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The Concept of Safety and Security Education in the Context of Sustainability

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Abstract: The emergence of safety and security risks is a huge threat to the implementation of sustainability; therefore, safety and security education allows one to detect the symptoms of emerging crises, helps in the appropriate response to that and helps in a quick return to the path of sustainability after crisis conditions would disappear. The development of the concept of safety and security education in the context of sustainability is very important from both a scientific and practical point of view due to the fact that schools play a key role in society constituting the basic source of education for future generations of citizens, shaping awareness, competence and skills of future generations and thus creating a society that is able to analyse the opportunities and threats arising from the changing economic, social, environmental, technological, political and legal environment. The aim of the paper is to indicate the key factors for improving the security and safety education in the context of sustainability and to prepare the recommendations for preparing the security and safety courses. To complete that objective studies, Computer-Assisted Web Interview either with students or with security and safety experts were used in the study. The survey was conducted among two representative samples of high school students in Poland—one sample 418 high school students from regular high schools, and 100 from solitaire classes. The results from the CAWI were discussed with 20 security and safety experts to indicate the learning methods and tools to improve safety and security education. The main finding from the study was that safety and security education must be improved because respondents saw gaps in their knowledge on several issues in the area of safety and security. Modern training methods should be included in safety education, e.g., e-learning platforms, Serious games, social media, virtual worlds, simulators, integrated systems using e.g., kinect, VR goggles, accessories, mobile technologies.

Keywords: education; security; safety risk; sustainability

1. Introduction

"We have changed our environment so radically that we have no choice but to change ourselves and adapt to this changing environment" Norbert Wiener "The Human Use of Human Beings". The complexity of environment, the need for a flexible response to changes occurring in it, condition a new view on education. The new quality of education is strongly associated with innovation, creativity, the ability to analyse the environment and quick response to the emerging threats. Perception of security as a value is associated with shaping the attitudes of members of a given society, which is influenced by the following factors: awareness of the society, knowledge of ethical values and categories, knowledge of environmental, social and economic threats. Safety education plays a very important role in creating the right attitudes of the society in the aspect of improving their security, because it influences the appropriate behaviour of members of the given communities. An educated, aware society can react appropriately to emerging threats by taking specific corrective and preventive actions. In the process of building awareness and knowledge of people, education in secondary schools and education for safety

among university students are very important. It becomes necessary to introduce modern teaching methods that will support education for safety. Sustainable development is the biggest challenge for education system in the 21st century. The education system, at both secondary and higher levels, contributes to change and accelerates sustainable development for the next generation, and universities are the key to a sustainable future.

Since the security and safety is one of the critical factors of sustainability it would be interesting to know to indicate the key factors for improving the security and safety education in the context of sustainability. In order to prepare recommendations for organizing the effective security and safety courses following research questions were set up:

- Q1. What is the perception of the concept of security and safety among society?
- Q2. What are, the preferred by respondents, education forms for security and safety in the context of sustainable development?
- Q3. What are, the preferred by respondents, education techniques to perform effective security and safety education courses for high school and university students?

2. Literature Review

2.1. The essence of the Sustainability Concept in Contemporary Social Development and in Education for Safety

Sustainable development: "is the process of achieving human development in a just, reasonable and safe manner" [1]. It is a development that meets the needs of the present generation without prejudice to the ability of future generations to meet their needs. It means the integration of the organization's goals in ensuring high quality of life, health and well-being, taking into account social justice and preserving the Earth's potential. These social, economic and environmental goals are interdependent and mutually reinforcing. Sustainable development can be treated as a way of expressing broader expectations of society as a whole.

Sustainable development has three dimensions—economic, social and environmental—which are interrelated, for example, the elimination of poverty requires the promotion of social justice and economic development and environmental protection [2].

Regarding sustainable development and the role of business in this respect, the World Business Council for Sustainable Development (WBCSD) the leading organizations in the world in the future will be those that provide goods and services, while focusing on the need for a solution of the world's biggest problems: poverty, climate change, resource scarcity, globalization and demographic changes [3].

Organizations implementing the concept of sustainability are constantly striving to achieve a balance between economic, environmental and social goals, whereas this balance is a key assumption when formulating their strategy and is a very important element when assessing their effectiveness.

Organizations must strive for extensive interaction and dialogue with stakeholders regarding both current offers (product compliance), as well as the way in which organizations can move closer to solving economic, social and environmental problems (the vision of sustainability) [4].

Numerous universities are conducting activities for the development and implementation of the sustainability concept in practice. According to George Mattis [5], Chalmers University of Technology in Sweden has developed programs to ensure a healthy lifestyle for its employees. They are offered some activities related to keeping fit. An agreement was concluded with the local health service regarding psychosocial advice and medical examinations—which emphasizes the importance of cooperation with the local community. Students are looking for institutions that actively demonstrate leadership in sustainable development and provide them with tools for comprehensive decision-making. The University of Plymouth had a strategy for personal development and employability for all graduates. They undertook to care for the sustainable skills of graduates and prepared students for future employment and citizenship. The university was aware that the practical application of the principles of sustainability and care for graduates are decisive factors attracting students and provide development prospects for universities and business schools.

