Youth Employment Services - YES

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Future skills: cultivating metacognition and creative thinking

Participant Workbook

**Cultivating Metacognition and Creative Thinking**

**Overview and Purpose**

This workshop introduces the key concepts related to creative thinking, adaptive and innovative thinking, divergent and convergent thinking, original thinkers, critical thinking, reasoning, and metacognition. You will take part in activities to define and explore how to build, improve, demonstrate and reflect on your creative and critical thinking skills.

**Time**

The workshop is between three and six hours long.

**Learning Outcomes**

At the end of this workshop you will be able to:

1. Understand the concept of creative thinking and why it is important in the workplace.
2. Identify the concepts of adaptive and innovative thinking.
3. Recognize divergent and convergent thinking.
4. Understand the pitfalls of creative thinking like groupthink.
5. Identify how to think “outside the box.”
6. Identify strategies for creative thinking.
7. Define the habits of original thinkers.
8. Understand the concept of critical thinking.
9. Identify the five stages of critical thinking.
10. Understand how to use critical thinking in the workplace.
11. Define metacognition and its phases.

**Leading Questions**

As you complete this workshop, you will think about and answer the following questions:

1. What is creative thinking?

2. Why is creative thinking important to employers?

3. How can you think outside the box?

4. What are the habits of original thinkers?

5. Why is critical thinking important in the workplace?

**Workshop Agenda**

Introductions and Workshop Overview

1. Creative Thinking

2. Creative Thinking: How to Connect the Dots

3. How to Think Outside the Box

4. Strategies for Creative Thinking

5. Original Thinkers

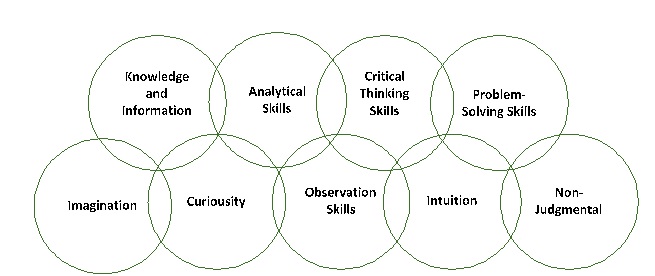
6. What is Critical Thinking?

7. Five Parts of Critical Thinking

8. Metacognition

9. Review and Wrap-Up**1. Creative Thinking**

*1.1 What is Creativity?*



* **Knowledge and information**: Creativity is not based on nothing. It is based on what we already know.
* **Analytical skills:** To be creative, we have to be able to analyze something or a situation and identify what is missing.
* **Critical thinking skills:** To be creative, we have to evaluate everything that we do, making judgements about what is good and what is not.
* **Problem-solving skills:** A lot of creativity is based on finding solutions to problems, often everyday problems.
* **Imagination:** To be creative we have to imagine something that doesn’t exist yet.
* **Curiosity:** Creativity comes from asking questions about everything we see. Why is something the way it is? What would happen if we do something differently?
* **Observation skills**: Creativity comes from noticing everything—what are people doing, how often are they doing something, what tools are they using.
* **Intuition:** Creativity has an intuitive element to it. Our gut tells us something and we listen to it.
* **Non-judgmental:** Creativity comes from not ruling anything out and being open to all ideas, even those that at first seem as though they won’t work.

*1.2 Creative Thinking*

**Creative Thinking** is a way of looking at problems or situations from a fresh perspective to conceive of something new or original.

**2. Creative Thinking: How to Connect the Dots**

Teamwork is vital if you want to work well with colleagues and teammates.

The better you work with others, the more successful your team will be in achieving its goals.

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|  | Watch the video: *Creative Thinking: How to Connect the Dots*  <https://youtu.be/cYhgIlTy4yY> |

*2.1 Adaptive and Innovative Thinking*

**Adaptive Thinking** is when you take existing conditions and try to do things better.

**Innovative Thinking** stretches outside your comfort zone or does something completely new to address a challenge.

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|  | Food waste – the food that is wasted, lost or uneaten. |

*2.2 Divergent and Convergent Thinking*

**Divergent Thinking** is a free-flowing thought process or method used to generate creative ideas by exploring many possible solutions.

