

Supplementary Material

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Embracing Chaos in Health Education: Dark Pedagogy and Scenario-Based Learning in Entrepreneurship Education

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Teaching Guide for the Chaos Scenario

Preparing the Instructors

Carrying out the chaos scenario requires substantial preparation. A narrative needs to be created that not only guides students through the scenario but also includes sensory descriptions of the dystopian future. To enhance emotional engagement, which is highly emphasized in dark pedagogy, images, sound effects, and relevant videos must be incorporated. The narrator must thoroughly rehearse the script to fully immerse themselves in the scenario. In addition to the narrative, images must be created. For this chaos scenario, we used image-generating AIs to ensure we could generate the most fitting and accurate visuals (Figure 2a and 2b). These images were compiled into a PowerPoint presentation, accompanied by sound effects for each image. The sounds were either self-created or sourced from free platforms, such as Pixabay. Materials for the exercises have also been developed, including an overview map of the destroyed hospital, a summary of available resources in the scenario (Figure 3), and a list of 15 very different injured patients that the students

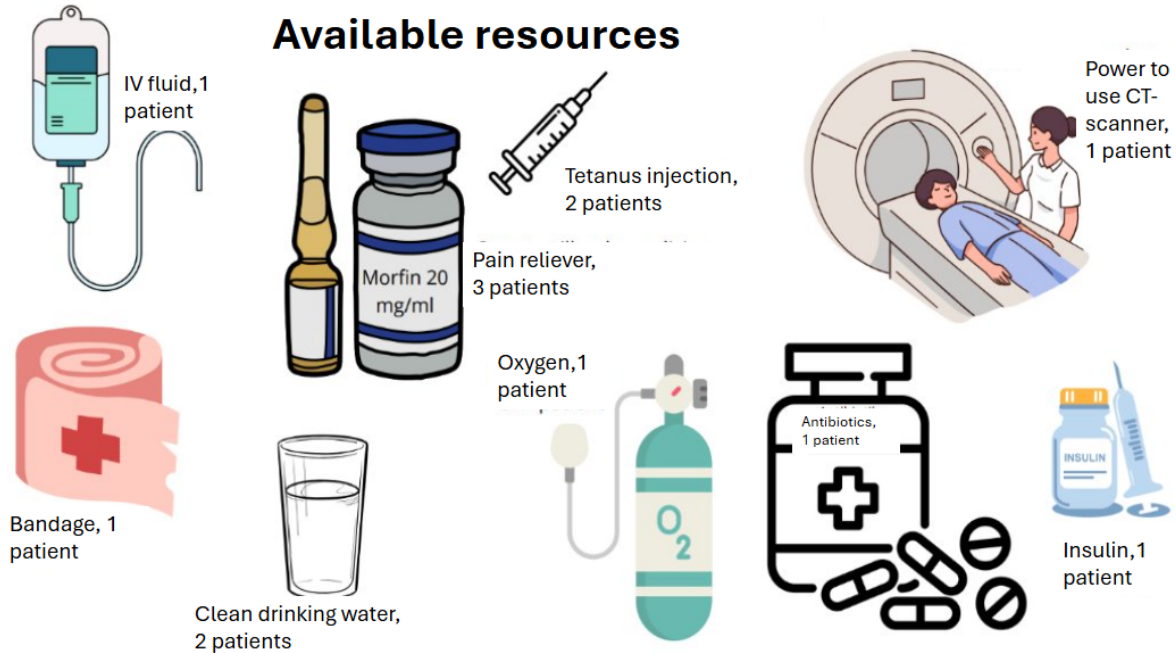


Figure 3: *Available Material Resources in the Scenario*

Preparing the Students

Before the chaos scenario, the students receive instruction in acute, critical, and complex nursing care, including simulation-based learning with various patients in emergencies and/or critical situations. They are also taught communication and teamwork skills in critical scenarios. In addition to the core nursing curriculum, students participate in lessons on psychological safety in teams. Furthermore, they participate in what we call the existential laboratory, where the focus is on exploring the students' inner selves. This includes discussions on personal and professional values, social inequality, moral distress, compassion, trust, risks, and other relevant sociological, psychological, and ethical aspects of nursing.

