

Guide to PUNC e-portfolio



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WHAT IS PUNC?

“The key is not to predict the future but to prepare for it” - PERICLES (500 BC)

Young Europeans face uncertainty on a daily basis and as a result some are becoming more critical about systemic dominance of certain reductionist and siloed ways of knowing. They actively search for experiential learning opportunities which will prepare them to deal with ultimately unresolvable challenges. Educators must organize learning under extreme uncertainty because there are multiple aspects that must be considered and acted on but the knowledge necessary to effectively conduct the management action comes with substantial limitations and is often time-dependent.

Analogically to uneven global distribution of the population under 30, the young generation's awareness of how to solve divergent, “wicked” problems and engagement for sustainability varies culturally. It is strictly related to the general quality of education as well as indicators of social capital and power relations. Students are the group hit hard by uncertainty of what may jeopardize or benefit their futures so they are vocal about the need to transform the educational system for preparing them for sustainability leadership. These needs include new competences for change-makers, especially resilience, courage and uncertainty management.

The Erasmus+ Professional UNcertainty Competence (PUNC) project , in response to the above described needs, brought together six European partners (Turku University of Applied Sciences in Finland, University of Gdansk in Poland, Innocamp PL in Poland, Valencia Polytechnic University in Spain, Business Academy Aarhus in Denmark, and Utrecht University of Applied Sciences in the Netherlands) to create four interconnected products:

- 1. Educators' guide for designing hybrid VUCA learning environments .**
- 2. Competence framework for identifying one's PUNCompetence and for formulating individual and context relevant learning outcomes.**
- 3. Toolbox that supports the developing of one's PUNCompetence.**
- 4. E-portfolio that monitors this development.**

Professional UNcertainty Competence is conceptualised in the project as the ability to acknowledge, to explore and to handle uncertainty in a productive way. The PUNC framework is a method to support the development of one's PUNC by:

- Understanding one's uncertainty experience in terms of acknowledging, exploring, and handling uncertainty.

- Deciding which elements of knowledge, skills, and attitude one want to develop regarding this experience.
- Formulating one or more learning outcomes in which these knowledge, skills and attitude are incorporated.

The PUNC framework was developed to help students and professionals to define their PUNC. The need for managing uncertainty can focus on different stages in a professional process. The PUNC consortium developed a three-stage strategy to discover where the main need is: Is it about acknowledging, exploring, or handling uncertainty? A competence in general contains elements of knowledge, skills, and attitude. Therefore, students can define which specific knowledge, skills, and attitude related to sustainable way of dealing with uncertainty they choose to develop. It can be done with the three above stages in mind/ In the PUNC Menu several possible elements of knowledge, skills and attitude were offered, from which the student can choose. When the student has decided on which part he or she wants to focus on, and what knowledge, skills and attitude is needed, they can construct specific learning outcomes which define their personal PUNC within that specific situation. The focus on concrete knowledge, skills and attitudes helps the student to engage in learning situations, using tested tools

To strengthen the students' productivity, working with the three stages and their outcome in terms of learning outcomes is supported by the meta-competence 'reflection'. This involves a record of emotional, cognitive and social experiences, cause and effect analyses of decisions, actions or neglects. The PUNC framework offers support for the formulation of specific, contextually relevant, and highly individual learning outcomes. The need for such a learning outcome emerges from the students' reflection on an experience of uncertainty. Based on this reflection she or he decides which of the PUNC elements of the menu (knowledge, skills, attitude) are relevant for them to contribute to sustainability in a professional sphere. PUNCbox tools help the students develop the competency to handle uncertainty more productively and become more critical of power structures, turn their fears or biases into collaborative intent and increase the repertoire of responses to uncertainty using creativity, mutual support networks and compassion.

Uncertainty avoidance (Hofstede, 2001) is the degree to which a culture or society will accept someone being anxious or uncertain about the unknown. It can be thought of as how well an individual can deal with anxiety. In some cultures, individuals will make the safest decisions possible because they have a high uncertainty avoidance. They want to control the outcome of the situation, so they make sure to consider every outcome and make a calculated decision that gives them the best chance of getting what they desire. In other societies with low uncertainty avoidance, individuals are more comfortable with taking risks and making decisions that could result in unknown consequences. This measure of uncertainty avoidance is known as the **Uncertainty Avoidance Index**.

Uncertainty Avoidance Index

The **Uncertainty Avoidance Index (UAI)** measures how a culture deals with its members being anxious or uncertain. In a culture with **low uncertainty avoidance**, the people tend to be more open to the unknown. They take more risks, make decisions even when they don't know the potential outcome, and are more inclusive of others. These cultures focus less on rules and principles and more on ideas and personal feelings. In cultures with a **high uncertainty avoidance**, individuals are typically surrounded by strict rules and social obligations. They are less tolerant of uncertainty and they expect others to follow the rules and make socially acceptable decisions. Although the UAI score tends to reflect the general

disposition of a particular culture, there are times when it can be problematic and inaccurate. For example, in high UAI cultures, it is believed that individuals will almost always make careful, well-thought-out decisions because they feel more in control. However, there are instances where they take large risks that are uncharacteristic of them because of their fear of failure.

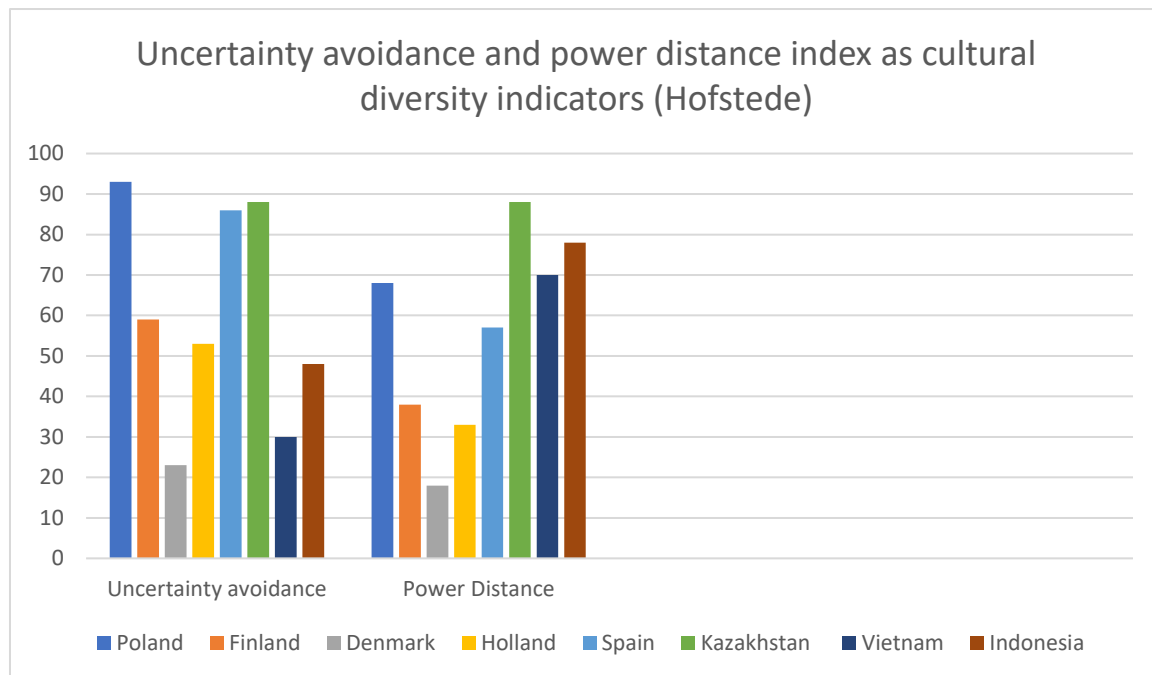


Fig. 2 Uncertainty avoidance index, source: <https://www.hofstede-insights.com/fi/product/compare-countries>

