Booklet Code: TJ-122

STEP 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 16 most important challenges and write them in the space provided

1	If the implants can deeply implanted in brain tissue then it could be difficult to remove if patients encounter negative side effects in the years to come.As a result the patients may either have to risk facing possible brain damage to have the chips removed or deal negative side effects for the remainder of their life.
2	If the CIN is the only company with this technology, then they could devleop a potential monopoly. As a result, they could raise their prices to an unreasonable level making it even more difficult for more patients to be able to get the surgery.
3	If patients such as Nikola suffer from severe headaches due to the CIN implant, then this could cause her to have to miss work on a regular basis. AS a result, she could put herself at risk of losing her job, leaving her without any money to provide basic needs for her family.
4	If Nikola is experiencing episodes where she is getting confused and walking into busy crosswalks without noticing cars whizzing about her, then she may cause a traffic accident to occur. This may put her safety and the safety of others at risk
5	If there are many instances where patients who receive the CIN implants experience negative long term side effects, then this may discourage other potential patients from getting the implants. As a result, they may never be able to experience the benefits that these implants could have provided for them.
6	If many insurances only cover 40% of the cost of the procedure to receive the CIN implants, then many patients may not have the financial resources necessary to receive the surgery. As a result, they may never be able to experience the potential benefits of the procedure.
7	If the CIN chips have to be replaced periodically due to malfunctions or unforeseen negative side effects, then this may introduce more electronic waste into the environment. This waste could contaminate ground water possibly compromising drinking water for nearby communities.
8	If patients continue to experience negative long term side effects, then the Cascadia Institute for Neurotechnology may be sued by patients and their families. As a result, the company could lose revenue and lose the trust of other existing customers as well.
9	If the proper safeguards are not in place and the BCI chip were to get hacked, the patients' data may be in danger of be stolen. As a result, CIN patients could lose patients could be at increased risk of identity theft.
10	If Ricardo's employer tracks all of this activities through his smart devices from the moment that he arrives until he leaves work each day to the moment that he leaves in order to determine worker productivity, then he may feel extra pressure to have the CIN procedure so that he can meet their expectations. This may cause him additional emotional stress which may have a negative impact on his social relationships with his coworkers.
11	If patients such as Nikola experience negative side effects from the CIN implants in later years and they are unable to have them removed, then they may develop a feelings of hopelessness, depression, and anxiety. As a result, this may affect their ability to do everyday tasks.

12	If patients who receive the CIN implants experience negative side effects from the chips which affect their daily activities, then this may also greatly create their ability to create or perform new artistic works. As a result, they may lose much of this creative outlet that is so important to creative expression.
13	If patients experience negative side effects from the CIN implants which cause them to not be able to perform everyday tasks, then this may also prevent them from attending church regularly. As a result, this may negatively affect their spiritual development and possibly make them question their faith.
14	If countries such as North Korea were to gain access to the CIN implant technology, then they may try to use it to create a superior race or super soldier similar to what we saw with experiments in Nazi Germany. As a result, this could potentially allow another country to gain a significant military advantage over other countries putting other countries at increased risk of attack or invasion.
15	If businesses are reluctant to allow therapy animals such as the ones described in the future scene into their establishments due to their limited knowledge of these enhanced animals, then this will greatly limit the activities of that individual. As a result, this may hinder the expansion of this part of CIN's program and discourage potential patients from using this resource.
16	If politicians decide to debate against the use of neurotechnological procedures (just as they debated against the vaccination of COVID-19 in 2020-21 such as the CIN implants this this may alienate other members of their party from wanting to utilize this technology. As a result, many people may choose not to take advantage of these potentially lifechanging procedures.

STEP 2. Identify the Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the Future Scene situation. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Since there has been unforeseen negative side effects from the neurochips provided by the Cascadia Institute for Neurotechnology (CIN), how might we reduce potential vulnerabilities of this technology, so that we can increase the chances for long term sustainability of this potentially life changing program in regions where the CIN neurochips are used in 2045 and beyond?

STEP 3. Develop Solutions

Generate solution ideas to the Underlying Problem in Step 2. Choose the 16 most effective solutions and write the elaborated ideas in the space provided.

1	Nord VPN will create a firewall for the BrainBorg that will stop a third party from hacking into the brain borg chip. By addressing possible safety vunerabilities we will protect patients from harm that could be created by unathurized third parties
2	The federal government will create a task force to monitor the way in which neuroscience procedures such as BrainBorg are developed and implanted. this will help identify vulnerabilities in the system and allow them to be corrected.