**Convergent Thinking** is deliberate and conscious using a standard to judge the material we screen, select, evaluate, and to refine the options and determine potential solutions.

The result of Divergent and Convergent Thinkers working together will be better than any one type of thinker working by themselves.

*2.3 Pitfalls of Creativity – Groupthink*

**Groupthink** happens when the need for the participants to fit in with a group leads to dangerous or negative results.

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|  | Watch the video: *Groupthink - A short introduction*  <https://youtu.be/CWEvJciU0Zc> |

**8 Symptoms of Groupthink**

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|  | Symptom | Description | Sounds Like |
| 1. | Illusion of Invulnerability | Members ignore danger, take extreme risk and are overly optimistic. | “If anyone can do it, it has to be us” |
| 2. | Stereotyping Others | Members discredit and explain away warning contrary to group thinking. | “No one is as smart as us” |
| 3. | Self-Censorship | Members withhold their dissenting views and counter-arguments. thinking differently but not speaking up | silence |
| 4. | Illusion of Unanimity | Members perceive falsely that everyone agrees with the group’s decision; silence is seen as consent. | “You agree, right?” |
| 5. | Unquestioned belief | Members discredit and explain away warning contrary to group thinking. | “We are selling sentiments!” |
| 6. | Direct pressure | Members pressure any in the group who expresses arguments against the group’s stereotypes, illusions, or commitments, viewing such opposition as disloyalty | “She agrees, she just doesn’t know it yet” |
| 7. | Rationalizing | Members discredit and explain away warning contrary to group thinking. | “I guess we could make it a noble cause specific project” |
| 8. | Mind guard | Some members appoint themselves to the role of protecting the group from adverse information that might threaten group complacency. | “No tests, we are going to launch a kick-starter campaign!” |

**Ways to Avoid Groupthink**

1. Be aware of the consequences if/when the group is wrong.
2. Seek out alternative viewpoints that disagree with your own and keep an open mind.
3. Try to poke holes in your own argument. Look at your ideas from the other side to better understand your own thinking.
4. Prepare to make mistakes.
5. Write down your reasons for making a decision in the first place and review periodically to see if things have changed.
6. Talk your ideas through with a trusted outside source that will give you honest feedback.

**3. How to Think Outside the Box**

**Thinking outside the box** means confronting problems in atypical ways, thinking creatively and freely, and encouraging frequent challenges to what currently is.

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|  | Watch the video:  *Creative thinking - how to get out of the box and generate ideas: Giovanni Corazza at TEDxRoma*  <https://youtu.be/bEusrD8g-dM> |

* **Why?** It’s not a luxury to step out but necessary in order to move forward.
* **Which box are we stepping out of?** The difference between what we know and what we have not even thought of yet
* **How do we get out of the box?** Add a new idea not obviously related to the challenge – use divergent thinking*. (Remember when we talked about divergent thinking? Check out page 5 for a refresher).*
* **What are we doing when we step out of the box?** We are assessing the value of a new idea and matching it to our original focus.
* **When is it a good idea to challenge your environment?** Is your workplace and/or boss ready? If environment punishes mistakes people won’t step out of the box.

**The 3 Silent P’s of Innovation**

1. **Permission** – people need to feel that they have permission to try something new
2. **Protection** – people should feel that they are protected if something goes sideways
3. **Policy** – people need assistance in policies that support innovation not slow it down

Source: The Shift, Halton District School Board

**4. Strategies for Creative Thinking**

*\*If you are not sure of a concept, look it up.*

* Reflective journaling
* Start a notebook to capture the ideas you generate
* Explore new inspiration – look to nature, music, art, science, fiction, travel
* Research “makers”
* Practice mindfulness
* Learn about fun stories related to design and creativity – listen to podcasts, go to the library, surf the web, check out Ted Talks
* Brainstorm solutions to common challenges – stray cats, water restrictions, the common cold, any challenge you see in our day-to-day life
* Invent a recipe using your favourite ingredients
* Try to a real world design challenge related to climate change, health care, homelessness, food insecurity, violence, sustainability, or education
* (add your own ideas)

