Creativity and Problem-Solving in Action

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CHALLENGER

The way humans learn is unchanged, there are only different paths to achieve it.

The world is changing, schools have to addapt to changes.

Chapter 1

Challenged-based learning

Things needed to “make it work in Schools”

The Philosophy of Makerspaces: Understanding the core principles that make makerspaces a powerful learning environment.

Designing Challenges: Creating and implement effective challenge-based learning experiences that inspire creativity and problem-solving.

Facilitating Maker Projects: Tips and strategies for guiding students through their projects, from ideation to completion.

Assessment in Maker Education: Innovative approaches to evaluating student progress in a makerspace setting.

Making changes step by step

Dynamic Learning Environments: Makerspaces offer hands-on, problem-solving learning, fostering innovation, resilience, and collaboration.

Resourceful Integration: Existing classroom spaces can be repurposed into makerspaces; start small and grow gradually.

Educational Evolution: Schools should shift from knowledge sources to hubs for critical and collaborative information navigation, reflecting significant educational changes.

Mentorship and Growth: Embrace the role of a maker-space mentor, guiding students through inquiry, experimentation, and discovery to enhance engagement and creativity.

The aim is not to completely redefine the school system, but like every living organism, school systems must evolve to meet the demands of the 21st century.

Chapter 2

Encouraging a Creative Mindset

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Promote a Risk-Taking Culture: Encourage students to embrace failure as part of learning by celebrating attempts and iterations, creating a safe environment for experimentation.

Provide Inspirational Examples: Share stories of innovators and highlight real-world applications of creativity to inspire and show the impact of creative thinking.

Diversify Resources and Tools: Equip makerspaces with a variety of materials and technologies to spark imagination and enable experimentation with different mediums and techniques.

Allocate Time for Exploration: Dedicate unstructured time for students to explore interests and foster curiosity-driven learning.

Chapter 3

Problem Solving Techniques

Design Thinking

Integrating structured problem-solving techniques can greatly improve the effectiveness of makerspace projects. It's important to recognize that success comes through incremental steps.

A human-centered approach to innovation that combines people's needs, technological possibilities, and business success requirements. It involves five phases:

Empathize: Understand the users and their needs.

Define: Clearly articulate the problems to be solved.

Ideate: Brainstorm a range of creative solutions.

Prototype: Create tangible representations of ideas.

Test: Refine solutions through feedback and iteration.

SCAMPER Methode

This technique involves seven strategies for creatively thinking about existing products or problems:

Substitute: Identify what can be replaced to improve the product.

Combine: Explore if elements can be combined to create something new.

Adapt: Consider how the product can be altered to serve another purpose.

Modify: Think about what can be modified to bring about change.

Put to another use: Find ways to use the product in a different context.

Eliminate: Determine what can be removed without sacrificing functionality.

Reverse: Explore if reversing or rearranging elements offers benefits.

SCAMPER facilitates structured exploration, encouraging students to think outside the box.

Brainstorming and Mind Mapping

These collaborative thinking activities promote the free flow of ideas and help visualize thought processes:

Brainstorming: Generates a wide range of ideas through spontaneous and open discussions.

Mind Mapping: Organizes and connects these ideas visually, aiding in problem definition and solution brainstorming.

Together, these methods foster creativity and help students systematically explore and develop innovative solutions.

Chapter 4

Urban Beekeeping Project

Example of using Problem Solving Techniques on a School project

Initiative: Students used design thinking to tackle environmental issues through urban beekeeping.

Impact: Enhanced biodiversity preservation and community engagement within the school's makerspace.

Duration and Participants: One school year, involving 47 students and 5 teachers.

Methodology: Employed structured problem-solving techniques in 4 phases.

Empower your students with problem-solving techniques, for in their challenges lie the seeds of innovation. As teachers, we don't just educate; we ignite the spark of curiosity and equip young minds with the tools to navigate the complexities of tomorrow.

Phase 1: Empathize and Define with Design Thinking

Initiative: Students used design thinking to tackle environmental issues through urban beekeeping.

Impact: Enhanced biodiversity preservation and community engagement within the school's makerspace.

Duration and Participants: One school year, involving 47 students and 5 teachers.

Methodology: Employed structured problem-solving techniques in 4 phases.