When doubt replaces basic trust in the way of life of one's social group or in one's place in it, one's sense of identity can be undermined (Lynd, 1958). Therefore, one's social group and its corresponding communication rituals take on a great importance to culture members with strong UA. This is because the violation of social communication rules could possibly lead to a loss of face. During an interaction to establish control, members of strong-UA cultures aim to impart their communication rules or rituals explicitly in order to prevent the actor from engaging in unpredictable communication that might be face-threatening. Culture members with strong-UA have a strong need for clarity (Hofstede, 2001). Clear low-context messages are characterized by spelling things out (Hall, 1976). "There is a natural tendency to feel a kind of security by a language of signs whose meaning does not alter" (Lynd, 1958, p. 118). Communication that includes free verbal play with its inevitable risks of misunderstanding is for such strong UA persons something to be feared. Without the armor of verbal specificity, individuals with strong UA cannot feel secure in their beliefs (Joost, 1952). Because strong-UA cultures have formal rules for interaction (Gudykunst & TingToomey, 1988), their motivation to control communication to avoid face threatening uncertainty is often translated into behavior attempting to endorse explicit predictable ritualistic practices.

Developing the ability to deal with uncertainty productively may be viewed as a continuous, creative, sensitive, and reflective process in which a person 'makes sense' of his or her experiences in a given scenario (Weick, 1995). Individuals generate meaning from their own viewpoint, history, culture, and context while making sense of an event. Instead of dismissing or avoiding uncertainty, it must be embraced, investigated, and potentially re-framed into a new narrative that is appropriate for, and possibly even essential for, that particular scenario

or learning experience. It must be made sense of before it can be productive. E-portfolio has been tested in the context of cultural compass, including its capacity to embrace uncertainty avoidance index which proved a useful reflective tool in the PUNC project context as well.



What is an electronic portfolio and what is its structure

An electronic portfolio (e-portfolio) in the context of higher education is a digital collection of artifacts that showcase a student's learning and growth in competences required by the specific program. It can include a variety of evidence for achieving learning outcomes: materials, such as project descriptions, presentations, essays, blog posts, code samples, and creative works. It can also contain the record of the process behind those achievements such as diagnosis of educational needs, the choices for specific goals and methods to meet them, benchmarks for individual or collective progress, instructors' and peer feedback, formal and informal assessments, reflection and a collection of credentials that may contribute to formal "Microcredentials" or be the base for supplement to the diploma. The evidence has both the narrative, verbal form as well as the more dynamic capture of experiences, performances or even failures in multimedia format (videos, pictures, drawings, mind maps, posters etc).

The structure of an electronic portfolio for higher education students has some key elements:

1. **Introduction:** This section should provide an overview of the e-portfolio, including the student's preferred identities, strengths, goals and objectives. provide some background information about the student, such as their interests, experiences, identified purpose (if any) and values.
2. **Educational map or paths:** This section should list the student's educational background, including courses taken, projects completed, and awards or credentials received.
3. **Working life experience:** This section should list the student's practical experience, including volunteer work, internships, service learning projects and jobs related/in line with the described learning/developmental paths.
4. **Competences:** This section should list the student's unique combination of knowledge skills attitudes and abilities, including both hard skills (e.g., proficiency in software programs) and soft skills (e.g., communication and teamwork skills).
5. **Reflective record:** This section should include reflective writing, graphic, sound (podcasts) or video from the student, such as reflections on their learning, their experiences, responses to feedback and their goals for the future. This element should be made credible by referring to widely used taxonomies, narrative structures without compromising the content originality.

In addition to these core elements, e-portfolios for more specific purposes like changemakers' education may also include the following:

Projects: This section could include descriptions of projects that the student has worked on, such as social justice campaigns, environmental initiatives, or entrepreneurial ventures.

Publications: This section could include links to any publications that the student has authored or co-authored, such as blog posts, articles, or research papers.

Awards and Recognition: This section could list any awards or recognition that the student has received for their work.

References: This section could include contact information for people who can provide references for the student, such as former employers, professors, or mentors.

It is important to note that the structure of an e-portfolio is not fixed. Students should feel free to customize their e-portfolios to reflect their unique experiences and goals.

Here are some tips for creating an effective e-portfolio for showcasing unique competences like uncertainty management or changemaking/innovating:

1. Choose the platform that promotes showcasing the competences not just lists achievements and facts in linear way. There are a number of different platforms that can be used to create e-portfolios. Some popular options include Google Sites, WordPress, and Weebly. Choose a platform that is easy to use, can be easily accessed by peers, tutors and future employers, project partners, stakeholders of your ventures and that meets your specific needs.
2. Design the structure or follow good practices for specific purposes of showcasing your competences. Be selective. Don't include everything in your e-portfolio. Focus on including the most relevant and impressive evidence for your qualifications and future collaborations.
3. Tell your story. Your e-portfolio should have a form of a narrative in which your journey is seen as something unique and you come out as an empowered changemaker. Be sure to include your personal reflections and insights.
4. Request and offer feedback. Engage and ask others to review your e-portfolio and give you feedback. This will help you to identify any areas that need improvement. Invite as diverse stakeholders as possible.
5. Treat failure as data that will help you develop further and others see you as a credible collaborator. Make others aware of the difficulty level of challenges you dealt with and problems you managed to solve. Stress the importance of collaboration, giving credit to your mentors, partners, competitors etc.

Overall, an e-portfolio is a powerful tool that can help changemakers to showcase their skills and experiences, document their learning, and reflect on their growth. By following the tips above, students can create e-portfolios that are both informative and engaging

Why use e-portfolio for uncertainty management learning

E-portfolios have proved to be effective as a tool:

- to reflect on and showcase learning. E-portfolios provide students with a space to reflect on their learning over time, identify their strengths and weaknesses, and set goals for future growth. This can be especially important for changemakers, who need to be able to critically reflect on their work in order to be effective.
- to develop digital literacy skills. Creating and maintaining an e-portfolio requires students to learn how to use a variety of digital tools and technologies. This can help them to develop the skills they need to be successful in the 21st century workplace.