3	The I.B.R.O (International Brain Research Organization) will create an international exchange program where doctors and neuroscientists can go across the globe to learn from each other about their work. This will help the doctors and neuroscientists to better their practices to reduce potential vulnerabilities.
4	The CIN will force all employees to go through a special training regime specific to the kind of neurochip they will be implanting. This regime includes 6 weeks of extra training, 3 tests to show that they remember what they learnt, and a final exam that they have to pass to be able to work with the neurochips. If the employee does not pass the test, they are allowed to try twice more, after an additional week of training. If they still have not passed, they will have to wait 6 months before they can try again.
5	C.I.N will design the chip with a shutoff switch so if a malfunction occurs the chip will automaticly shut off putting the user out of harm's way by adding additional safeguards to the technology it will help to reduce potential potential vunerabilities of this technology so that patients can have a chance at the best possible outcome.
6	The legislature will pass a law that requires ,ore research and development of neuroscience procedures before they can be implanted on patients in the united states.By requiring additional research an development this will allow the developer to look for potential vulnerabilities in their technology and procedures.they will then be able to make the adjustments necessary to make their procedures safe and effective for patients.
7	The United Nation will periodically create international internet forums where doctors, neuroscientists, and technology developers will share their expertise with others. This will help to create an International Professional Learning community that can help to further the technologies needed to serve patients while addressing potential vulnerabilities in these systems before patients experience any negative side effects.
8	CIN will create an app where loved ones of patients will monitor the patient's chip if any malfunctions were to occur then their loved one would be notified so they can seek appropriate help from a practitioner. This will help patients keep their well being so that patients will have confidence in the program for long term sustainability.
9	CIN will make employees go through an advanced ethics screening and agree that they will have all their actions while at the company monitored so that they know that the employees access private information of patients. This will help to improve the transparency of the program and decrease the chances of the privacy of the patient being compromised
10	Music therapists will work with C.I.N. patients to improve their technology through music therapy to help them heal faster. music therapy has been proved to help heal patients with brain injuries or impairments since it allows for stimulation of brain activity. This will strengthen the program and reduce potential vulnerabilities.
11	CIN will create an enhanced chip that can be updated remotely for extended periods of time without any additional surgery.This will allow potential vulnerabilities to be corrected so patients do not suffer negative side effects. This will extend life of existing chips and decrease the amount of electric waste that is being introduced into the environment.
12	The C.I.N will create a series of nanodrones named G.U.A.R.D.I.A.N (Global Universal Advanced Remote Digital Information Analyzing Nanodrones). It is a series of nanodrones that will monitor the use and implementation of the C.I.N neurochips. It will also monitor the brain activity of the user to make sure that there are no negative consequences from the tech. It will communicate with the central database that holds the latest info regarding the tech. If the nanodrones detect any potential vulnerabilities, they will report them to a technician at the C.I.N, so that they can fix the problem before it effects the user. By stopping potential vulnerabilities, this will greatly increase the chances of long term sustainability for the C.I.N neurotechnology.

13	Microsoft will create a new division of their company called the "Microsoft Association for Neurotechnology" (M.A.N). The M.A.N will create their own neurochip to compete with the C.I.N's neurochip. This will create an incentive for the C.I.N to better their product, so that people will want to buy theirs instead of the M.A.N's chip. This will help reduce the potential vulnerabilities by forcing the C.I.N to make their product safer and better.
14	CIN will create a checks and balance system with their company.Each branch will over see each others making sure that all procedures and protocols are being followed correctly.This will greatly reduce any oversights that may lead to vulnerabilities in the program making it more effective for patients.
15	The United Nations will create an international information sharing internet forum. This forum will be opened annually, and when open, neuroscientists and doctors will post their techniques and their information about the neurochips. This will help the doctors do the surgery better, thus reducing the potential vulnerabilities.
16	CIN will make all of their employees go through advanced ethics and screening and agreed that they will have all their actions while at the company monitored so that they know that the employees access private information of patients.this will help improve the transparency of the program and decrease the chances of the privacy of the patient being compromised.

STEP 4. Generate Criteria

Generate criteria to determine which solution idea does the best job of solving the Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

1	Since there has been unforeseen negative side effects from the CIN neurochips, what solution will most decrease the chances of negative long term side effects for the users of CIN technology?
2	Since long term effects from the CIN technology are still unknown, which solution will most reduce potential vulnerabilities of the CIN procedure?
3	Since much of CIN's technology is new, which solution will allow CIN's technology to have the greatest chances at long term sustainability?
4	Since CIN's technology could present as new treatments for mental illnesses such anxiety, which solution will provide patients using CIN's neurochips with the most effective care plans?
5	Since CIN's technology isn't available in all areas, which solution will most allow CIN's programs to expand to newer areas?

STEP 5. Apply Criteria to Solutions

From the solution ideas written in Step 3, select the 8 ideas with the most potential to solve the Underlying Problem and list them on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 8 (best). The numerical ranking for one important criterion may be doubled.

Rank solutions.

