Applicable
2	Provide clear goals, job expectations, standards, and performance measures	Technical	Yes	Applicable
3	Provide predictable routines	Technical	Yes	Applicable
4	Communicate consistent messages	Soft	Yes	Applicable
5	Encourage employee participation in decision making	Technical & Soft	Yes, from the perspective of safety culture	Applicable
6	Enable employee to control their work and their time	Soft & Technical	Yes, from the perspective of safety culture	Applicable
7	Watch for employees who undermine trust	Unacceptable	No	- (Chernobyl, 1986)
8	Rebuild organizational trust once broken	Impossible	No	- (TMI, 1979 Fukushima, 2011)

Source: Author's research results

Of the eight possible strategies, two do not apply to the nuclear field, and two could be applicable under certain conditions. In all four strategies applicable to this field, employees need to have either soft skills, technical skills, or both.

How productive is an employee at work? This question could generate an answer like: It depends on its daily behavior. Behavior, in a business environment, maybe what an employee is doing, when he must act, according to processes and procedures, in order to perform a specific task of his job. To perform a specific task, an employee must get the knowledge of doing it. When performing that task, or even before, the employee has a specific mindset (e.g. open to do it, reluctant, glad, bored, pleased, afraid) and here is the place where the attitude is generated. Connecting the knowledge, the skill, and the attitude we are reaching the KSA Model.

Initial, the three letters meant Knowledge, Skills, and Attitude according to Banathy (1968, p.24-6) when referred to "the purpose of education." Clark (2012) seems to have identified when a paper mentions for the first time that "A" as coming from Abilities, in a handbook issued by The Department of Energy (named A System Approach to Training) in 1994. He also mentions those who preferred "Abilities" instead of "Attitudes", and later a writer on management topics for over 17 years, strongly argues that "A" comes from Abilities (Reh, 2019).

Since the author started to practice the training activity, he noticed that the way to participate in the training has changed among the participants. For example, in 1995-1998, participants wanted to learn, while in 2016-2019, they wanted to be active participants in the training. In the first period, the participants were usually older than the author (Baby Boomers), and in the second period mentioned, the participants were younger than me (Generation Y). Here, the researcher wants to emphasize that the preferences of trainees have changed with the change of generations.

Generations and behavioral changes of employees' overtime

People who experience the same events tend to develop similar behaviors, and this group of people forms the "generation" (Mannheim & Kecskemeti, 1952). Those living an event at a ripe

age will experience a specific event differently than those, from a younger generation, who will encounter the event as a "first experience."

Sociologists have found that employees, over time, have different behaviors that were determined by the events they witnessed.

Studying the generations' definition in the specialized literature, the researcher found that they have very few characteristics in common, even if each of the authors claiming that his studies are the most scientifically accurate.

The researcher chose to present the generation chart published by McCrindle Research in 2018 because it also mentions issues related to generation education.

Table 2. Generations Defined

	Baby Boomers	Generation X	Generation Y	Generation Z
Year of birth	1946-1964	1965-1979	1980-1994	1995-2010
Iconic Technology	TV (56) Audio Cassette (62) Transistor radio (55)	VCR (76) Walkman (79) IBM PC (81)	Internet, Email, SMS DVD (95) PlayStation, Xbox, iPod	MacBook, iPad Google, Facebook, Twitter Wii, PS3, Android
TV & Movies	Easy Rider The Graduate Colour TV	E.T. the Extra-Terrestrial MTV	Titanic Reality-TV Pay-Tv	Avatar 3D Movies Smart TV
Social Markers/ Landmark Events	Neil Armstrong (69) Vietnam War (65-73)	Challenger Explodes (86) Haley's Comet (86) Stock Market Crash (87) Berlin Wall (89)	New Millennium September 11 (01) Bali Bombing (02)	Iraq / Afghanistan war Asian Tsunami (04) WikiLeaks Arab Spring (11)
Sales & Marketing	Mass / Traditional media Above-the-line	Direct / Targeted media Below-the-line	Viral / Electronic Media Through Friends	Interactive campaigns Positive brand association
Purchase Influences	Brand-loyal Authorities	Brand switches Experts	No Brand Loyalty Friends	Brand evangelism Trends
Financial Values	Long-term needs Cash Credit	Medium-term Goals Credit savvy Life-stage debt	Short-term wants Credit dependent Life-style debt	Impulse purchases E-Stores Life-long debt
<i>Influencers</i>	Evidential Experts	Pragmatic Practitioners	Experiential Peers	User-generated Forums
<i>Training Focus</i>	Technical Data Evidence	Practical Case studies Applications	Emotional Stories Participative	Multi-modal eLearning Interactive
<i>Learning Format</i>	Relaxed Structured	Spontaneous Interactive	Multi-sensory Visual	Student-centric Kinaesthetic
<i>Learning Environment</i>	Classroom style Quiet atmosphere	Round-table style Relaxed ambience	Cafe-Style Music & Multi-modal	Lounge room style Multi-stimulus
<i>Ideal Leaders</i>	Commanding Thinkers	Co-ordinating Doers	Empowering Collaborators	Inspiring Co-creators