Sustainable development is one of the biggest challenges for the education system in the 21st century, because it has become one of the most important strategic goals of almost every organization in both the economic and social sectors. In order to achieve the goals of sustainable development and enable a quick return to this path after the risk materializes, it is necessary to take actions in the field of education for safety that will contribute to improving the awareness and concentration of the organization's stakeholders on economic, social and environmental goals. In addition, educational activities lead to the development of knowledge and key skills of students, but also affect their character and building their social attitudes.

The goal of the United Nations Decade of Education for Sustainable Development 2005–2014 was "to integrate the principles, values, and practices of sustainable development into all aspects of education and learning" [6].

ACARA's definition of Education for Sustainability is as follows (Australian Curriculum, Assessment and Reporting Authority (ACARA): "Education for sustainability develops the knowledge, skills, values and world-views necessary for people to act in ways that contribute to more sustainable patterns of living. It enables individuals and communities to reflect on ways of interpreting and engaging with the world. Sustainability education is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence" [7].

Education for sustainable development enables people to change the way of thinking and acting for a sustainable future and thus ensures safe conditions for functioning both for the society and the organization of the first, second and third sector.

Education for safety should focus on the development of knowledge, skills, values and behaviours needed for sustainable development by incorporating sustainable development issues into teaching and learning [8,9].

Members of the sustainable development program committee have set the following goals for sustainable development education:

- Courses focusing on comprehensive, transdisciplinary analysis and solving problems related to sustainable development issues;
- Learning models for sustainable research, practice and social services;
- Conditions for lifelong learning.
- Research on problems identified by the community;
- Commitment to natural, economic and cultural well-being;
- Leading position in research and practice of sustainable development [2].

The practice from Japan and other Asian countries shows the in the Asian coutries there is a common conviction "safety education, that is, education required for the development of a safe and securesociety (i.e., a resilient and sustainable society) [10–12] and plays very important role unlike in Poland.

2.2. Definition of Safety and Its Role in the Process of Educating Social Attitudes

The term "safety" comes from the Latin words "sine cura", which in translation means "lack of care", "lack of worries". In a broader sense, it is defined as "certainty of existence and survival, possession, as well as functioning and development of the subject. It is the result of a lack of threats and their proper perception, it also arises as a result of the creative activity of a given entity" [13].

The modern concept of safety has a broader dimension than in the past. It covers political, military, economic and technological, ecological, social and humanitarian factors. It also includes preserving the national identity and respecting fundamental civil rights and freedoms. Most often, safety is defined as an anxiety-free state that creates a sense of confidence [14].

Definition of Security by Merriam-Webster: "Definition of security: the quality or state of being secure: such as (a): freedom from danger: safety; (b): freedom from fear or anxiety; (c): freedom from the prospect of being laid off job security" [15].

Safety can be defined as the process of achieving a desired state by specific individuals or the state. It is related to the dynamics of changes in society that are conditioned by a given situation in the country. In addition, safety is also referred to as the need for peace and development opportunities. This is also related to the certainty that the entity is not in danger [16]. Safety defined in this way means that not only a given country, but also society, which can be perceived both as a given individual and, contributes to its sense.

Abraham Maslow also included a need for safety. Safety occupies the second position in the pyramid, after physiological needs. It follows that, to meet other needs, man must be sure that he is safe. The concept of safety in the pyramid of needs is literally referred to as freedom from fear [17].

"Safety has two main components: a guarantee of the inviolable survival of a given entity and the freedom of its development". According to J. Stańczyk, "the essence of safety based on guarantees of inviolable survival and freedom of development is certainty. Certainty is a condition of both of these components, and it can be objective or subjective. Safety in a synthetic approach can be defined as the objective certainty of guaranteeing inviolable survival and development freedoms" [18].

In the literature, safety is also seen as:

- a guarantee of inviolable survival and free development of the safety subject [18];
- a state of calmness, confidence, lack of danger and protection against it [19];
- maintaining sovereignty and territorial integrity, free choice of the country's development path, achieving individual well-being and social development [20];
- appropriate state of organization of defense and protection against military and non-military threats of various areas of state activity [21].

The wide scope of the concept of safety makes it impossible to define it clearly. The variety of threats that can occur at a given time in a given areas also contributes to this. Therefore, there are types of safety that allow categorizing individual areas that may be affected by threats. One of the basic safety divisions divided them into:

- internal;
- international;
- economic;
- energy;
- social;
- cultural;
- ecological;
- information.

Safety, which is one of the supreme values for man, at the same time plays a special role in shaping his attitudes. Education for safety begins from an early age. Shaping appropriate attitudes and behaviours in children and adolescents is a very complex process [22].