			Criteria
#	Solution	1 2 3 4 5	Total

1	Nord VPN will create a firewall for the BrainBorg that will stop a third party from hacking into the brain borg chip. By addressing possible safety vunerabilities we will protect patients from harm that could be created by unathurized third parties	5 2 6 2 4	19
2	The federal government will create a task force to monitor the way in which neuroscience procedures such as BrainBorg are developed and implanted. this will help identify vulnerabilities in the system and allow them to be corrected.	6 3 7 3 3	22
3	The I.B.R.O (International Brain Research Organization) will create an international exchange program where doctors and neuroscientists can go across the globe to learn from each other about their work. This will help the doctors and neuroscientists to better their practices to reduce potential vulnerabilities.	7 1 2 5 6	21
4	The CIN will force all employees to go through a special training regime specific to the kind of neurochip they will be implanting. This regime includes 6 weeks of extra training, 3 tests to show that they remember what they learnt, and a final exam that they have to pass to be able to work with the neurochips. If the employee does not pass the test, they are allowed to try twice more, after an additional week of training. If they still have not passed, they will have to wait 6 months before they can try again.	4 5 1 8 7	25
5	C.I.N will design the chip with a shutoff switch so if a malfunction occurs the chip will automaticly shut off putting the user out of harm's way by adding additional safeguards to the technology it will help to reduce potential potential vunerabilities of this technology so that patients can have a chance at the best possible outcome.	3 4 5 4 1	17
6	The legislature will pass a law that requires ,ore research and development of neuroscience procedures before they can be implanted on patients in the united states.By requiring additional research an development this will allow the developer to look for potential vulnerabilities in their technology and procedures.they will then be able to make the adjustments necessary to make their procedures safe and effective for patients.	1 8 8 1 2	20
7	CIN will create an enhanced chip that can be updated remotely for extended periods of time without any additional surgery.This will allow potential vulnerabilities to be corrected so patients do not suffer negative side effects. This will extend life of existing chips and decrease the amount of electric waste that is being introduced into the environment.	2 6 4 7 5	24

8	The C.I.N will create a series of nanodrones named G.U.A.R.D.I.A.N (Global Universal Advanced Remote Digital Information Analyzing Nanodrones). It is a series of nanodrones that will monitor the use and implementation of the C.I.N neurochips. It will also monitor the brain activity of the user to make sure that there are no negative consequences from the tech. It will communicate with the central database that holds the latest info regarding the tech. If the nanodrones detect any potential vulnerabilities, they will report them to a technician at the C.I.N, so that they can fix the problem before it effects the user. By stopping potential vulnerabilities, this will greatly increase the chances of long term sustainability for the C.I.N neurotechnology.	8 7 3 6 8	32

STEP 6. Develop Action Plan

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the Future Scene will be affected.

Brief Overview: The Cascadia Institute of Neurotechnology (CIN) will work with neuroscientists from across the globe to create G.U.A.R.D.I.A.N (Global Universal Advanced Remote Digital Information Analyzing Nanodrones) It is a system of nanodrones that will monitor the implementation and use of the CIN neurochips. It will also monitor the brain activity of the user to ensure that no negative side effects occur for the user. It will communicate with a central database that will hold all of the latest information regarding this technology. If it detects any potential vulnerabilities, (hacking, malfunctions, etc.) it will report it to a technician at the CIN, and will also report it to the users personal physician, to ensure that no negative side effects occur whatsoever. This will help to reduce the potential vulnerabilities of the CIN neurochip, which will greatly increase the chances of long term sustainability for the CIN's programs. How it Works: When recipients receive the surgery, they will receive a digital tattoo which will serve as a gateway for the G.U.A.R.D.I.A.N. nanodrones to interact with the CIN neurochips. If potential vulnerabilities are detected they will be reported to technicians who will then be able remotely fix these malfunctions before it has any negative effects to the patient. This chip will also be enhanced so that it can be continually reprogrammed from a remote location by technicians to adjust the care plan for the patient.equipped with the latest software to perform updates for the most innovative technology. This will greatly reduce the need for the patients chip to be replaced because of the chips amount of storage. Technicians solving these problems will help patients to have the best possible care plan. Timeline: Development of G.U.A.R.D.I.A.N will begin immediately. Within 3 months, the first prototypes will have been created. Within 6 months, the final version of the nanodrones will be created. Within a year, G.U.A.R.D.I.A.N will be released to the public. Obstacles: The two main problems are the initial cost of development, and the fear from the patients that the chip can monitor what they think. To solve the initial cost of development, they will get a loan from the federal government to create this technology. To solve the fear from the users that the chip can monitor their thoughts, the C.I.N will begin an advertising campaign proving that it cannot monitor your thoughts. They will also have government inspections to prove that the chips cannot monitor your thoughts. Potential Impact: By allowing the technology to be reprogrammed to fit the patients individual needs this will not only benefit safety concerns but also it will provide with the best possible care plan to ensure that all of their needs are met which will greatly increase the chances of long term sustainability. How this Addresses the Criteria: It addresses the criteria by alerting the patients personal physician and a technician at the C.I.N if a potential vulnerability occurs, so that they can fix it before it affects the patient.

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