**Original Thinkers**

*5.1 Habits of Original Thinkers*

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|  | Watch the video:  *Habits of Original Thinkers*  <https://youtu.be/fxbCHn6gE3U> |

**3 Traits of Original Thinkers**

* **Late to the party** – After the “first movers” have taken the plunge, original thinkers can think in convergent ways and improve on the idea.
* **Feel doubt and fear** – Self-doubt (you constantly feel like you're not good enough) and idea doubt (you don't know if a specific project or idea is going to work).
* **Have lots of bad ideas** – Original thinkers fail the most because they try the most.

*6.1 What is Logical Thinking?*

**Logic** is a proper or reasonable way of thinking about or understanding something.

**Logical thinking** is a process of taking important facts, ideas and conclusions involved in a problem and arranging them in a chain-like progression that makes sense.

*6.2 Reasoning*

**Reasoning** is the capacity of consciously making sense of things, establishing and verifying facts, applying logic, and adapting or justifying practices, institutions, and beliefs based on new or existing information.

**Deductive Reasoning** uses evidence that is specific and supported.

An example of deductive reasoning is -

• Fish are living organisms in the water.

• Goldfish is a fish.

• So the Goldfish lives in the water.

**Inductive Reasoning** uses evidence to create an idea or conclusion.

An example of inductive reasoning is –

• Playing Clue supports intelligence development of children.

• Playing Chess supports intelligence development of children.

• So all logic games support children's intelligence development.

*6.2 Reasoning*

**Grid Logic Puzzle**

To solve the puzzle use deductive reasoning. Use the clues above and put a checkmark in the boxes that you know are true and an X in the boxes you know are or cannot be true.

Sue, Bindi and Kate are wearing different coloured sweaters (brown, blue and white) and also have different coloured hair (grey, black and brown). Can you figure out what each person is wearing?

1. Kate thinks white sweaters are not practical, and so does the person with brown hair.
2. Bindi thinks her black hair is too long.
3. The person with the grey hair is also wearing a blue sweater.

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| --- | --- | --- | --- | --- | --- | --- |
|  | Yellow sweater | Blue sweater | White sweater | Grey hair | Black hair | Brown hair |
| Sue |  |  |  |  |  |  |
| Bindi |  |  |  |  |  |  |
| Kate |  |  |  |  |  |  |
| Grey hair |  |  |  |  | | |
| Black hair |  |  |  |
| Brown hair |  |  |  |

Sue has \_\_\_\_\_\_\_ hair and is wearing a \_\_\_\_\_\_ \_ sweater.

Bindi has \_\_\_\_\_\_\_ hair and is wearing a \_\_\_\_\_\_ \_ sweater.

Kate has \_\_\_\_\_\_\_ hair and is wearing a \_\_\_\_\_ \_\_ sweater.

*6.3 Why is Critical Thinking Important at Work for Employees?*

Today, organizations value critical thinking as a means to greater innovation and improved problem-solving. The World Economic Forum found that complex problem-solving and critical thinking are the most important skill in the workplace. Critical thinking is important because it helps individuals and teams more effectively solve problems and identify possible solutions that aren’t entirely obvious at first.

Critical thinking can help resolve conflicts in the workplace. When workers use critical thinking and consider a range of possible approaches to solving a problem rather than relying on bias or snap judgments, they are more likely to arrive at a better solution.

1. **Five Parts of Critical Thinking**

Critical thinking is an approach to thinking in which a person visualizes an idea and then goes about the task of taking the steps necessary to reach a conclusion. It involves research, investigation, evaluation, conjecture and implementing. Having critical thinking ability is vital to many professions in our information society. Utilizing the five-step process of critical thinking skills can help us be intentional in our problem solving.