Source: Author's extract (McCrindle, 2018)

In the table from above, the researcher changed the order of lines. The last five criteria are related to the subject of this paper.

A first observation is that for the first time in history, we have employees representing three different generations: Baby Boomers, Generation X and Generation Y or Millennials. In 2020, Baby Boomers are between 56 and 65 years old, representatives of Generation X are between 55 and 41 years old, and Millennials representatives are between 40 and 26 years old. Generation Z is approaching (whose representatives are already 25 years old in 2020). We can easily see that, for the next nine years, we will have as employees the representatives of 4 generations.

A second observation is that there are apparent differences between the four generations in terms of Influencers, Training Focus, Learning Format, Learning Environment, and Ideal Leaders. The researcher assumes that Influencers and Ideal Leaders would be the ones that could generate Leadership. Regarding the differences, yet another proof is Bresman and Rao study (2017) which followed three of the above generations on the following aspects: Leadership Ambitions, Entrepreneurial Ambitions, Relying on Technology, Training, and Fitting In.

Table 3. According to Bresman & Rao Study

	Generation X	Generation Y	Generation Z	
Year of birth	1965-1979	1980-1994	1995-2010	
Leadership Ambitions	57%	61%	61%	Becoming a leader (responses varied by country)
	more enthusiastic	more enthusiastic	higher levels of responsibility and more freedom	About the coaching and mentoring that comes with management jobs
Entrepreneurial Ambitions	one in three (33%)	one in three (33%)	one in four (25%)	To start their own business
Relying on Technology	believed VR would have a low impact on their work	saw VR as the technology most likely to revolutionize their work	most enthusiastic about the potential of VR	The potential of virtual reality (VR)
Training	78%	77%	70%	Online course offered by the employer
	25%	21%	13%	To choose between an online course and an in-person
	nan	nan	69%	
Fitting In	40%	50%	50%	Their personalities fit with where they work (responses varied by country)

Source: Author's own research results

This article concluded that "firms and leaders need to understand the different preferences among these generational cohorts in order to make better decisions about leadership development, technology, training, and culture-building." (Bresman & Rao, 2017)

For the Future Employees – Training, Learning or Development

Biech (2017, p.17) defines "Training is the activity conducted by adults who are learning new skills. Knowledge is generally put to immediate use; hands-on practice is included." Biech (2017, p.18) further argues that, if the training is done correctly, the learning "is gaining knowledge and

skills to make change”, and participants' attitudes become more likely to be changed "based on new knowledge."

When we refer to learning as a process, it shows that people learn from experiences (accidental or pursued). Then, people reflect on them (consciously or unconsciously) and conclude, which will lead them to act differently in the future. They act differently, and this becomes a new experience which leads to new learning and "thus the cycle begins again" (Parsloe & Leedham, 2013, p.77).