- to connect with others and build community of practice. E-portfolios can be used to share work with others, get feedback, and collaborate on projects. This can help students to connect with other changemakers and build a community of support.
- to demonstrate readiness for studying, working and living in the VUCA world. E-portfolios can be used to showcase students' skills and experiences to potential employers and training institutions. They can also be used to document students' learning and development over time, growing agency and ability to engage diversity to solve divergent problems.
- brainstorm and generate ideas. E-portfolios can be used to collect and organize ideas from a variety of sources, such as articles, books, websites, and videos. This can help students to come up with new and innovative solutions to problems for specific collaborative projects or .
- evaluate and refine ideas. E-portfolios can be used to document the process of evaluating and refining ideas or prototypes. This can help students to identify the strengths and weaknesses of their ideas and make necessary adjustments.
- share ideas, approaches, networks of expertise and get feedback. This can help students to refine their ideas and reframe problems they are working on.
- document the process of solving divergent (VUCA) challenges. E-portfolios can be used to document the entire process of tackling a problem, from brainstorming and generating ideas to evaluating and refining ideas to sharing ideas and getting feedback. This can help students to learn from their mistakes and improve their problem-solving skills over time.

Overall, e-portfolios are a valuable tool for changemakers education because they can help students to reflect on and showcase their learning, develop digital literacy skills, connect with others, and build community. They can also be used to demonstrate readiness for college, careers, and life.

What is unique about PUNC e-portfolio

PUNC e-portfolio is both a method and a tool for acknowledging, exploring and making uncertainty safe and productive. It is a collection of digital artefacts, identities, learning outcomes evidence and a record of diverse human response, including feedback/forward loops, structured reflection and assessment of PUNC personal/collective achievements. It is a form of organizing the PUNC journey into an on-line interactive display marking its in-put and output stages, allowing the students to share the content of their choice to specific stakeholders of their professional development. The artifacts, narratives, opinions, self/peer assessments and recommendations are uploaded or linked to student created and dynamically updated free websites e.g. sitesgoogle.com and managed by mobile applications (these are still under construction and testing)

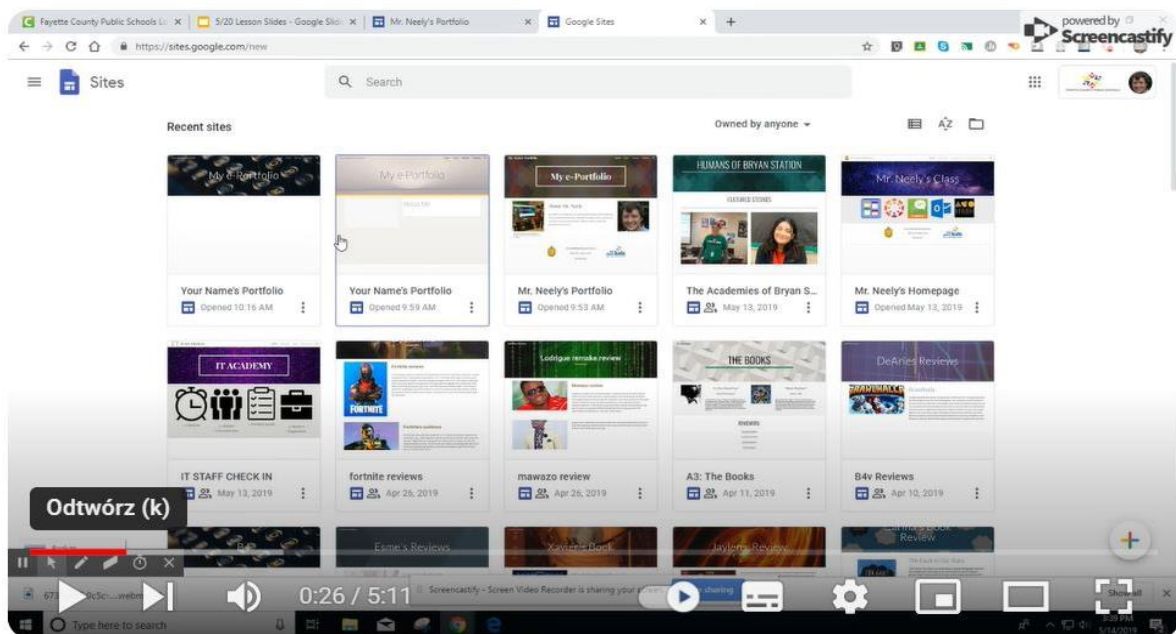
The added value of PUNC framework is the tested practice of engaging students' strengths and diversity with collaborative intent. No matter what the students' level of uncertainty avoidance is PUNC is helping them to find a role to contribute to change-making and collective sustainability attitudes. E-portfolio is an important stage and space in their journey to the enhanced competence as it provides an effective scaffolding for reflection and sense-making. There is no competence building without the proper focus on meaning of the experience related to uncertainty. Students need the support in structuring their paths towards PUNC from selection of their learning goals, through the use of PUNCbox tools, giving and receiving constructing feedback on their roles and contributions to peer/self-validation of their PUNC outcomes. Once they learn how to build and use e-portfolio the students gain a powerful tool,

alternative to their CV to be used for recruitment, presentations, interviews for scholarships, project pitching etc.

STEP BY STEP

How to set up and use PUNC portfolio

1. Students watch the simple instructional YouTube video on making e-portfolio <https://www.youtube.com/watch?v=9Aq4roixJ6A> . They follow the steps and create the basic structure for their personalized web-sites



Create an e-Portfolio on Google Sites

2. Students browse through the PUNC model structure: https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1inG6IN3-0Zr9K6np3LmyMUqhAJxQi4Xi/edit and decide on the overall design of their e-portfolio website

3. Students start with creating content on their PUNC self-diagnosis, describing their PUNC related:

Strengths

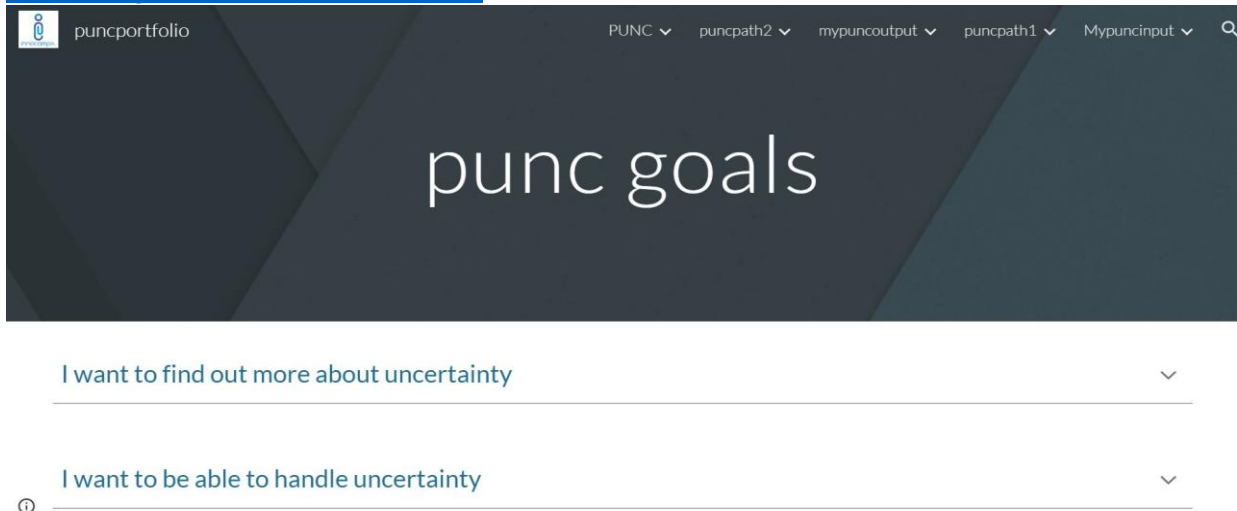
e.g. https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1mxQMDRurc6-iFK



The screenshot shows a website header with the title 'punc strengths' in white text on a dark blue background. The navigation bar includes 'puncportfolio' and several dropdown menus: 'PUNC', 'puncpath2', 'mypuncoutput', 'puncpath1', and 'Mypuncinput'. Below the header, there are two dropdown menu items: 'What I know about my uncertainty' and 'What I can do with my uncertainty', each with a downward arrow and a small information icon to its left.