The students are given little information about the chaos scenario beforehand. They are told that they will participate in an acute, critical, and complex chaos scenario, but we make it clear that it is not role-play (to avoid deterring any students). They are informed that the session will be run as a reflective space where

they are expected to enter the scenario as themselves. Notably, we intentionally avoid discussing the connection to sustainability, as we have found that some students are less motivated by this focus. This approach is a deliberate choice.

Step 1: Entering the Chaos

The students enter the classroom and are seated at group tables, with 4–6 students assigned to each table. The room’s lighting is dimmed, and the curtains are drawn. A video is playing, showing images of natural disasters with no verbal narration. The video lasts for 5 minutes. Following this, the students are welcomed into the chaos scenario and briefly briefed on the structure of the four lessons. They are informed that they are not required to play roles but rather to act as themselves in a scenario that will be guided by the instructors/teachers. This approach is emphasized to alleviate concerns some students may have about role-playing.

Step 2: And so it Begins

The scenario begins with a grounding exercise in which students are instructed to feel the floor and focus on their breath. This exercise is intended to help them connect with the present moment and their current surroundings. We then enter the time machine—an image of a time machine appears on the screen, accompanied by mechanical and robotic beeping sounds. The narrator begins:

In front of you stands a gleaming time machine, its surface reflecting the light. As it activates, you feel a sudden weightlessness, and the room dissolves into flowing colors. When everything stops, you step into 2055—a polluted, chaotic world filled with the sounds of rushing water, distant screams, and sirens.

The students are welcomed to the year 2055 in Denmark. A picture of flooded streets, along with the sound of rushing water, fills the room. The story unfolds as follows:

Imagine your country transformed by unpredictable natural disasters. Floods have devastated cities; streets are flooded, and many areas are uninhabitable. Power outages and contaminated water supplies have led to the spread of disease, while hospitals are overcrowded, including with children exposed to mold. Mental health challenges like anxiety and PTSD are rampant, with climate refugees arriving in desperation. You are now part of this reality, tasked with making life-saving decisions in a chaotic, urgent environment.

The students now step into a hospital in this future—a photo of a crowded and chaotic hospital ward is displayed, while sounds of many people screaming and monitors fill the space. The narrator describes the setting, providing sensory details of smells and emotions:

Suddenly, you're in a hospital of the future. The sky is gray, rain pours heavily, and the building shakes with the sound of rushing water as chaos fills the overcrowded entrance. Inside, screams, frantic movement, and the stench of wet clothes mixed with disinfectants overwhelm the air. There is not enough space for everyone, and nurses and doctors are forced to decide who gets treated and who must wait.

The students are informed that they are taking over a shift and that their help is urgently needed. Materials are then distributed, including the overview map of the hospital and a list of available resources. A picture of a group of nurses standing in a mildly flooded room, discussing resources, appears on the screen. The sound of a ticking clock and a countdown begin. The students are tasked with their first collaborative exercise: create an overview of the department's available spaces, resources, and staff, all under time pressure. The narrator continues:

A rushed colleague approaches you. Her face is tired, eyes deep with worry. “We have almost nothing left,” she says, her voice both firm and resigned. “No power. Almost no water. We can't access the medicine room, and we have very little left here. Can you help us create an overview?” Now it's up to you. What do you do first? You take a deep breath and begin gathering the facts. What are resources like? How many people are left to help? With a scratching pen and a piece of paper, you make a list. You feel the weight of pressure on your shoulders. Time is short, and the patients are waiting.

The narrator emphasizes the urgency, which heightens the students' curiosity about whether the materials will be taken from them again, as they need to determine how to organize the overview.