Development occurs when the person can demonstrate that he or she performs at a higher level. The development process is describing by the cycle of the transition. The cycle starts the unconscious incompetence through the competent unconscious. In the beginning 'I do not know what I do not know'; then, 'I do know what I do not know'; later 'I can do it if I think about it ', and finally, 'I can do it naturally without thinking' (Parsloe & Leedham, 2013, p.77-9). An important observation here is the following: if the skill is a new one or is changed, it is possible, to become unconsciously incompetent again. At the same time, the employee thinks he or she is still competent.

Developing Others vs Self-Managed Learner

Developing Others is a managerial competence that is often measured and by which the manager helps someone to do their job according to Boyatzis (1982, p.143-4). Self-Managed Learning is what the coaching-mentoring approach proposes to encourage the employee to work with himself, giving him the onus of using his coach-mentor to solve his problems (Parsloe & Leedham, 2013, p.79-80).

Both approaches focus on employee progress. The difference is that the first allocates the entire responsibility to the manager, while the second proposes to the employee to make his voice. Both approaches, presented in the two papers, have in common: coaching, making changes (referring to the employee's behavior) and feedback (as a necessary action).

Coaching - A Must-Have Competence in Business

In 1995 the author bought his first book on management. Since then, he has bought and read online tens of management books. In all these books, coaching is a subject, and in most of them is even a chapter. Twenty-three years ago, the author became interested also in leadership, and he started to buy books on this subject. In all these books the coaching is present too.

Being an external coach, with over 15 years of practice, the author is convinced that coaching skills are valuable assets for every manager, employee, or entrepreneur.

Definition of Basic Concepts

Artificial Intelligence – the science and engineering of making intelligent machines. Includes intelligence that is programmed and rules-based, as well as more advanced techniques such as machine learning, deep learning, and neural networks (An Executive's Guide to Real-World AI., 2019, p.1).

Coaching – unleashing someone's potential by support or challenge, without advice even when is asking for; raising as well the awareness of the client using questions, exercises and observations, as the wisdom of them both (N.B. client and coach) to act in the future (Tudoran, 2018, p.986).

Competency – is the resultant combination of knowledge on the one hand and skills and/or abilities on the other, in a specific business area, and may be used in assessing the employees. The Attitude concept could enrich the assessment criteria and in certain situations, can be used as a classifier (N.B. between employees).

Generation – a social group that shares a common temporal location, exposure to common events and an “entelechy” (Mannheim & Kecskemeti, 1952).

Leadership – the action “to take people where they would not have got by themselves” (Owen, 2018, p.10) at the right time and in the way/manner required, by the situation.

Learning – happens in all organizations, every moment, through each member or even the entities that make up the organization. Despite the omnipresence of this term, the process is not consciously. Over time, learning chapters may disappear. A.I. could be a tool in permanently learning from an organization. Senge (1994, p.8) generates an appealing vision for the future, defining a learning organization " where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together."

PSA (Probabilistic Safety Analysis) – a systematic, structured approach to analyze an NPP reaction to challenges potentially affecting the safety of workers, environment, and population. This approach is also used in the aerospace industry and by some hazardous chemical industries (Serbanescu, 2015).

Team Coaching – is coaching the whole team in workshops, their meetings, and stakeholders’ engagements. Hence, the team is clear about its purpose, functions at more than the sum of its parts, more effectively partners with all its stakeholders and becomes a learning team (Hawkins & Clutterbuck, 2020, p.25).

Training – is an activity that combines theory with immediate practice. Although theory and practice seem to be opposed, the two form a true dyad.

The concepts presented above, rely on the author expertise and experience in the field, more than 24 years. Different authors defined each of them according to their knowledge and interests in the respective field. Therefore, the author does not have a unitary approach that could clarify all similarities and differences between these intervention methods within organizations.

Methodology

This research was carried out within the course “Creativity in Economy and Business” delivered during the Business Consultancy Master Program in 2018-2019; this program is running by The Faculty of Business and Administration, a faculty of University of Bucharest, Romania. The researcher is the author and the lecturer of this course.

The researcher’s contribution to this study:

- to apply group facilitation techniques during the seminars to study their effects upon the participants’ behaviors, responses, and involvement as a team member;
- to observe and to assess the result for the group of master students;
- to compare the results of the two groups.