Education for safety also applies to upbringing at particular stages of life, which primarily concerns teaching citizens' awareness. It is a continuous process conditioned by social changes. For this reason, it is very important to identify people with the following transformations, thanks to which it is easier for them to adopt the right attitude in the given situation.

Man, as a social entity, strives for the highest level of safety. He tries to remove or eliminate threats, while alleviating his fear, uncertainty and anxiety. For this reason, internal security is distinguished, regarding the absence of threat to the individual, as well as external, which includes other entities that affect the individual.

Education for safety is inseparably connected with the life of the citizens of the state in peace. One of the accepted theses indicates that "if everyone has a sense of security, they will build security, then cultivate it—then there will be peace in the world" [23]. It consists of three factors: awareness, sense of security and its education.

Personal patterns, as well as ethical values and categories are very important for education for safety. It is also crucial to have awareness and purposefulness of action [24]. In addition, existing values and ethical categories affect the behaviour of society in various situations. Among them you can distinguish, for example:

- altruism;
- virtue;
- obligation;
- acting according to conscience;
- dignity;
- tolerance;
- responsibility [25].

All ethical values and categories, which are considered regulators of behaviour, also influence the shaping of citizens' attitudes in the field of security and should be the part of the education system.

Security is a very important value for man and the state. Knowledge of its basic types makes it possible to respond effectively to emerging threats in a given area. Knowledge of the possible threats and how to respond to them is inherent in the level of society's sense of security.

2.3. The Role and Importance of Education for Safety in Countering Economic, Social and Environmental Threats

Education for safety, which main task is to shape civil society in order to prepare them to counteract threats, is of great importance for improving security from both an individual and state perspective. Acting in this way may not only improve the level of security for citizens, but also improve the stability of the entire country.

The education processes in this area are supported by organizing trainings, conducting workshops and using other effective forms of knowledge transfer and raising the level of awareness. Education for safety leads to counteracting threats, both in the economic, social and environmental sphere.

We identify the following types of threats [26]:

- political,
- economic,
- technological,
- legal,
- socio-cultural,
- environmental,
- ethical.

A threat is a risk that may be created by external factors from the environment of the enterprise that are not directly affected by management. Threats are always negative and limit the organization's operation on the market, or they may cause losses. The external environment of the company should be monitored in order to prepare a protective strategy, thanks to which all negative impacts can be minimized, eliminated or transferred (e.g., insurance against them).

The threat is generally understood as a lack of security, which makes it unchanging and unavoidable, and in some cases universal, reality of human life. At the same time, it is closely related with security, which thus makes it a threat to its primary category. Identification of threats and knowledge of them become, therefore, a basic condition for the initiation of preventive actions and the organization of defence [27].

3. Materials and Methods

To complete the objective of the paper: "to indicate the key factors for improving the security and safety education in the context of sustainability and to prepare the recommendations for preparing the security and safety courses" and find the answers for the research questions the author has decided to conduct research the following way:

A. Desk research—that stage has included the overview of the literature sources that could be found on the scientific platforms like MDPI, Cambridge Journals Online—Cambridge University Press; Directory of Open Access Journals (DOAJ); EBSCOhost—Academic Search Complete; EB-SCOhost—Business Source Complete; EBSCOhost—Environment Complete; Emerald; Free Access Journals (HighWire); ibuk.pl; PLoS Journals; ScienceDi-rect/Elsevier/ICM; ScienceDirect/Springer/ICM; Wiley Online Library. The findings from that stage were mainly used in the introduction and the draft of the "Model of improving the education process in the field of education for security and safety in the context of sustainability". The findings from that stage were helpful to answer the Q1, Q2 and Q3 research questions.

B. Primary research using Computer-Assisted Web Interview and statistical analysis—The survey was conducted among two representative samples of high school and university students in Poland. 418 respondents have participated in the survey, that in compare to the minimal sample size, 280 respondents make the sample acceptable in order to representativeness. Among the respondents, 49.04% were women and 50.96% were men. That along the structure of students (high school vs. universities) and place of living (voivodeship) illustrates the structure of general population. The study included high school and university students, as well as military and civilian schools and colleges. In education system in Poland exist either solitaire classes in high schools or solitaire and military faculties in the universities that prepare future policemen, soldiers or security and safety experts. The age of the respondents was between 17 and 23 years. The characteristics of the sample according to the criterion of residence is shown in Table 1. For 40.91% of respondents, the place of residence is a village, while the rest of the respondents live in the city. The CAWI included several sections: Security & Safety; Threats and crisis management; Self-assessment of knowledge; Defence education; Patriotism; Decisions; Information on the respondent. Because of the wide thematic scope of the research the following paper covers the issues related to security and safety education. The questions used in the questionnaire were Likert scale arrays, ratio and dropdown. The data was analysed in the SPSS 22 statistical package. To find the relations between the data collected the Pearson's correlation test and Chi-squared test were performed. The overall process was conducted according recommendations Hu, L. and Bentler, P. [13,18]. The findings from that stage were helpful to answer the Q2 and Q3 research questions.