Another image of an overcrowded hospital ward is shown, and the narrator explains the numerous patients who need to be prioritized. A short film clip from *Pearl Harbor* (Bay, 2001), depicting the difficulty of patient triage after the attack, is shown to set the tone and evoke emotional involvement. The narrator continues:

I hope you've managed to get a good overview of the resources, because now it's time to relieve the other nurses, and the department is busy. You are faced with 15 patients who need to be prioritized. You

must start by asking: Who will you help first? What resources do you have? How will you prioritize? Will you prioritize those with the best chance of survival or those most critically threatened?

The students are then given lists with details about 15 patients, including their gender, age, condition, and care requirements. Some patients also have background and social status information. The timer starts, and the ticking clock and countdown resume, accompanied by the image of the overcrowded hospital ward. The narrator reminds the students frequently that time is running out and that patients are depending on them. As they prioritize, students can access the medicine room and collect one type of medication. If they choose to do this, they lose a nurse who cannot return. This means they must select a nurse to leave the table if they choose this option (none of the groups chose it). After prioritization, the groups briefly share what factors they considered and why.

Once this round is completed, the students are presented with the next dilemma. A picture is displayed on the screen, showing a large crowd moving toward the hospital, accompanied by shouts and screams. The narrator tells them they must now make a difficult decision—should the doors be opened or locked?

You might think things can't get any worse, but now they are. One of the nurses runs in, her voice frantic: "There are hundreds of desperate people outside trying to get in. Should we lock the doors? We risk not being able to help those already here if we keep letting more in." This decision hits you like a wall. Outside, people are banging on the doors. Their voices cut through the sound of the rain. "Help us!" they shout. You can see a woman with her newborn baby, struggling to breathe. How do you handle this dilemma? Should the doors remain closed to protect those inside, or be opened to give hope to those outside?

As the students work through this dilemma, they continuously receive new information that may influence their decisions. This could include one of the people knocking on the door turning out to be someone close to them—perhaps their own mother or an important colleague who could bring critical skills to the situation. How will this new information affect the decisions? The new information could also include that new complexity arises when one of the people outside turns out to be a relative of one of the children already hospitalized. It is perhaps a father, desperately trying to get in to be with his child. He is heard shouting, "That's my child in there! You can't deny me access to my own child!" This dilemma challenges

the students not only to apply logic but also to reflect on their own values and principles. They must consider the consequences of their choices, both for those outside the hospital and those already inside.

Step 3: Debriefing Following the Chaos Scenario

Before the students are fully guided out of the scenario, we ensure a comprehensive debriefing, as some students may be emotionally affected by the chaotic scenario. The focus in the debriefing session is on the students' successes in taking action and collaborating despite difficult circumstances. The narrator says,

After several intense hours, you step back and hand over the chaos to the next team taking the shift. You are exhausted and possibly emotionally affected as you walk down the hospital corridors. You are now given the opportunity to rest and recuperate in a break room. Here, you will debrief together about the decisions you made.

Five reflection questions appear on the screen, and the students are given the opportunity to discuss them:

- What emotions did you experience during the exercise, and how did you manage both your own and others' emotions in the situation?
- What impact did your collaboration and communication have on your ability to make decisions under pressure?
- How did you experience taking on clinical leadership in a situation where resources were scarce and the number of patients was high?
- What have you learned about yourselves as future nurses during this exercise?
- How can this exercise help you handle future crisis situations?

After their discussions and reflections, the session concludes with a collective debriefing in class. The structured debriefing is not just a closure to the scenario; it is an essential part of the dark pedagogical approach. A key principle of dark pedagogy is that emotionally intense experiences must be processed to become meaningful (Lysgaard et al., 2019). The structured reflection session ensures that students are not left alone with the emotional residue of the scenario. Instead, they are given the opportunity to articulate their emotions, recognize their coping strategies, and reframe their experiences constructively. Despite its focus

on discomfort, dark pedagogy is not intended to leave students in despair. Instead, it is based on using moments of crisis to reaffirm their agency and capability. The emphasis in the debriefing on their successes, how they acted under pressure, how they collaborated, and how they managed emotions ensures that students emerge from the exercise not with a sense of helplessness but with a recognition of their growth and strength.

