



# STRENGTHEN COMPUTER SCIENCE EDUCATION USING DESIGN THINKING

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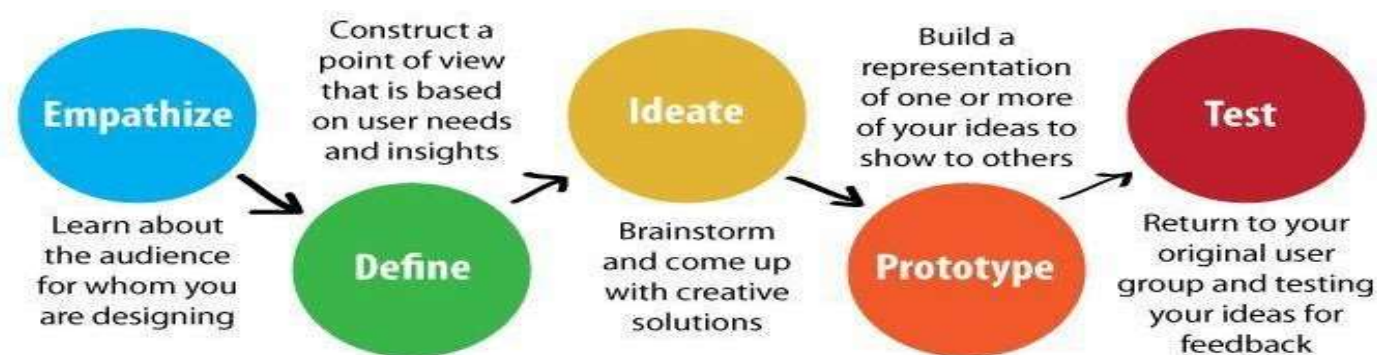
## MAIN IDEA



How might we strengthen computer science education using design thinking by the STEM Approach?

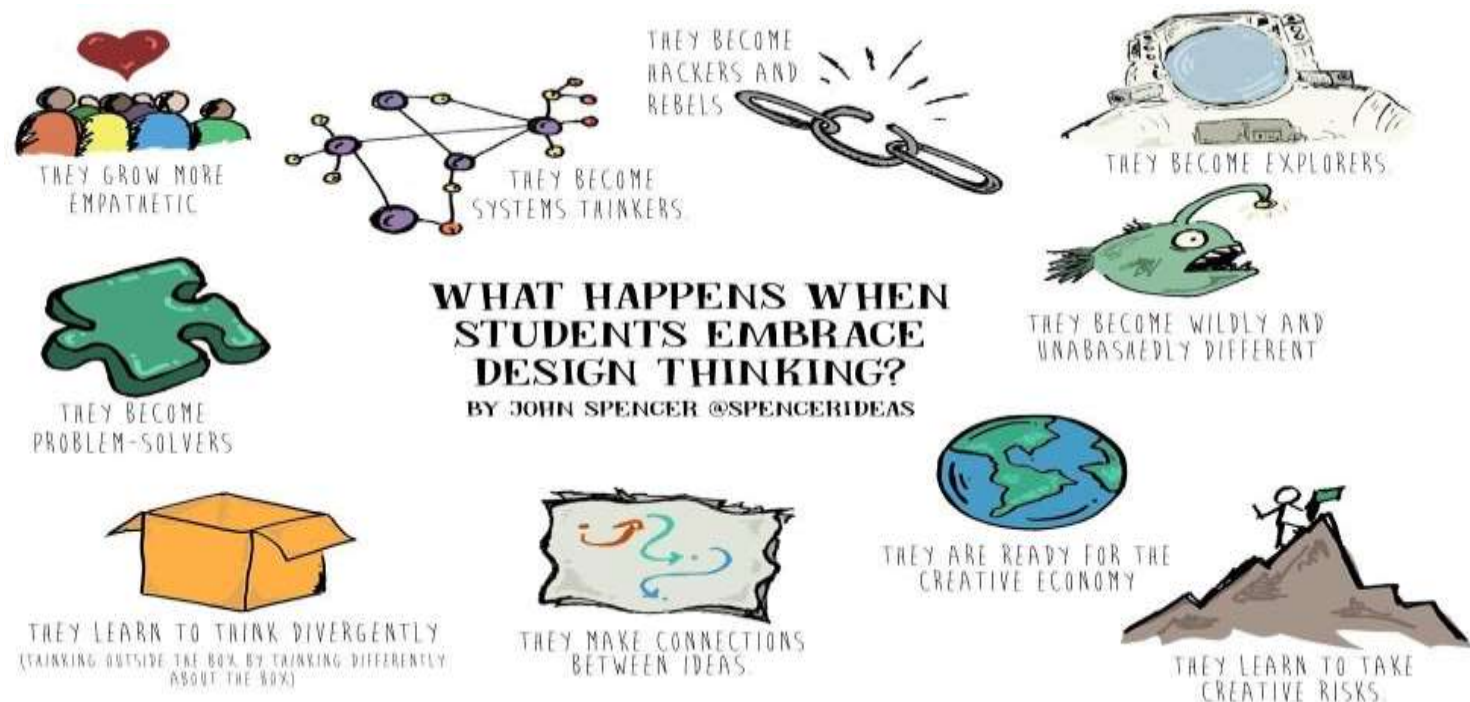
## WHY IS IT IMPORTANT?