C. Primary research using Delphi Method—the survey questionnaire and especially the results from the CAWI were discussed with 20 security and safety experts to indicate the learning methods and tools to improve safety and security education. The findings from that stage were helpful to answer the Q2 and Q3 research questions

Table 1. Structure of respondents by place of residence.

Place of Residence	Percentage of Respondents
Village (A1)	40.91%
Suburban town (A2)	12.44%
A city up to 50,000 residents (A3)	16.27%
A city from 51,000 to 100,000 residents (A4)	10.05%
A city from 101,000 to 250,000 residents (A5)	6.70%
A city over 250,000 residents (A6)	13.64%

The analysis were done according to Hu, L. and Bentler, P. [28].

4. Results

From the complex survey questionnaire that were chosen to bring the answers for the research questions.

To answer the research question: Q1. What is the perception of the concept of security and safety among respondents? The question about understanding the concept of security among respondents was asked.

Along with the conducted research: 85.65% of respondents indicated that safety means for them eliminating threats to life and health; 83.49% described security as lack of threats related to terrorism, another group of respondents described security in the environmental aspect—as: eliminating threats related to food and water contamination—81.82%, no threats related to crime—80.86%; eliminating threats related to environmental pollution—73.68% and access to energy sources—73.21%. For 70.33% of respondents, security is a basic human need. 61% of respondents indicated security as eliminating threats of loss of material goods. It was further stated that security means: eliminating threats of loss of respect, feelings—57.89%; access to the Internet—50%; eliminating job loss threats—49.28%; access to social networks—45.93; access to mass media—43.78%, having many friends and acquaintances—36.6% (Figure 1).
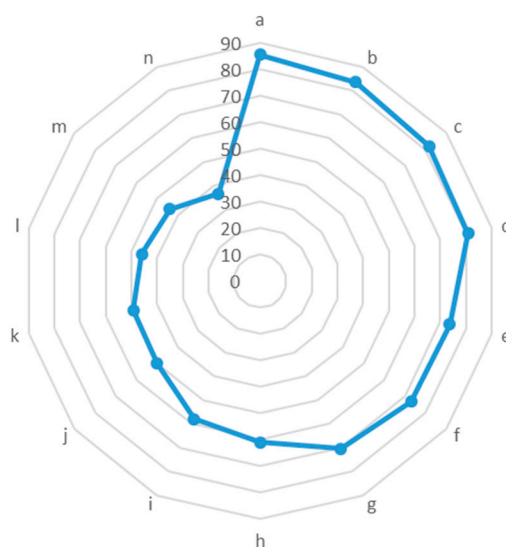

Figure 1. Understanding the concept of security among respondents (%) * The graph presents the answers I definitely agree and I agree. a—Eliminating threats of loss of life, health; b—No threats related to terrorism; c—Eliminating threats related to food and water contamination; d—No threats related to crime; e—Eliminating threats related to environmental pollution; f—Access to energy sources; g—Basic human need; h—Eliminating threats of loss of material goods; i—Eliminating the threat of loss of respect, feelings, j—Access to the Internet; k—Eliminating threats of job loss; l—Access to social networks; m—Access to mass media; n—Having many friends and acquaintances.

The Chi-Square test was performed to indicate if the above in order to examine if there is variation between above factors and sex, place of living, type of school. The hypothesis:

- H0: the factors: (a) Eliminating threats of loss of life, health; (b) No threats related to terrorism; (c) Eliminating threats related to food and water contamination; (d) No threats related to crime; (e) Eliminating threats related to environmental pollution; (f) Access to energy sources; (g) Basic human need; (h) Eliminating threats of loss of material goods; (i) Eliminating the threat of loss of respect, feelings; (j) Access to the Internet; (k) Eliminating threats of job loss; (l) Access to social networks; (m) Access to mass media; (n) Having many friends and acquaintances do not depend on (A) sex; (B) profile of school; (C) place of living; (D) voivodship.

- H1: the factors: (a) Eliminating threats of loss of life, health; (b) No threats related to terrorism; (c) Eliminating threats related to food and water contamination; (d) No threats related to crime; (e) Eliminating threats related to environmental pollution; (f) Access to energy sources; (g) Basic human need; (h) Eliminating threats of loss of material goods; (i) Eliminating the threat of loss of respect, feelings; (j) Access to the Internet; (k) Eliminating threats of job loss; (l) Access to social networks; (m) Access to mass media; (n) Having many friends and acquaintances depend on (A) sex; (B) profile of school; (C) place of living; (D) voivodship.