General learning/developmental self-identified needs e.g.

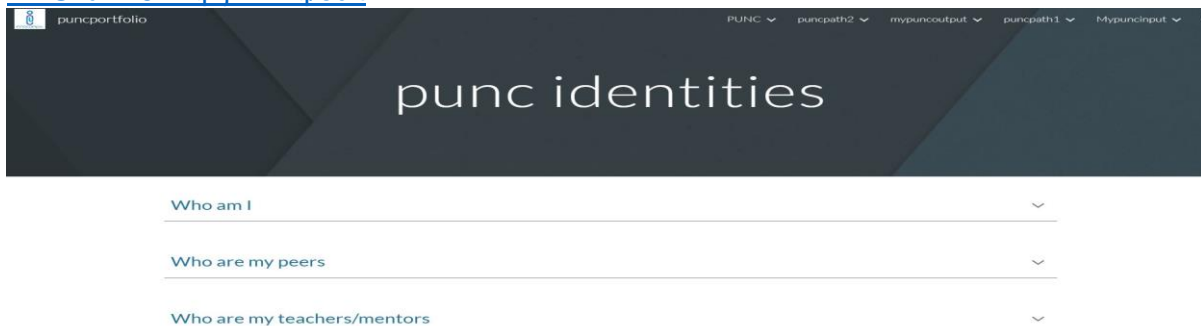
https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/138_7Qf-6C4VsSdgwSrTi6lNYqSOvnx7P/edit



The screenshot shows a website header with the title 'punc goals' in white text on a dark blue background. The navigation bar includes 'puncportfolio' and several dropdown menus: 'PUNC', 'puncpath2', 'mypuncoutput', 'puncpath1', and 'Mypuncinput'. Below the header, there are two dropdown menu items: 'I want to find out more about uncertainty' and 'I want to be able to handle uncertainty', each with a downward arrow and a small information icon to its left.

Any PUNC relevant background information on their cultural/personal identities e.g.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/14LleDpZ43-wlifSvuH78Vflq1jnlkAlq/edit



The screenshot shows a website header with the title 'punc identities' in white text on a dark blue background. The navigation bar includes 'puncportfolio' and several dropdown menus: 'PUNC', 'puncpath2', 'mypuncoutput', 'puncpath1', and 'Mypuncinput'. Below the header, there are three dropdown menu items: 'Who am I', 'Who are my peers', and 'Who are my teachers/mentors', each with a downward arrow.

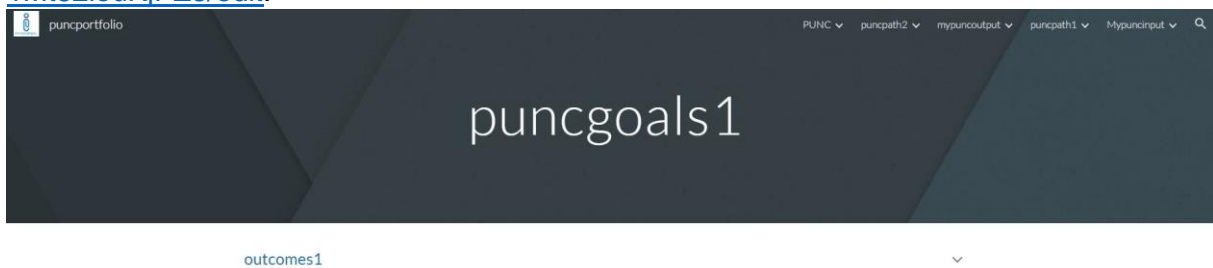
4. In the next step students design a bigger picture of their PUNC journey – they may draw a map of different paths they plan to take or have already taken relating generally to their experiences with their VUCA world. Alternatively – they can delay the design till they have tried 1-2 PUNC tollbox-based paths. E.g.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1TX7gnWFLnHuynBnmS3QJ5w51_fcCtfHs/edit



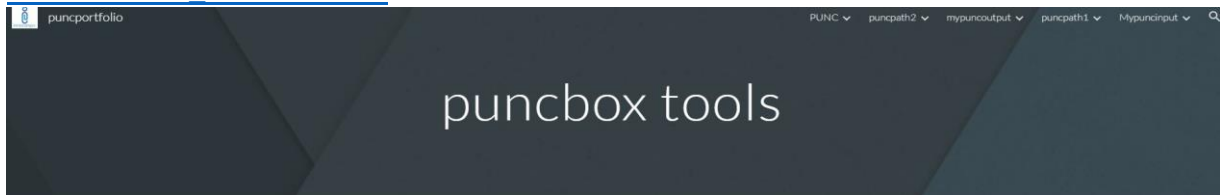
5. Students either choose or they are offered specific tools or methods by the PUNC instructor. Once they are familiar with the path they select the learning outcomes from the PUNCbox list (mobile application will offer it in the unfolding menu) e.g.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1clpkSUZeVITpNG7x6tV1Mt82louKjPZ5/edit



6. Students either describe the tool themselves or use PUNCbox link (available in the mobile application). They should also add some digital artefacts like photos or short videos of being engaged in the activity e.g.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1uefxsMk2-H8cennVXltiiJ_xzV0i6tJv/edit



Roll your plague

Description:

Total time about 30'

Agenda:

- 1) 5' intro
- 2) 15' construction and testing time,
- 3) 10' reflection

Instructions:

Organize the whole group in teams of 3 to 5 people. You need at least 2 teams.