**Identify the Problem**

* The first step in critical thinking is to identify the problem.
* Consider what the issue is and break it down so it is specific as possible.
* Ask how big this problem really is.
* Determine why this problem exists and what would the consequences be if no action is taken to solve it.
* Determine who should be involved in the solving process.
* ***Example*** – when you take your bike into the shop to be serviced the technician does a series of tests to determine what the problem that needs to be fixed

**Gather Information**

* Learn as much as possible about the problem.
* Look for potential reasons and solutions, but don't just accept facts at face value.
* Research and investigate all possibilities.
* Don't hesitate to seek out other people's opinions and perspectives about the issue.
* Determine both the whether something is true and that you can count of the information you learn
* ***Example*** –– when you are renting your first apartment you consider how much you have to spend, how much money you make, the size of apartment you need, the reputation of the landlord, the location and services you prefer

**Evaluate the Evidence**

* Evaluate the evidence or information that has been collected.
* Ensure that the information is accurate.
* Confirm that it has come from more than just one source and that each of the sources are both unbiased and dependable.
* Identify any assumptions or information you may have collected without evidence.
* Ask for clarification of any concept or information you don’t fully understand.
* Determine if the information is based on fact or opinion.
* List all the ways the evidence could be interpreted.
* ***Example*** – when you go to the doctor and they take your temperature, look in your eyes/ears/throat, check any test results, and look at your previous records they are using this information to make a judgment about the state of your health

**Consider Solutions**

* Plan several solutions based on the conclusions made from the evidence evaluation.
* Figure out the advantage and disadvantages of each of these options.
* Outline what the obstacles might be, as well as any short-term or long-term results the solution has.
* It helps to look back at similar problems from the past and what solutions were used to solve them.
* ***Example*** – lawyers consider the solutions to a situation when they are determining what approach to take to a case

**Choose and Implement**

* There are three factors to consider when deciding on an option.
  + The first is determining the amount of risks involved with the solution.
  + The second is whether the solution is practical.
  + The third whether there are any priorities that need to be fulfilled.
* Once the solution is selected and put to action, follow-through is needed by monitoring the results of the plan implementation.
* Communicate your decision to anyone who is or will be impacted by the choice.
* Ideally you would also take time to reflect on your choice and its impact.
* ***Example*** – when you buy a laptop you look at the features, whether the type of laptop is a practical choice for your needs and whether to buy new or used. After the laptop is purchased you will follow-through and stay on top of the virus protection, service and upkeep and when it comes time to replace it you will take your experience with that laptop into account when you are choosing

*7.1 Critical Thinking Case Study*

Read the case study below and use the worksheet below to use critical thinking to determine a solution.

**The Sandwich Company**

* The Sandwich Company is a restaurant that has been operating in Ontario for the past five years. Recently the restaurant has been experiencing many pressures. The owner has invested a lot of money to build a new building, but over the last year The Sandwich Company is having trouble finding workers and the number of customers is not enough to keep the business going.
* The costs are increasing, the profits are down, and the owner is concerned. All of the employees know that the business is struggling.
* There is a history of conflict between the managers and the employees. There have been threats of walking out, but the managers and the workers have been able to work things out at the last minute.
* The owner is thinking about changing how the restaurant is run and this is going to have an impact on whether the restaurant stays open or not.
* The pressure has created tensions between the managers and the workers. The managers are pushing the workers because they have been directed to work harder and faster.

The manager has pulled together a few of the workers to problem solve about how to increase workplace climate and increase productivity.

***Identify the Problem***

* What is the problem?
* Why does this problem exist?
* Who should be involved in the solving process?

***Gather Information***

* What do we know about the problem?
* What are some of the reasons this problem occurred?
* What are some possible solutions?
* Are there other restaurants we have worked at that had a similar problem? If so, what happened?

***Evaluate the Evidence***

* What do we need to know more about?

***Consider Solutions***

* What are some solutions to the problem? (try to generate at least 3 ideas)

* Figure out the advantages and disadvantages of each of these options.

***Choose and Implement***

* What is the amount of risk involved with each of the proposed solutions?

Put them in order from most risky to least risky to implement

* Are the solutions practical?
* Are we taking care of the things that need to be taken care of (priorities)?