The results of the Chi-Square test analysis have shown no significant dependency between the factors. Although the H0 hypothesis had to be rejected, but the Cramer's V oscillated according to:

- sex—between 0.09 to 0.18—that means the very weak or relationship;
- type of school—between 0.08 to 0.19—that means the very weak or relationship;
- place of leaving—between 0.10 to 0.21—that means the very weak or relationship;
- voivodship—between 0.11 to 0.20—that means the very weak or relationship;

Based on the above analysis the assumption that sample is quite homogeneous could be made.

To answer the research question: Q2. What are, the preferred by respondents, education forms for security and safety in the context of sustainable development? About the actions to improve residents' knowledge of crisis management procedures undertaken in the place of residence of respondent was asked. In the light of the research conducted by the author of the research—67% of respondents stated that conferences or seminars are organized in their place of residence, 59.57% indicated conducting retraining courses using the traditional method, 51.67% publishing newsletters, 49.28%—conducting social campaigns in mass media, 41.87%—conducting social campaigns in social media, 29.67%—conducting retraining courses with the e-learning method.

The Chi-Square test was performed to indicate if the above in order to examine if there is variation between above factors and sex, place of living, type of school. The hypothesis:

- H0: the factors: (a) Organizing conferences or seminars; (b) Conducting retraining courses using the traditional method; (c) Publishing newsletters; (d) Conducting social campaigns in the mass media; (e) Conducting social campaigns in social media; (f) Conducting retraining courses using the e-learning method do not depend on (A) sex; (B) profile of school; (C) place of living; (D) voivodship
- H1: the factors: (a) Organizing conferences or seminars; (b) Conducting retraining courses using the traditional method; (c) Publishing newsletters; (d) Conducting social campaigns in the mass media; (e) Conducting social campaigns in social media; (f) Conducting retraining courses using the e-learning method depend (Figure 2) on (A) sex; (B) profile of school; (C) place of living; (D) voivodship.

The results of the Chi-Square test analysis have shown no significant dependency between the factors. Although the H0 hypothesis had to be rejected, but the Cramer's V oscillated according to:

- sex—between 0.08 to 0.2—that means the very weak or relationship;
- type of school—between 0.08 to 0.20—that means the very weak or relationship;
- place of leaving—between 0.12 to 0.21—that means the very weak or relationship;
- voivodship—between 0.11 to 0.18—that means the very weak or relationship;

Based on the above analysis the assumption that sample is quite homogeneous could be made.

To answer the research question: Q3. What are, the preferred by respondents, education techniques to perform effective security and safety education courses for high school and university students? Among the highest-rated forms of education for safety in the context of sustainable development (on a scale of 1-5), the respondents indicated: simulations—4.25, trainings—4.15, gamification—4.05 and exercises—3.95. The quite low assessment for the e-learning form is surprising—2.58. The following

was rated the lowest: conferences 2.51, lectures and seminars—2.31 and publishing newsletters—2.94. Among the indicated forms of education, the following were also assessed: conducting social campaigns in mass media—3.02, as well as conducting social campaigns in social media—3.15 (Figure 3).
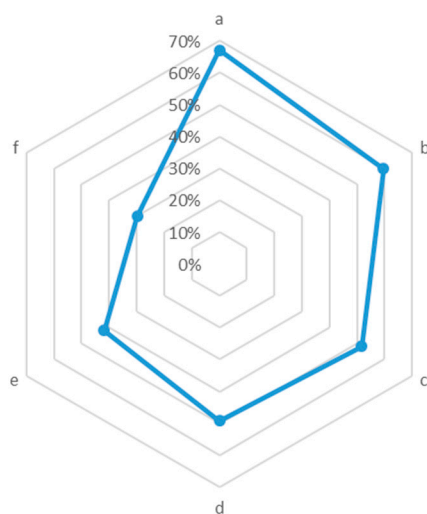

Figure 2. Actions to improve residents' knowledge of crisis management procedures undertaken in the place of residence of respondents (%)—The graph presents the answers I definitely agree and I agree. a—Organizing conferences or seminars; b—Conducting retraining courses using the traditional method; c—Publishing newsletters; d—Conducting social campaigns in the mass media; e—Conducting social campaigns in social media; f—Conducting retraining courses using the e-learning method.

Figure 3. Assessment of education forms for security in the context of sustainable development (on a scale of 1–5).

In addition, the correlation between the variables being studied was analysed. A high positive correlation was observed between attaching great importance to teamwork and answering questions on how to deal with the threat—Pearson's correlation coefficient—0.68. A similar relationship was observed here between the self-assessment of leadership skills, as well as answers to questions about how to deal with the threat—Pearson's correlation coefficient—0.65.

The Chi-Square test was performed to indicate if the above in order to examine if there is variation between above factors and sex, place of living, type of school. The hypothesis:

- H0: the analysed factors do not depend on (A) sex; (B) profile of school; (C) place of living; (D) voivodship
- H1: the factors depend on (A) sex; (B) profile of school; (C) place of living; (D) voivodship.