Previous framework

The target group, for the research carried in 2017, was made of ten experts in nuclear risk and safety, who have attended The PSA Training project at Centrala Nucleareoelectrica Cernavodă (CNE Cernavodă) / Nuclear Power Plant Cernavodă (NPP Cernavodă). The training took place in

two modules, equal in duration. All participants attended all ten training days. Analyzing the structure of that target group, the researcher has noticed a feature: the group was homogenous from the technical point of view; in the same time, they were coming from different departments and organizations with different areas of interest and natural asperities (Tudoran, 2018, p.987). Four of them were around and over 40 – they belong to Generation X – and the other six were around 30 – they belong to Generation Y. For easier text tracking, the researcher will name this target-group: Generations X & Y.

Actual framework

The target group, for the research carried in 2018-2019, was made of master students in "Business Consultancy", who have attended the seminars - from France, Iraq, Iran, Italy, Nigeria, Romania, and Turkey. All participants attended the two seminars and performed the public presentation in the team. Analyzing the structure of the target group, the researcher has noticed some features, as follows:

- the participants were below 24 years old - belonging to Generation Z -, with one exception (a lady who was older than 41 years, belonging to Generation X);
- the group was homogenous from the work experience point of view, with the same exception;
- participants preferred to stay in the room grouped by nation and/or religion;
- for all of them, English was not the mother tongue; the range of English level was between A2 to C1 – according to Common European Framework of Reference for Languages (CEFR, 2018).

At the beginning of the course, the author asked them why they chose to attend this course. Most of them said that they want to increase their creativity level, participate in new experiences, and meet new people. The author presented the course curriculum and the evaluation method. One of the activities of the course is the Public Presentation on the team. As stated by most of them, the author invited them in the third seminar to tell which are the teams for Public Presentation. They all agreed verbally. At the beginning of the seminar, there was no team. Besides, they stayed in the room grouped by nation or religion. The author communicated his observation to them and, of course, they had fun. The author realized that one of the exercises he did with the PSA Training participants might be useful. The researcher invited them to do that exercise. All 27 students agreed to participate. For easier text tracking, the researcher will name this target-group: Generation Z.

Study methods approached

The researcher has applied the following study protocol, like the ones for the PSA Team Projects, as follows:

Table 4. Study Protocol Performed

Step	Study protocol for the PSA Team Projects	What have the researcher done
1	At the end of Module 1 (exclusively technical), the Project Manager requested feedback from the participants.	At the beginning of the course, the researcher received written answers. The students mentioned their expectations on the course and what are they ready to do to accomplish them.

2	The Project Manager filled in an assessment form for the first PSA training week.	In the second seminar, the researcher communicates to them the conclusions from their forms.
3	Day one and two during Module 2: direct observation of participants and Project Manager's interview. All results were recorded in the Observation Form.	In the second and the third seminars: direct observation of the students. The researcher recorded the results in an Observation Form.
4	In the Facilitation Module, the researcher used five exercises carried out by the model: briefing, practice, and debriefing.	In the third seminar, the researcher introduced the first exercise. Between the 5 th and eighth seminars, all the teams delivered the public presentation.
5	At the end of Module 2, the Project Manager requested another feedback from the participants.	A feedback session followed each of the public presentations.
6	At the end of Module 2, the Project Manager filled in an assessment form.	The researcher filled an assessment form for each team.

Source: Author's research results

Students' behavior until the start of the third seminar, provided by direct observation:

- interaction among students belonging to other culture was low;
- transmission of information between groups was inexistent;
- the group dynamic was non-existent;
- participants preferred to shut up instead of interaction; they did not show openness to feedback.

Taking into considerations these observations, I chose to challenge the students and to observe their reactions.

Regarding the group of students, I have considered the following:

- the target-group includes graduates with different specializations (e.g. foreign language, engineering, one lawyer, sociology, and business administration - most of them);
- the group was homogeneous regarding the work experience – junior, with one exception;
- the approach was projected on a few seminars, for six weeks;
- the first exercise was not planned as part of the course before the third seminar;
- participants were lacked few competences (public speaking – most of them – and the feedback process – all of them); I noticed that some of them knew some part of the theory for both competencies.