There are 3 variants of this exercise: 1) Pasta Tower 2) Paper bridge

The whole idea is to divide the time of the exercise and add there 2 unpredictable events that occur during the exercise. The teams are supposed to use a 10 min timeslot to build the construction in 1 out of 3 variants. After 3 min and after 6 min the facilitator stops the time, roll dice (k6) and inform the teams about the plague that is happening. Examples of the plagues:

It is important that they are given the time and space to fill in the reflection part for the specific experience and ask for peer/expert feedback directly after the activity or as soon as possible using the Neck's taxonomy scaffolding (again available as guiding questions in the mobile application) e.g,

7. Students list their PUNC learning outcomes as skills and attitudes they self-identified or got feedback/assessment from peers, instructors, experts or other stakeholders e.g.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1TNUTFZ97YpiBq4QpdH5TPIHD62WEYBv7/edit

Here, under PUNCOutput section they also should consolidate all the feedback they have requested either by sending invites to edit this section by peers/instructors/stakeholders or using the mobile app (under construction) eg.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1MIFPsPb0BHJ3Jip3nJslar1Y0bUnoWco/edit

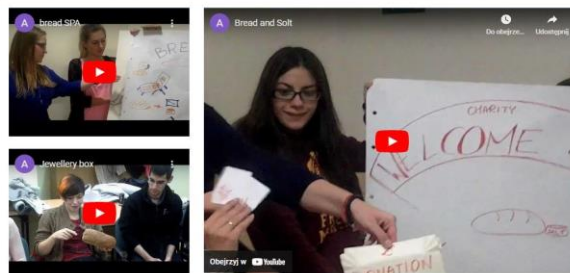
8. Students dynamically update their self-reflection, ask for the feedback/forward sharing links to specific subsites of their e-portfolio , any social media platforms or depending on how intimate they want to be, sharing the content on password protected cloud drives e.g. https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1ufacQ3TIlmHaLjNUOXbLiMuU-tv13py7/edit If the specific University requires more formal validation of PUNC e.g. when students are involved in a longer path e.g. service learning, project hatchery, innovation camp etc. e-portfolio has a section for uploading a certificate or any formal validation e.g

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1ufacQ3TllmHaLjNUObi



Under this sector students are also welcome to upload any material related to PUNC or more generally VUCA learning environments.

https://sites.google.com/d/1xJrFMCCjyps1JksGlaBpxprE_05_f2vt/p/1RrxkchB7rFUzwn6k8gj0uy8j5ct1d_nr/edit



9. Students should be encourage to add as many paths as they wish, modify their website structure, share or remove the content. (the mobile application will offer some options for navigation)

10. Mobile application to accompany the use of e-portfolio is available for students for free from PUNC project associated partner MARKED from Finland: You can download the app from the following links and find the PUNC Tool from the courses site.

Android: <https://play.google.com/store/apps/details?id=com.ag.marked>

Apple: <https://apps.apple.com/us/app/arked/id1658302496>

User name: punc Password: punc23 . The instructions on the functionalities of the app are described in the other IO4 results **E-portfolio platform** manual on the project webpage.



The insights from testing of the e-portfolios

The site-google-based e-portfolio platform was tested in line with the above instructions by all the PUNC partners. The students from all the HE institution plus INNOCAMP PL partner universities from Poland, Indonesia, Vietnam and Kazakhstan used it in connection with other PUNC results, especially PUNCbox coordinated by Business Academy Aarhus from Denmark.

The feedback on the structure of e-portfolio was developed and offered by partners' experts. Ideas on how can other people give students feedback on their intrapersonal development and in what form were suggested: arranged individual video sessions or messaging system (with the use of mobile application) to avoid a behavioristic element sneaked into an otherwise social constructivist or phenomenology paradigm adapted by the e-portfolio concept. How can someone's subjective judgement on a students' personal traits fit into our academic traditions, where there is a methodological foundation for anything remains a challenge. So does the fact that educators as the feedback-givers may reveal traits are as much reflected in the feedback as the student's traits. As instructor/teachers some may feel uncomfortable with this and have a need for some further methodological clarification. At the least this element should come with some sort of disclaimer, also in formal diplomas. Some of the tasks according to experts originally seemed to be based on isolated keywords which may have lacked meaning, until they were presented in a context. Narratives with a persona or actual person's total PUNC-journey as part of an introduction were added to provide context. An introduction to the PUNC-language became also part of the general introduction to help students understand PUNC-goals versus PUNC-outcomes.

E-portfolio should be seen as a journey, but educators could help students to make much more of it. This could be done in a written dictionary format or in a video. Being asked to do so many desk tasks of filling in content may make students wonder what the intermediate actions are, is it just normal student life, or should students seek out specific challenges? What situations then provide the best training ground? Using the e-portfolio for external purposes may present challenge for future employers or internship hosts. The guide on how to transform insights from the PUNC-process into a good application should be another separate product as a follow up to the PUNC project deliverables. The portfolios seem to focus on an individualistic journey. But we often develop in the context of communities interacting with each other, its role for that should also be considered in the future. The process of tasks seemed very controlled for some partners (Dutch, Danish, Finish) but left to the students' own devices too much according to others (Polish and Spanish). PUNC project itself should stimulate positive experiences with handling uncertainty so the question remains how could the process become gradually more open-ended along the way, pointing out the learning potential in the process itself. The use of Neck's taxonomy was univocally considered as the most valuable part of e-portfolio connecting it to the PUNC tool box itself where it was described in detail with ample examples referring to uncertainty management.

Additionally to the testing and expert feedback on the e-portfolio structure, the prototype of the mobile application developed by Finish coders based on the MARKED structure for reflective learning was tested at Turku University of Applied Sciences. During the orientation week mixed groups of Finish, Erasmus and Non-EU students were approached by INNOCAMP PL team to download the application, do an exercise involving taking a slide or a staircase and use the phone to apply PUNC methodology on managing uncertainty. The students recorded both the experience of taking the slide, explained why they chose not to do that and offered some of their responses to the created challenge: "if you are fun take the slide if you prefer not to -just take the stairs". Those who downloaded the app and logged in were contacted within 3 days and asked to fill in the questionnaire which asked them about the experience and the potential of the e-portfolio in uncertainty management education.

The evaluation based on 98 responses (Likert scale) is as follows:

1. 79% agreed totally that e-portfolio gave them space to record and reflect on experiences leading to uncertainty management
2. 77% agreed totally that e-portfolio should become the main source of showcasing their uncertainty competence
3. 74% agreed totally that mobile application made it possible to instantly acknowledge, explore and strategize on uncertainty
4. 72% agreed totally that mobile application is helpful in connecting and building the sense of belonging to a diverse group of peers
5. 69% agreed that mobile application is a form of gamifying a complex task of learning about uncertainty
6. 67% agreed totally that mobile application encouraged them to look at the PUNC menu and tool box for more experiences with uncertainty management
7. 64% agreed totally that site-google is the most accessible platform to create and sustain their e-portfolios
8. 63% disagreed with the statement that HE teachers are prepared to give feedback on the content of their e-portfolio
9. 53% disagreed that uploading content to e-portfolio would be used for developing and validating their new competences
10. 32% agreed strongly that employers will be interested in looking at their e-portfolios while 65% had no opinion about it.

The most important insights from that study are that students are able and willing to use e-portfolio in combination with the mobile application as developed for the PUNC project by INNOCAMP PL and MARKED. They appreciate the methodological solutions for recording and reflecting on their uncertainty management experiences, the gamifying elements and the sense of community generated by the mobile functionalities. They find it encouraging for further study of uncertainty and development of useful competences. However, they have a problem with strong motivation to dedicate so much time to filling in the e-portfolio with content if this does not become the part of the academic culture. In particular, they have doubts how their contribution may translate into the actual validation of their competences and how it will be valued by employers and academia itself.