Step 4: Back to the Present

Part one of the scenario ends as it began. The narrator guides the students to enter the gleaming time machine as the image of it appears again, accompanied by robotic and beeping sounds: “It is time to return to the present...”

To illustrate and stimulate a sense of a secure base, a picture of a North Sea beach is displayed on the screen, followed by the calming sounds of waves rolling in, as it represents a relaxing atmosphere. As the scenery shifts, so does the narrator’s pitch, lowering the voice and speech rate to gently ground the students:

You are home now. Look at each other. You were in this together. Listen to the ocean. Maybe you feel the urge to take a deep breath. Maybe you can imagine how the wind plays with your hair, how the sand tickles your feet, and the smell of seaweed and the taste of salt on your lips. You are home. I hope you’re okay.

When the scenario reaches the present, the narrator pauses. Now, the instructor takes over, facilitating a process in which the students reflect on concepts of the future. First, the students find examples showing how forecasts impact everyday life. The purpose is to illustrate whether what one can imagine influences actions. For example, when one sees the weather forecast predicting rain, they take an umbrella when leaving the house.

Second, the students are introduced to the futures cone (Voros, 2017), a model that visualizes multiple possible futures and thereby illustrates that the future is not linear. The purpose is to establish a common starting point for the next exercise, which is embedded in understanding the taxonomy of alternative futures.

The next element in this facilitated process is a brief exercise that catalyzes students’ imagination. The students are told to work in pairs for this exercise. Each of them gets 2 minutes to complain about whatever comes to mind. To emphasize the broad range of complaints students may have, the instructor can

provide examples both from everyday individual experiences and from a global perspective. The instructor keeps track of time and ensures that both students talk and listen.

As the exercise ends, the instructor reveals the power of complaining. On the one hand, it emphasizes that complaining is also a story that shows that things can be different. On the other hand, knowing that things can be transformed also involves longing for this transformation. In this, both hope and longing are embedded. Complaining involves these strong emotions that activate not only one's imagination but also the courage to act.

On that note, the instructor introduces the next exercise, called the blank canvas. In this exercise, students are presented with a blank canvas titled 'Year 2055'. Referring to the futures cone and the previous exercise regarding longing and imagination, the students are now supposed to imagine the 2055 they long for and use the blank canvas to either draw or write what they imagine. To support this process, the instructor shares some guiding questions. For example, what does healthcare look like? How do people live? How do we communicate? (Figure 4).



Figure 4: *Blank Canvas Guiding Questions*

Step 5: Returning to a Different Future

The students work on the blank canvas exercise for 20 minutes. The next step is a return to the future, the year 2055. The instructor frames the idea that the students now have a vision of 2055 that they long for. They must now imagine that they are back in 2055. Here, they meet a nurse who confirms that

some of the catastrophes foreseen in 2025 were fortunately averted. The nurse also shares their perspective on what ultimately became the crucial turning point.

What does the nurse say? The students are instructed to share, in plenaries, a suggestion of what the nurse might say, and they are informed of how much time they have for this task.

As each group of students shares their ideas about what the nurse says, the instructor writes their suggestions on the board. So far, the students' imagination process has drawn upon divergent thinking. Now, the instructor introduces a shift to a more convergent way of thinking, as well as trying to establish a connection between the imagined suggestions and students' daily lives and actions. The instructor introduces the final task, which consists of three steps: First, convert the suggestions into objectives. Second, consider what kind of action is needed. Third, determine which of the proposed actions seem like options. When scaffolding reflections through these three steps, the entire process is intended to yield final answers to a rather complex challenge in everyday life.