Phase 2: Ideate with Design Thinking and Brainstorming

- During collaborative brainstorming sessions, students generated concepts to establish bee-friendly environments within both the school and the local community. Utilizing the Torch method in the school's computer classrooms, they explored ideas such as implementing a school-owned apiary, establishing a beekeeping club, and organizing educational workshops for both students and community members.

Phase 3: Prototype with Design Thinking and SCAMPER methods

Substitute: Use school park for bee habitats instead of rural areas.

Combine: Integrate beekeeping with environmental science curriculum.

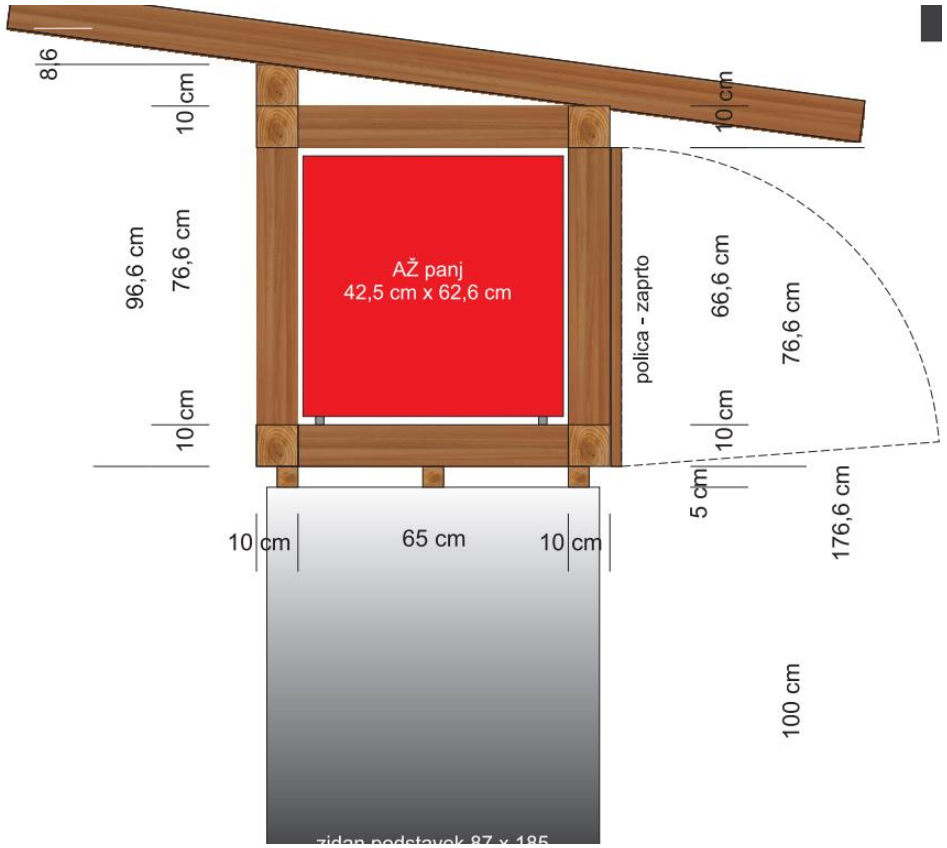
Adapt: Incorporate bee-friendly plants into existing gardening projects.

Modify: Redesign apiary for urban aesthetics and safety.

Put to another use: Utilize school honey for promotion and fundraising.

Eliminate: Reduce pesticide use on school grounds.

Reverse: Launch "Bee Ambassador" program to educate community. Outcome: Prototypes for bee habitats, educational programs, and community engagement.



Phase 4: Test with Design Thinking and Mind Mapping

- Activity: Construction students design apiaries using AutoCAD. Local beekeeper selects most suitable design from 7 options. Construction students create materials list, passed to economics students for financial planning. Economics students also create online questionnaire about urban beekeeping's purpose. Additionally, students establish beekeeping club to conduct workshops with local beekeeper.
- Outcome: Optimized urban beekeeping project fostering biodiversity, education, and community engagement in sustainability.

Chapter 5

Assessment and Feedback

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Assessment in makerspaces is crucial for fostering creativity and problem-solving. We prioritize both process and outcome, using rubrics to evaluate creativity, effort, problem-solving, and teamwork. Feedback should be specific and actionable to drive improvement. Peer review enhances critical thinking and communication.

Assessment and feedback are the compass and the fuel for students' educational journey, guiding them towards mastery and growth.

To dismiss the need for makerspaces in our schools is to overlook the fundamental shifts in our educational landscape.

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Thank you!

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