The results of the Chi-Square test analysis have shown no significant dependency between the factors. Although the H0 hypothesis had to be rejected, but the Cramer's V oscillated according to:

- sex—between 0.07 to 0.17—that means the very weak or relationship;
- type of school—between 0.12 to 0.20—that means the very weak or relationship;
- place of leaving—between 0.12 to 0.18—that means the very weak or relationship;
- voivodship—between 0.11 to 0.18—that means the very weak or relationship;

Based on the above analysis the assumption that sample is quite homogeneous could be made.

The assumptions about the homogenous structure of the sample where tested with the Two-step cluster analysis. Although two segments were separated but the quality of the separation was very weak (Figure 4).
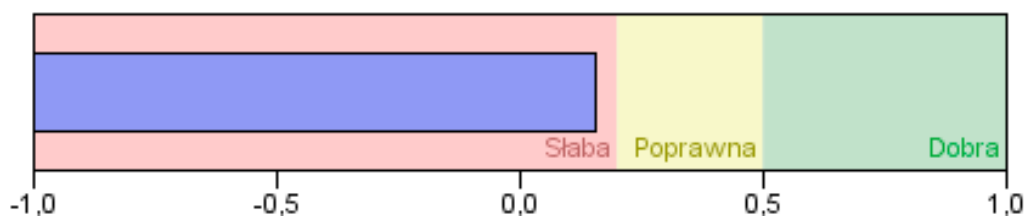

Figure 4. Cluster Quality measured by Silhouette measure of cohesion and separation.

The results were discussed during panels with security and safety experts to propose the Model of improving the education process in the field of education for safety in the context of sustainability.

5. Discussion and Limitations

The research on the education in the field of security and safety don by the author follow the trend in the literature. Authors, such as You-xiao X, Kitamura Y and other Asian authors [29], [30], [10] as the experts from the research panel agree that security and safety education should be integrated part of education system from the elementary school through the high school to the university. The experts from the research panel indicate that so far efforts put on security and safety education in Poland are not adequate to the needs therefore there is the need to perform research like that.

The findings from the empirical study to answer the research question Q1. What is the perception of the concept of security and safety among society? Go along with the previous research done in that field done Araucz-Boruc, A. [22] and Stańczyk, J. [18].

The findings from the empirical study to answer the research question Q2. What are, the preferred by respondents, education forms for security and safety in the context of sustainable development? And Q3. What are, the preferred by respondents, education techniques to perform effective security and safety education courses for high school and university students? Are similar to that found in Gawlik-Kobylińska, M. [7,31], Burbules, N. [32], Nguyen, D. N., Zierler, B., Nguyen, H. [12]. The author as well as the research panel indicates that educational tools and methods should be up to date with current technology standards that could be used even in the conditions of disaster, epidemy or pandemic. That is very important in the COVID-19 situation. They recommended the use of remote techniques such as virtual worlds, immersed reality or e-learning platforms.

Gamification, defined by Deterding et al. (2011) [33] as the use of game design elements in non-game contexts, is a fairly new and rapidly growing field. The concept of gamification is different from that of an educational or serious game.

The term "gamification" is quite recent: according to its first documented use is in 2008 but it did not see widespread adoption before the second half of 2010 [33].

The limitations of research done by the author are related to:

- the sample structure—Although the structure could be treated as representative according to sex, type of school a place of living the research on a bigger scale could be performed in order to obtain better results.
- Utilization of technology—the further research should be done latest in two years because the teaching technology should change parallel to trends in entertainment and areas using high tech. Learning in order to be attractive has to carry element of modernity in order to be attractive for students.

Based on the findings, recommendations and author's experience the model of improving the education process in the field of education for safety in the context of sustainability would be presented in the next section that includes use of the immersed reality laboratory, group training using VR technology and the inclusion of training taking place in the field are a novelty in the presented proposal.

6. Model of Improving the Education Process in the Field of Education for Security and Safety in the Context of Sustainability

The following proposal will be implemented as the test system at the War Studies University in Warsaw or organizations that have appropriate infrastructure and know-how in this regard:

- E-learning platforms—Remote learning platforms are the most popular tools used in the implementation of training. They offer the opportunity to learn anytime and anywhere. Therefore, they provide learning flexibility [34]. War Studies University uses the Moodle platform in this respect.

Integrated virtual reality systems—Systems that are highly advanced in helping to reflect reality are an area of interest for many training creators and organizers. An example of such an integrated device is CAVE Automatic Virtual Environment (virtual reality caves), which provides an immersive learning environment for one person or a small group of people. In this regard, War Studies University has a Mini-Cave immersed reality laboratory (Figures 5 and 6.).

