

Case of Reform on School and Higher Education "Computational Thinking"

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The Khon Kaen 30 years project (2000 - 2030) started on how to change the way







What is Computational Thinking?

"The only way to rectify our reasoning is to make them as tangible as those of the mathematicians, so that we can find our error at a glance, and when there are disputes among persons, we can simply say: Let us calculate, without further ado, to see who is right".

(Leibnitz, 1685)

This means, decomposing arguments in term of thousands of simple units, which can be recombined and thus able to be expressed and performed as mechanical computations.



What is Computational Thinking?

"Computational Thinking is the *thought processes* involved in formulating a problem and expressing its solution(s) in such a way that a computer – human or machine – can effectively carry out".

(Jeannette Wing, 2006)



What is Computational Thinking?

"Computational Thinking is understood as a *problem solving* paradigm of mathematizing a problem in such a way that the computer can execute it."

(Tin Lam, 2020)



Computational Thinking is very powerful for Problem Solving

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Figure 1: Programming Thinking adapted from Kano (2020)



What students need to be?





Computational thinking has close connections with epistemology, ethics and wisdom

All of them share *several core concepts* such as *knowledge*, *learning*, and *values*



Computational thinking provide tools to design intelligent and moral artificial agents that accompanies and give emotional and intelligent support to us.



Consider the case of an accident in an autonomous vehicle. Who is responsible?

What happens if the accident is due to a system error, or due to an error in design flaws?

But what happens if the vehicle learns autonomously?



Figure 2: Curriculum Framework for Computational Thinking on InMside



This model will become the reference implementation framework model in carrying out the design process of curriculum formulation and implementation of the *new curriculum* proposed in each APEC member economies for *high school, middle school and*

primary school respectively.



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THANK YOU