***What is your best solution and why?***

*7.2 How can we encourage Critical Thinking at work?*

* **Ask “Why?” frequently** - Answering questions like this will help you and others think through the logic used to solve a problem or come to a certain conclusion.
* **Connect with your co-workers and create social/lunch break opportunities** - Play card games or board games that encourage strategy and logical thinking. You can learn a lot about your coworkers (and friends!) when you play games with them.
* **Use a structured approach** - When you are approaching a task at work use the Five Parts of Critical Thinking and share this approach with your coworkers.

*7.3 Ways to Develop Critical Thinking*

* Learn through trial and error
* Stimulate curiosity and thinking
* Commit to take on small challenges every day
* Don’t tell people to do things in a certain way
* Be able to give reasons to justify your decisions
* Ask questions.
* Foster curiosity in others, if something doesn’t make sense to them encourage them to voice her objection or difficulty.
* Consider alternative explanations and solutions. Many problems yield themselves to more than one solution. When people consider multiple solutions, they may become more flexible thinkers.
* Clarify your meaning. Practice putting things in your own words (while keeping the meaning intact). Everyone should be encouraged to make meaningful distinctions.
* Talk about biases. Everyone can understand how emotions, motives--even our cravings--can influence our judgments.
* Don’t confine critical thinking to purely factual or academic matters. Encourage people to reason about ethical, moral, and public policy issues.
* Write. The process of writing helps you clarify your explanations and sharpen your arguments.

**8. Metacognition**

*8.1 What is Metacognition?*

**Metacognition** refers to awareness of your knowledge—what you do and do not know—and your ability to understand, control, and manipulate your learning.

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|  | Watch the video: *What is metacognition? (Exploring the Metacognition Cycle)*  <https://youtu.be/HZrUWvfU6VU> |

*8.2 Phases of Metacognition*

1. Develop a plan before approaching a learning task, such as a new training module or taking part in an inventory count.

During the planning phase, you can ask,

* What am I supposed to do?
* What prior knowledge will help me with this task?
* What should I do first?
* What should I look for in these instructions?
* How much time do I have to complete this?
* In what direction do I want my thinking to take me?

1. Monitor your understanding and use “fix-up” strategies when things don’t make sense.

During the monitoring phase, you can ask,

* How am I doing?
* Am I on the right track?
* How should I proceed?
* What information is important to remember?
* Should I move in a different direction?
* Should I adjust the pace because of the difficulty?
* What can I do if I do not understand?

1. Evaluate your thinking after completing the task.

During the evaluation phase, you can ask,

* How well did I do?
* What did I learn?
* Did I get the results I expected?
* What could I have done differently?
* Can I apply this way of thinking to other problems or situations?
* Is there anything I don’t understand—any gaps in my knowledge?
* Do I need to go back through the task to fill in any gaps in understanding?
* How might I apply this line of thinking to other problems?

**9. Review and Wrap-Up**

*9.1 Workshop Review*

1. Creative Thinking

2. Creative Thinking: How to Connect the Dots

3. How to Think Outside the Box

4. Strategies for Creative Thinking

5. Original Thinkers

6. What is Critical Thinking?

7. Five Parts of Critical Thinking

8. Metacognition

9. Review and Wrap-Up

*9.2 Ask any final questions.*

**10. Additional Resources**

**Convergent Versus Divergent Thinking** - [**https://youtu.be/cmBf1fBRXms**](https://youtu.be/cmBf1fBRXms)

In this sketchnote video by John Spencer, he explores the differences between convergent thinking and divergent thinking. (1:51)

**Originals: How Non-Conformists Move the World**, Adam Grant (2016)

**Outliers: The Story of Success**, Malcolm Gladwell (2011)

**Printable Grid Puzzles Online** <https://www.brainzilla.com/logic/logic-grid/printable/>

**The Tipping Point: How Little Things Can Make a Big Difference**, Malcolm Gladwell (2002)

**Zig Zag: The Surprising Path to Greater Creativity**, Keith Sawyer (2013)