Figure 5. Gawlik-Kobylińska, M. Midi-CAVE, http://integraav.pl/realizacje/laboratorium-zanurzonej-wizualizacji-przestrzennej-politechnika-gdanska.html. 2019.
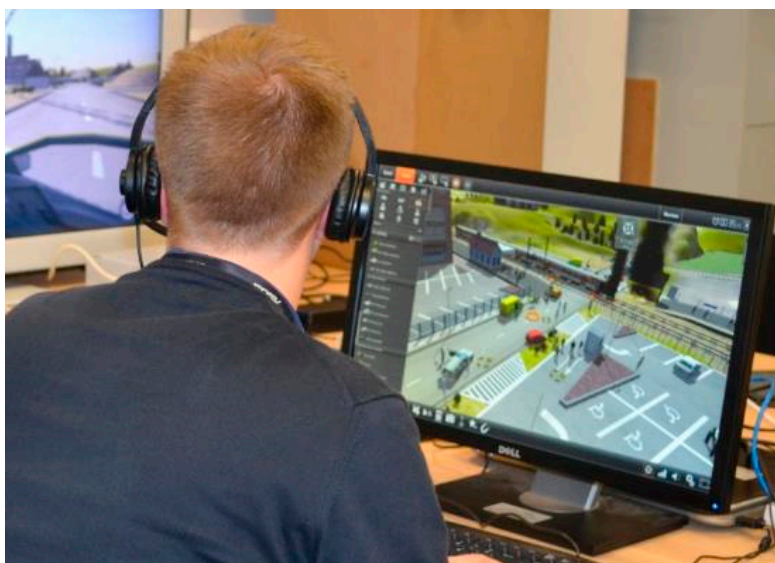
Figure 6. Airport focus international, Training on crisis situation management—http://airportfocusinternational.com/crisis-training/, 2019.

While the conditions for access to equipment are met, training can be designed. Referring to the conducted research and the above-mentioned results, it was found that training focused on safety in the context of sustainability, to be effective and meet the needs of recipients, must consist of both elements of remote training implemented on the e-learning platform, simulation training implemented on the integrated platform and joint trainings in a simulated environment in the real world.

The author purposes the following process of the preparing and conducting the process of preparing and conducting the training course related for security and safety.

The process contains (Figure 7):

1. Stakeholder analysis—(Identifying training needs)—each training must be adapter to the context of the situation on an ongoing basis. Only training in accordance with the needs of recipients can be considered effective, therefore both program content and the way of transferring knowledge should be agreed with the ordering party before commencing the training. The findings should be documented.

2. Conducting an opening meeting—Each group training should start with an opening meeting during which you can discuss the purpose of the training, clarify issues related to the training tools used, and finally confirm the expectations of participants.

3. Getting to know the theoretical foundations in the field of training—e-learning platform—the theoretical foundations are a range of knowledge that can be successfully learned using remote learning tools, such as e-learning platforms. This is mainly due to the different pace of knowledge acquisition by training participants.

4. Checking theoretical knowledge—e-learning platform—checking theoretical knowledge is also a stage that can be implemented using remote learning tools, such as e-learning platforms. The use of e-learning platform allows for a flexible approach and modification of issues to be checked on an ongoing basis as needs arise.

5. Individual training—immersed reality laboratory or VR Glasses—individual training can be carried out through 3D platforms. These platforms enable better, more visualized implementation of scenarios that take into account actions in realistic situations. In contrast to flat e-learning platforms, they provide greater immersion by, e.g., using accessories, such as VR googles or joysticks. 3D platforms can be used as a simple tool to implement scenarios that can be recorded and then made available in the form of instructional video. A more advanced way to conduct

individual training is to use immersed reality, which is a more accurate representation of the real world in digital reality.

6. Group training—immersed reality laboratory or VR Glasses—Conducted research has shown that group training should be an indispensable part of security training. The use of both VR tools, immersed reality and fast information transfer tools allows for the creation of virtual teams regardless of the physical presence of the course participants.

7. Group training—field conditions—the experience of the author and experts shows that even the best training using VR technology will not replace training in a real environment. Therefore, it is necessary to create, wherever possible, a real training environment. This environment can of course be supported by such tools as IoT or monitoring. The use of tools to monitor group trainings taking place in a real environment is used both to improve the training environment and to better, more objective assessment of training participants.