The most important conclusions, based on the phenomenological analysis of the contents of the students' portfolios shared with INNOCAMP PL, are that

1. The choice of the learning outcomes and then the tools the students describe in their e-portfolios will depend on multiple human character traits and cultural variables in which the uncertainty avoidance and ritualized behavior play a major role. Low Uncertainty avoidance participants tend to choose more challenging tools and engage in long-term commitments like service learning or hatcheries therefore achieve higher order outcomes including designing and service leading skills and mindsets for engaging diversity to innovate and speculate empathetically . High Uncertainty Avoidance participants benefit from PUNC in terms of dropping the destructive behavior like panic or sabotage and trying to control the controllables, sharing knowledge or accepting roles based on human strengths.

2. In the context of education for sustainability PUNC training experiences reported and reflectively shared through e-portfolio reveal that difference in High and Low Uncertainty Avoidance is that the latter group chooses tools that are more helpful for regeneration and transformative innovation rather than just mitigation. Keeping all safe during the PUNC box activities, or more complex projects e.g. preserving the environment and mitigating damage are the drivers for Dutch and Finish students. Combined with their new PUNC skills for dialog, sharing gut feelings or even tacit knowledge their potential contribution to sustainability efforts seems appreciated by LUA peers. Regardless of cultural differences at the input level most of students report a significant increase of plausible choices and creative actions they can take in response to uncertainty helping them to request and accept the support from peers rather than feel alone and heroic victims. No matter how ritualized the original culture of the students is they benefit from PUNC in achieving appropriate level of collaborative skills and courage to work for sustainability and global peace.

3. For educators and students, presenting the PUNC Framework and including reflection tools will be important to get full benefit from the experience. This is to secure, that students are aware that the learning is specifically about uncertainty. Because from the results of the testing of tools it is clear, that students act without reflecting and do not explore what is at stake. Framing the uncertainty context is important in the use of the tools in the future. Also, it is important to frame for the students that they must train reflection skills and the ability to acknowledge the actual and concrete uncertainty context is necessary to be able to explore and handle.

4. The majority of educators found the tools useful, and 92 % were very likely or likely to recommend the tool to a colleague. The use of the tools is about training the students in handling uncertainty. Handling does not mean changing attitude or character traits. The responses of HUA students show that PUNC provides the safe environment to acknowledge, explore and deal with uncertainty or the VUCA environment in a broader sense. The PUNC framework is not directly transferable to knowledge, skills, attitude in the PUNC-menu. It is not always a linear process but it is important to go through it to reach the point of understanding what is needed for the student and for formulating individual learning objectives. For that purpose, the PUNC menu is a really valuable tool for dialogue between the educator and student and for the actual process of formulating learning objectives.

5.

The PUNC frame and toolbox provides opportunities for collaborative exploration of uncertainty and finding equity strategies for liberation from largely White/Western ways of knowing, being and working, which were often blamed by the students for contributing to their levels of uncertainty. PUNCers become more critical about dominance, seeing it often as the root cause

of systemic damage to ecosystems and global peace. They recorded their direct or vicarious/simulated/aesthetics experiences with alternative paths for win-win, green solutions acceptable to diverse communities and eco-systems. They perceive uncertainty as an opportunity to overcome the cultural differences through exercising creative problem solving, co-designing and leveraging polarities. Empathy and compassion-based acknowledgement of uncertainty appears as a common value. The students' narratives include diverse forms of personal and collective empowerment to face challenges with increased courage and grit. According to their reports the challenge-based PUNCbox experiential learning paths deliver the PUNC outcomes chosen by the students and in some cases, where intercultural collaboration is possible over extended period of time and space (e.g. service learning, innocamps, chagemakers' campus), they list collaborative leadership skills that go beyond their original ambitions in terms of inner-development and sustainability competence. These levels of achievement include foundations of collective resilience: solidarity, compassion, achieving meaning and depth, honesty, authenticity, ethical fiber.

5.

For educators and students, making sense of the PUNC Framework depends heavily on how successfully the reflection tools are matched with their learning styles to get full benefit from the experience. On one hand e-portfolio was considered as tedious, time demanding tool and raised a lot of resistance both from students and instructors, on the other hand, it secured, that the learning was specifically about professional uncertainty. From the results of the testing of tools it is clear, that students act without reflecting and do not explore what is at stake or how transformative leveraging of creative tensions may prove to be. Framing the uncertainty context is appreciated after some distancing, the use of reflective taxonomies, empathy-based mentoring sessions, analyses of on-line feedback, etc.. Most of them admit to the inner struggle with their motivation to actually acknowledge uncertainty both personally or even more collaboratively. They need mentoring support to discover that vulnerability at this stage is an act of professional courage and only then can they move on to explore and make uncertainty productive.

6.

The PUNC framework sought to address the self-diagnosed students' needs and desires about making their uncertainty professional by proposing and carrying out several activities in class, and by using the students' alternative paths. In the e-portfolios there are several reflective records that indicate how the students valued this strategy considering it at first as a challenge.

"I knew this course would represent a challenge, to the extent that the PUNC suggested much more than typical academic content, it appealed to emotions, something more creative. Several times I had to expose myself in activities and I had to learn how to express my feelings. This was one of my major difficulties and, simultaneously, one of the largest blessing. Nowadays, I know how to better identify physical and emotional reactions, and I try to get to the root of the problem, not to find an immediate solution, but to reflect upon what's happening and why." (exert from one of PUNCER's e-portfolio)

There seem to be points of confluence regarding competencies, social and emotional traits, especially, the development of: self-awareness; self-regulation of emotions such as anxiety; social consciousness by being attentive to others; and relationships management. Students alluded to the necessary interventions and presentations in class during the course, but also professional demands, where communication happens under constant uncertainty. It appeared that they considered the emotional regulation under uncertainty a threatening task, referring to instability and reactive feelings, namely impulsivity, nervousness, and anxiety. Empathy was

revealed as an ability that builds intercultural synergy, calling for appreciation/recognition and for tuning in with their emotions and feelings.

Cultures vary on the way their members behave under uncertainty and therefore how they understand their role in sustainability. Educational interventions, like case-studied PUNC framework and toolbox may help future leaders acknowledge, explore and find effective ways of handling uncertainty so their work contributes to sustainable development. Higher Education sector will benefit greatly from using the new competence framework but additional training and awareness building is necessary to help educators understand the role of engaging diversity and creativity into the curriculum as well as international and intersectoral expertise collaborations.

In the e-portfolios there are many reflective records that indicate how the students valued this strategy considering it at first as a challenge. Regardless of students' self-diagnosis, the training process not only focused on providing conditions for the development of self-awareness and personal learning outcomes, but mainly opened a space where students had to engage with unpredictable situations. Surprisingly, their proposals and engagement kept emerging. All PUNC toolbox learning practices were important, but students needed training, persistence, extension to other contexts to integrate relevant competencies. Hence, students would benefit from extending these practices into their community-based projects, given its importance in the development of a perception and regulation of uncertainty. During the class, those practices were usually articulated with broader themes and reflections. The facilitators did not impose any particular sequence of predetermined practices, which presented a bigger challenge, since they tried to link class contents and students' evolutive learning process, experiencing PUNC tools, balancing with cultural contexts.