The researcher has chosen to focus his intervention (the first exercise) on the soft skills issues in order to take them out of their comfort zone and to offer them some the opportunity to practice requested skills for teamwork, hopefully leading to the improvement of group dynamics too.

Referring to the managerial competencies according to Armstrong (2017, p.13) in the exercises proposed to the participants, they used the following skills:

Table 5. Distribution of Practiced Managerial Skills

	People Management	Management Skills	Personal Skills	Developing People
1 st exercise for Generation Z (1 st in 2017)		To be creative	To be decisive To listen To make a solid argument	To relate to each other
2 nd exercise for	To provide feedback		To make effective	To relate to each other

Generation Z (3 rd in 2017)			presentations	
3 rd exercise for Generation Z (5 th in 2017)	To provide feedback	To manage stress To plan and prioritize	To assess own performance To communicate To listen To question effectively To make effective presentations	

Source: Adapted after author's research results (Tudoran, 2018, p.989)

The focus of the researcher's attention during the observation was on the People Management, Personal Skills and Development People skills, while the and Managerial Skills (see the second column in Table 5.) proposed by the exercises, the researcher considered good to have.

Results and discussions

How the participants reacted – personal observation

In order to make the comparison of the results easier later, in the table below, I divided the observation stages as in the study carried out in 2017.

Table 6. Participants' Reactions & Behavior during the Stages

Six weeks stage	Generation Z - Participants' reactions/behaviors (Master Students)
Before the 3 rd seminar	They were quite indifferent and silent They were more concerned about how they could score higher on the final exam than what they had stated as expectations They moved as in a daily routine
During the stage	After the first exercise – they become attentive There were keen to respect the indications received Some of them have become more and more attentive to the words used by the lecturer for the task instructions They quickly accepted the exercises' challenges
After the end of the stage	They were keen to be involved in discussions, even those with a lower English level A high level of energy They were enthusiasts on their public presentations Interested in person-to-person interaction

Source: Author's research results

Three Special Notes on Generation Z – leadership, real-life application, and feedback

Leadership in practice - In the first exercise, the whole group have the task to provide a solution in 20 minutes. The discussion seemed to be so exciting in the group that they had lost the notion of time. After 15 minutes, the lady who belonged to Generation X announced that there are up to 5 minutes from the time allocated. Although the English level of the lady was not top-notch and traditionally dressed in a burka, everyone listened to her and then gave her the final solution to present it before the deadline (minute 19). In the researcher opinion, this is an excellent example of leadership.

Practical application - In the last seminar, one of the students told me how she applied what she learned in class. She was a junior in sales, and the head of the department had become

ill. To visit the prospects, she had to go with a lady, who was about 60 years old and was involved in the operational area. After three visits to the prospectuses, the student realized that her senior colleague also intervened in the aspects related to the sale, which is one of the signed contracts meant even a lower income for their company. She was ashamed to get his attention or tell someone in the company that they had lost money because of the lady. The master student proposed to the lady to ask for feedback. After the lady gave her feedback, she asked for her permission to give her feedback. After feedback, the lady thanked her for the way she transmitted the things she can do better for their relationship and the company. Indeed, the lady belongs to the Baby Boomers Generation, so between the two, it is about two generations (Generation X and Generation Y).

Good to know may be enough - The students refused to run the feedback session between them, after each public presentation, and explicitly requested feedback from the reader, that is from me.

Differences between the two target-groups & Results

From the researcher's point of view, there are several differences between the two target-groups that in fact, support the results. From another point of view, these differences could be considered as limitations of this study, the differences being over 10.

Table 7. Differences between the two target-groups

Criterion	Generations X & Y (experts in nuclear risk and safety)	Generation Z (master students)
Number	10	27
Time exposed to the practice of new skills	two days	six weeks
Hours/day	6	2
Generations	40% Generation X & 60% Generation Y	Generation Z + 1 in Generation X
Work experience	At least ten years	Max 2 years
Language used	Romanian	English
Mother tongue	All Romanian	No English
Economic field	High-risk technology	Business & students
Asperities between participants	Yes, expressed during presentations	No (at least not expressed or visible)
Number of exercises	5	3
Knowledge on public presentation	None	They received before to start the delivery of the presentations
Knowledge on the feedback	None	They received before to start the delivery of the presentations
Openness for feedback	Yes	Not between them; they asked for feedback only

Source: Author's research results

To better highlight, the results obtained with the exercises proposed on the behaviors and reactions of both target-groups, the researcher have drawn up the table below.