8. Closing the training—Each training should end with a closing meeting, whereby remote technologies such as videoconferencing can be used here. At this meeting, it should be first of all determined whether the training objectives have been achieved. Another issue is the assessment of how the training will be carried out and collection of suggestions for improving future training.
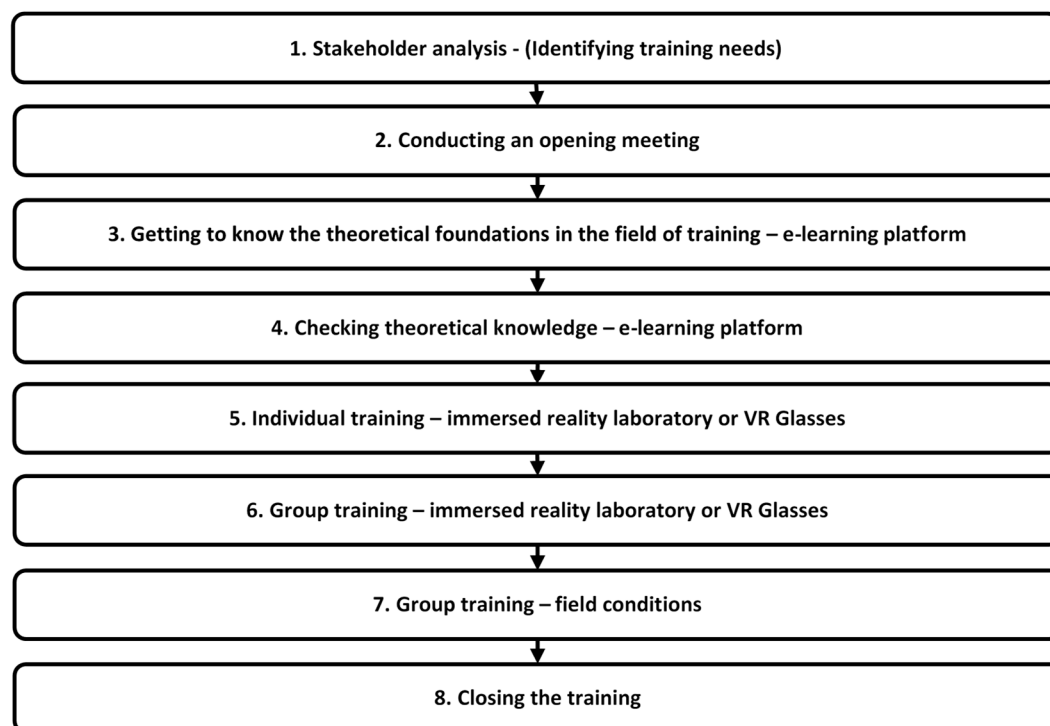

Figure 7. Proposed scheme of a training course.

Based on the opinions of experts in the research panel, literature review and the research done on the sample of high school and university students showed up that the use of new technology tools in the field of education for safety in the context of sustainability has a number of advantages, which include, above all, the flexibility of the mode and methods of teaching.

- Courses can be conducted in blended learning and completely remote mode.
- In terms of teaching method, it is possible to teach in a moderated and unmoderated manner, offline or online. The learning process can take place at any time, anywhere.
- The teacher can conveniently provide training materials.
- Materials can also be efficiently adapter to the training needs, and updated (assuming that the copyright of the creators of the training material is respected).

- Teachers can provide training for more people compared to full-time classes.
- Through the use of virtual space, teachers and learners can have continuous contact with each other, which has a positive effect on the motivation of the learners. However, it is worth noting that it is necessary to set rules for the manner and time of contact [35].
- Teachers, by publishing materials in cyberspace, also ensure the possibility of continually supplementing the user's knowledge and skills (levelling deficiencies, professional development).
- It is worth noting that the courses can be implemented in a blended-learning form, which means that classes preparing for practical activities can just take place in a virtual space, or vice versa, practical classes are completed with a test or task on a 2D or 3D platform.

Considering the training methods mentioned above, it is worth noting that one of the ways to implement ways to improve the quality of education, including education for safety, is to implement the project-based method. This method, as one of many teaching methods, which are based on the learners' own activity, applies to all activities undertaken based on previously established assumptions. The project breaks down with the division into subject content and allows to apply various strategies to solve the problem, preparing the trainees for interdisciplinary problem-solving [36]. It also generates cooperation between all members of the teaching process.

7. Conclusions

Based on the research done with CAWI and Delphi Method the following conclusions related to the research questions could be set up:

a. Q1. What is the perception of the concept of security and safety among society?—The Polish society is rather homogenous when it comes to the perception on several issues in the area of safety and security. Both experts and respondents themselves agreed about that. The respondents identified the gap in their security and safety education so there is the need to prepare the propositions for security and safety courses. The situation with COVID-19 shows that knowledge and education in security and safety would be very important.

b. Q2. What are, the preferred by respondents, education forms for security and safety in the context of sustainable development?—AMONG the highest-rated forms of education for safety in the context of sustainable development the following ones were indicated: simulations, trainings, gamification and exercises, campaigns in mass media as well as conducting social campaigns in social media.

c. Q3. What are, the preferred by respondents, education techniques to perform effective security and safety education courses for high school and university students?—Both experts and respondents indicated the most effective training methods in safety education, e.g., e-learning platforms, serious games, social media, virtual worlds, simulators, integrated systems using e.g., kinect, VR goggles, accessories, mobile technologies. The most important indication in the situation related to COVID-19 had shown that all the education techniques should be available to perform in distance learning.

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