The cultural dimension of dealing with uncertainty was considered especially important and the approach to educational and cultural practices in the contexts of PUNC tool box mocking of human attachment to certainty, were some of the activities carried out to open students' minds to other values and philosophies of life. The diversity is also a search to avoid being captured by a closed vision. What gives us the right to claim cultural superiority and how mainstream rituals may force the minorities into submission? Overall, many activities led students to look differently at each other, to seek what they had in common through sharing and to develop ethical relationships.

PUNC tool box reflected in the e-portfolios shared with INNOCAMP PL provided an opportunity for reflection and ethical practice about handling uncertainty in a productive way. Despite the apparent motivation to develop this collective project, many questions were still open, because as facilitators we feared that for some students the motivation was more extrinsic than intrinsic. This collective project led students to consciously reflect on the messages raised by narratives and digital content selected by peers in the portfolios that often was transferred to or at least related somehow to their experiences in daily life. Using aesthetic learning perspective, enabled a critical reflection on society and culture. Groups succeed by articulating the individual, collective and institutional levels altogether at once, since they were given the chance to work on their interests in collaboration with their colleagues and being actively involved in some cases with specific communities. However, we are always in doubt about the level of critical consciousness favored by these practices and if they are not mere epiphenomena in an institutional academia where students are more concerned with declarative knowledge. Despite that, we remained committed to rise more discussion into the learning space, around hard themes such as racism, oppression and social injustice and to develop the so-called pedagogy of discomfort, to "make it possible for teachers and students to use their discomfort to conduct new emotional (co-)understandings" (Goralska 2020, 117).

The study emphasizes the importance of student motivation and active participation in the educational process, with emancipatory and empowerment intentions, guided by principles of freedom, care and responsibility. The valorization of individual and collective interests that are identified, discovered and incited, stimulates the construction of both their individual and collective experiences and projects, going beyond a person-centered perspective: without losing each individual contribution, but integrating them in a more holistic and critical approach. Likewise, the solidarity develops with the practice of facing uncertainty through taking care of each other, building greater social cohesion among small groups, within the entire class and wider, especially underprivileged communities.

In this e-portfolio insights report, we highlight the emotional experiences and the range of different ways of integrating them into academic and professional life, some inscribed in ancestral traditions of cultures to deal with “not knowing”, others involving students in contemporary events that go beyond the academia to think about the community where they live, placing them in relation to manifestations of different order, namely of applied creativity and changemaking. In this way, they become involved in the discovery and experience of values, visions and cultural practices, unfamiliar to them. We were committed to engaging in gamified uncertainty enjoyment and contemplative experience, in the critical reflection on our societies and in the speculative design. As facilitators, however, we were aware of how much of a challenge it was for the students and realized that it was more a concern for us and other colleagues. The pilot of e-portfolio and accompanying mobile application developed between Poland and Finland was a challenge to our collective creativity, unrepeatable in its particularities, but at the same time an opportunity to test our principles and find ways to deal with the problems and dilemmas we face under uncertainty. We are also aware that some of the wicked problems are probably unsolvable and that our concerns and dissatisfactions constitute reason to continue the search, to improve and perhaps reach deeper and more lasting changes in individuals and institutions.

The e-portfolio contents show that educational interventions, like case-studied PUNC framework and toolbox may help them as future leaders acknowledge, explore and find effective ways of handling uncertainty. The results emphasize the importance of student co-designing of learning outcomes and paths to achieve them, guided by principles of freedom, care and responsibility. The valorization of individual and collective interests that are identified, discovered and incited, stimulates the construction of both their individual growth and collaborative capacities, without losing each individual contribution, but integrating them in a holistic and critical approach. Likewise, the solidarity develops with the practice of facing uncertainty through taking care of each other, by building greater social cohesion among small groups, within the entire class and wider, especially underprivileged communities. The e-portfolios highlight the cultural dimension of emotional experiences and the range of different ways of integrating them into daily life allowing the discovery and experience of values, visions and cultural practices, unfamiliar to the students before or with which they begin a new relationship.

Finally, we stress the collaborative process in which both of us as educators were building this course. It was collaborative both by the very nature of it being a joint self-study and our engagement with a team of researchers involved in a broader PUNC project. This collaboration enabled us to experience and reflect together some of the activities we proposed to students, also giving us the confidence to take risks. We reinforced our conviction that in higher education, as well as in other levels of education, it is necessary to develop joint working dynamics, networks and communities of practice (Wenger 2001), progressing and strengthening a collaborative culture that may be contagious to facilitators and students. Our wish is that this work will be an inspiration to introduce in a more structured way this

professional uncertainty for sustainability dimension in the training of professionals of education, to create the curricula in a way that is open to the participation of students and to integrate this aesthetics learning perspective, where personal, cultural and societal dimensions are integrated and deepened.

References and literature:

- Attard K. (2008) Uncertainty for the reflective practitioner: a blessing in disguise. *Reflective Practice*, 9:3, 307-317, <https://doi.org/10.1080/14623940802207188>
- Bahl, M., Cook, M. & Nerurkar, K. (2020). *Relearning How We Learn, From the Campus to the Workplace*. Center for the Future of work.
- Bai X. Vol. 39. Elsevier Ltd; 2016. 'Plausible and desirable futures in the Anthropocene: a new research agenda; pp. 351–362. (*Global Environmental Change*).
- Bar-Anan, Y., Wilson, T. D., & Gilbert, D. T. (2009). The feeling of uncertainty intensifies affective reactions. *Emotion*, 9(1), 123–127.
- Bigdeli, S. (2010). *Affective learning: the anxiety construct in adult learners*. Elsevier Ltd., open acces.
- Bennett, Nathan og Lemoine, James, 2014. What VUCA Really Means for You. [SSRN Scholarly Paper] Tilgængelig hos: <<https://papers.ssrn.com/abstract=2389563>> [accessed 21 dec. 2022].
- Bollinger, S., & Rooijen, R., van (2018). *Tools for Safe Uncertainty: design principles for tools to handle uncertainty productively during practice-based research*. [Unpublished article].
- Bollinger, S., & Rooijen, R., van (2022). (PDF) *Develop your PUNC with the Professional UNcertainty Competence Framework* (researchgate.net)
- Boyatzis, R.E., Smith, M.L. and Blaize, N. (2006) 'Developing sustainable leaders through coaching and compassion', *Academy of Management Learning & Education*, Vol. 14, No. 2, pp.8–24, doi: 10.5465/AMLE.2006.20388381.
- Carabine, J. (2013) *Creativity Art and Learning exploration of uncertainty*. iJADE 32.1. NSEAD/Blackwell Publishing Ltd.
- Codreanu, A. (2016). A VUCA action framework for VUCA environment. Leadership challenges and solutions. *Journal for Defence Resources Management*, 7(2:13), 31-38.
- Diwekar U, Amekudzi-Kennedy A, Bakshi B, Baumgartner R, Boumans R, Burger P, Cabezas H, Egler M, Farley J, Fath B, Gleason T, Huang Y, Karunanithi A, Khanna V, Mangan A, Mayer AL, Mukherjee R, Mullally G, Rico-Ramirez V, Shonnard D, Svanström M, Theis T. A perspective on the role of uncertainty in sustainability science and engineering. *Resour Conserv Recycl*. 2021 Jan;164:105140. doi: 10.1016/j.resconrec.2020.105140. Epub 2020 Sep 9. PMID: 32921915; PMCID: PMC7480224.
- Ellyard P. *Global Sustainable Society*. *Journal Of Futures Studies*. 2011;15(March):175–190.
- Fadel, C., Bialik, M., & Trilling, B. (2015). *Four-Dimensional Education. The competencies learners need to succeed*. The Centre for Curriculum Redesign.