Design thinking for educators is a creative process of thinking that helps the students design solutions for solving real world problems or challenges. The problems don't need to be technology-related. Students may want to tackle issues about the environment, natural disasters, social justice, health care, or cyber security. This methodology can help students find relevance in their computer science lessons, applying their skills to find and solve problems that matter to them. It is also central to recent conceptions of software development in general (e.g. Stanford School,,).



## PURPOSE

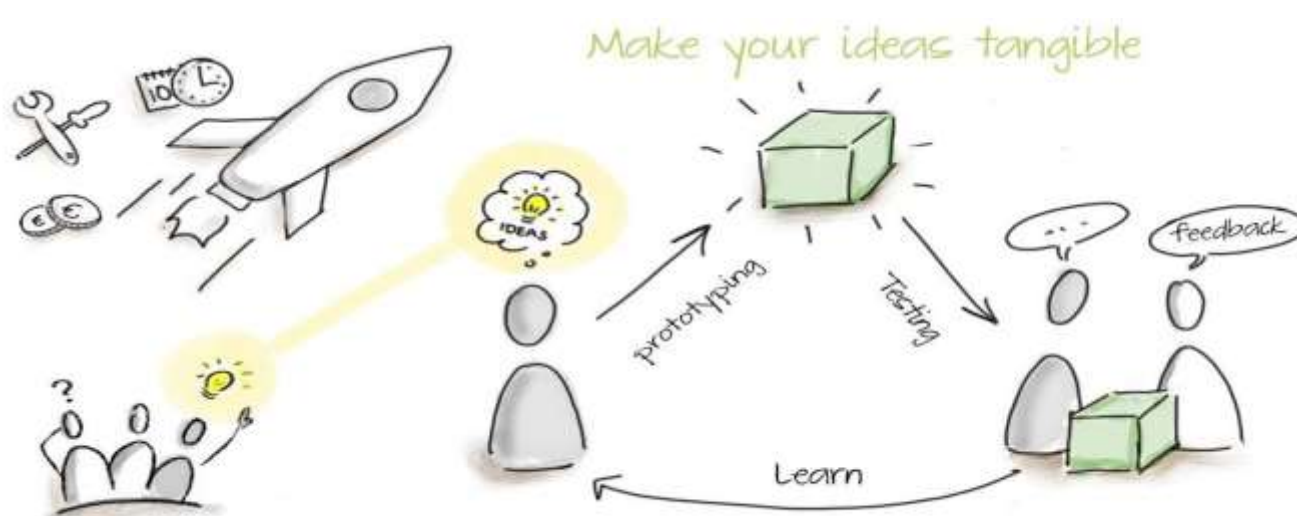
- To integrate computer science discipline through Design Thinking by involving students in relevant real-world problems.
- Provide opportunities for students to collaborate with peers to develop their design thinking skills and STEM skills.



## ACTIONS FOR CHANGE

- Allocate a room at the school for STEM education and collect/purchase STEM resources (e.g. computer with coding software).
- Support teachers in STEM disciplines to work and plan collaboratively to develop integrated tasks.
- Improve teachers' knowledge of design thinking through professional learning.
- Support teachers to critically reflect on their teaching practice by organizing group meetings.
- Support students to work in groups to solve real-world problems (e.g. Design a digital platform for school-family communication).
- As students work on projects, they receive feedback from teachers and peers.

## KEY IDEAS



- Computer Science teachers are also responsible for helping students to acquire 21<sup>st</sup> century skills (Communication, Critical thinking, Creativity, Collaboration)
- All students can benefit from the application of design thinking to solve authentic problems (For example: Designing an app through coding to create a digital platform for school communication with families)

## OUTCOMES

### Students

- Become confident learners who are able to transfer and apply their knowledge to solve future real-life problems.
- Transferring school information to families through a digital platform is time efficient and sustainable.

### Teachers

- Develop entrepreneurial mindset.
- Design an effective digital platform that enables parents to engage with the learning of their children through reactions and comments.
- Messaging teachers (directly and confidentially).
- Sharing learning success.
- Share expertise to produce quality learning for their students.

### School

- Create an environment that promotes STEM Approach and Design thinking .

## A SCHOOL EXAMPLE



## KEY RESOURCES/REFERENCES

1- Ralph, P. (April 2015). "The Sense making-Coevolution-Implementation Theory of software design". *Science of Computer programming*.

2- Simon, H. (1969). *The Sciences of the Artificial*. Cambridge: MIT Press.

3- Dugger, W. E., Jr. (2010). Evolution of STEM in the United States. Sixth Biennial International Conference on Technology Education Research.