Table 8. Participants' Reactions & Behavior during the Stages

	Generations X & Y -research in 2017-	Generation Z -research in 2018-2019-
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	(experts in nuclear risk and safety)	(master students)
1 st stage	They were intrigued During the break, they asked questions about an assessment (for sure there was a misunderstanding) They were late	They were quite indifferent and silent They were more concerned about how they could score higher on the final exam than what they had stated as expectations They moved as in a daily routine
2 nd stage	After the first exercise – they become attentive There were keen to respect the indications received Some of them have become more and more attentive to the words used by the facilitator for the task instructions They quickly accepted the exercises' challenges	After the first exercise – they become attentive There were keen to respect the indications received Some of them have become more and more attentive to the words used by the lecturer for the task instructions They quickly accepted the exercises' challenges
3 rd stage	They were keen to share their discoveries They were enthusiasts about future developments of the training of this module A high level of energy Availability for person-to-person interaction	They were keen to be involved in discussions (even those with a lower English level) They were enthusiasts on their public presentations A high level of energy Interested in person-to-person interaction

Source: Author's own research results

Discussion on results

From the above table, it is quite clear that the two results obtained are similar, even if the research was done at the one-year difference and if the two target groups studied were formed by people belonging to different generations.

In the first stage, the researcher can say that there is a difference while perceiving "intrigued" as being somehow related to the future. At the same time "indifferent and silent" is much closer to being disconnected. The second observation is more about dealing with uncertainty (though, what should I do to get over this?) – which the researcher think is quite natural. The third observation is more about approaching a compulsory activity, but each one in its way.

In the second stage, the reactions of both target-groups were the same. They accepted the challenge of the exercise and received the message that it might still be something for them. The researcher would say that at the individual level they have accessed some resources and, also, they have used them (the ability to listen, to be understood, to be heard, to be significant, to work in a team).

In the third stage, the researcher's comments on the observations are as follows:

- the first observation for both groups is similar, despite the communication barrier (the level of English language).
- the second set of observations are more about their state of mind and how they accepted to communicate their non-verbal means of using their discovered resources.
- the third observation, besides the fact that it refers to the energy released by each group, also relates to the attitude of each one (acceptance, openness, curiosity, availability, interest).
- the fourth observation has a powerful connection with the context in which each of the groups was:

- the experts in nuclear risk and safety (Generations X & Y) were members of three different organizations and had "asperities" inherent in the relationship between them (their level of relationship also had negative quotes),
- in contrast the master's students (Generation Z) had similar interests – to learn, to know new people - regardless from the culture they came from, to develop, to grow professionally – (so, their level of relationship had only positive quotes).

Personal Conclusion

After the two experiences described in this paper, I will recommend that the SKA Model has the following application in practice:

$$\text{Competence} = \text{Knowledge} + \text{Skill \&/or Ability} + \text{Attitude}.$$

If for the first and second term of the sum the observation in practice would be relatively easy to make, the third term - Attitude - could be observable by the energy level, by the manifestation of enthusiasm and by the voluntary availability.

Conclusion

The investigations performed so far illustrated the importance of the training and coaching programs connected with the original organization staff composition, as defined by its generic set of goals, aspirations, and skills, specific to the environments and age.

High-performance technologies are designed for a long and very long period. Therefore, considering the impact of generations approach in on the use and management of those technologies is of high priority.

It was identified aspects and issues of priority to be considered in training for such industrial areas. For the investigation of the solutions to such problems training and coaching methodologies were tested, some of them for the first time for such target groups, as for PSA groups in the nuclear industry

Even if the research is going on the results illustrate already the fact that new methodologies are expected to be used for such complex issues.

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