Fadel, C. & Groff, J.S. (2019). Four-Dimensional Education for Sustainable Societies. Chapter 8 in J.W. Cook (ed). Sustainability, Human Well-Being, and the Future of Education. Open Access. https://doi.org/10.1007/978-3-319-78580-6_8

Fields, J. (2011). Uncertainty. Turning fear and doubt into fuel for brilliance. Portfolio / Penguin

FDI, 2018. Byggeriet 2035 - en foresight analyse. Available at: https://www.frinet.dk/media/1296/fri_resume_byggeriet_2035_web.pdf

Geenen, M-J., Kolthoff, E., Van Halderen, R.C., & De Jong, J. (2016). Street-level bureaucrats in de justitiële jeugdinstelling? Hoe groepsleiders hun discretionaire ruimte benutten. Tijdschrift voor Criminologie 2016 (58) 4, p. 7-086. https://doi.org/10.1007/978-3-319-78580-6_8

Gelatt, H. B., & Gelatt, C. (2003) The Power of Positive Uncertainty: Making Creative Career Decisions. Global Realities: Celebrating Our Differences, Honoring Our Connections; see CG 032 572.

Ginwright, S. and James, T. (2002) 'From assets to agents of change: social justice, organizing, and youth development', New Directions for Youth Development, No. 96, pp.27–46.

Hänti, S., Keinänen, M., Välivirta Havia, M., Al-Bermanei, H., Ketola, M. & Heikkilä, J. (2021) Facilitate for the future. Educators guide for designing hybrid learning environments for the VUCA world. Turku University of applied sciences, Turku, <https://julkaisut.turkuamk.fi/isbn9789522167880.pdf>

Harvey, M. & Baumann, C. & Fredericks, V. (2019). A taxonomy of emotion and cognition for student reflection: introducing emo-cog. Higher Education Research & Development. 38. 1-16. [10.1080/07294360.2019.1629879](https://doi.org/10.1080/07294360.2019.1629879).

Havik, K., Patteeuw, V., & Teerts, H., (z.d.). Editorial Productive Uncertainty / Indeterminacy in Spatial Design, Planning and Management. [publisher unknown]

Hillen, M. A., Gutheil, C. M., Strout, T. D., Smets, E. M. A., & Han, P. K. J. (2017). Tolerance of uncertainty: Conceptual analysis, integrative model, and implications for healthcare. Social Science and Medicine, 180, 62–75. <https://doi.org/10.1016/j.socscimed.2017.03.024>

Hofstede, G., (2001) (2nd Edition). Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations. Thousand Oaks, CA: Sage.

Jonassen D.H. Toward a design theory of problem solving. Educational technology research and development. 2000;48(4):63–85.

Jordan, M. E. (2015). Variation in students' propensities for managing uncertainty. Learning and Individual Differences, 38, p. 99- 106.

Kolb, D. A. (1984). Experiential Learning: Experience as the Source of Learning and Development. Englewood Cliffs, NJ: Prentice Hall

Lane, D. A., & Maxfield, R. R. (2005). Ontological uncertainty and innovation. Journal of Evolutionary Economics, 15(1), 3–50. <https://doi.org/10.1007/s00191-004-0227-7>

Lawrence J., Haasnoot Marjolijn, McKim Laura, Atapattu Dayasiri, Campbell Graeme, Stroombergen Adolf. Dynamic Adaptive Policy Pathways (DAPP): From Theory to Practice in Decision Making under Deep Uncertainties. Springer; 2019. p. 187. editors Marchau et al.

- Lingard, L., Garwood, K., Schryer, C. F., & Spafford, M. M. (2003). A certain art of uncertainty: Case presentation and the development of professional identity. *Social Science and Medicine*, 56(3), 603–616. [https://doi.org/10.1016/S0277-9536\(02\)00057-6](https://doi.org/10.1016/S0277-9536(02)00057-6)
- Locke, L., Golden-Biddle, K., & Feldman, M. (2008) Making doubt generative. *Rethinking the Role of Doubt in the Research Process*, *Perspective Organization Science* 19(6), pp. 907–918
- Lönngren J., Adawi T., Svanström M. Scaffolding strategies in a rubric-based intervention to promote engineering students' ability to address wicked problems. *European Journal of*
- Marchau Vincent A.W.J., Walker E.Warren, Bloemen Pieter J.T.M., Popper Steven W., editors. *Decision Making Under Deep uncertainty: From theory to Practice*. Springer; Cham: 2019. ISBN 978-3-030-05252-2. [CrossRef] [Google Scholar]
- Marshall A., Ojiako U., Wang V., Lin F., Chipulu M. Forecasting unknown-unknowns by boosting the risk radar within the risk intelligent organisation. *Int J Forecast.* 2019;35(2):644–658. [Google Scholar]
- Nevalainen, M. K., Mantyranta, T., & Pitkala, K. H. (2010). Facing uncertainty as a medical student-A qualitative study of their reflective learning diaries and writings on specific themes during the first clinical year. *Patient Education and Counseling*, 78(2), 218–223. <https://doi.org/10.1016/j.pec.2009.07.011>
- Soros G. Fallibility, reflexivity, and the human uncertainty principle. *Journal of Economic Methodology*. 2013;20:309–329. doi: 10.1080/1350178X.2013.859415.
- Tauritz, R. (2016). A pedagogy for Uncertain times. *Environment and School Initiatives*. Via Researchgate: https://www.researchgate.net/publication/291687541_A_pedagogy_for_Uncertain_Times
- Tauritz, R. (2012). How to handle knowledge uncertainty: learning and teaching in times of accelerating change. In *Learning for sustainability in times of accelerating change via Researchgate*; <https://doi.org/10.3920/978-90-8686-757-8> and <https://www.wageningenacademic.com/doi/epdf/10.3920/978-90-8686-757-8>
- Tracey, M. W., & Hutchinson, A. (2018). Uncertainty, agency and motivation in graduate design students. *Thinking Skills and Creativity*, 29(May), 196–202. <https://doi.org/10.1016/j.tsc.2018.07.004>
- Walker W.E., Harremoës P., Rotmans J., van der Sluijs J.P., van Asselt M.B.A., Janssen P. Defining uncertainty: a conceptual basis for uncertainty management in model based decision support. *Integrated Assessment*. 2003;4(1):5–17.
- Weick, K.E. (1995). *Sensemaking in Organizations*. SAGE Publications Inc.