Monitoring the timetable problem

DEFININIG A KPI MAP

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The timetable problem

Every year the University of Bologna faces the problem of defining the timetable for each degree course

- *How do you imagine the process for defining the timetable?*
- *Which agents are involved?*
- *How can we measure the goodness of the timetable?*

How do you imagine the process for defining the timetable?

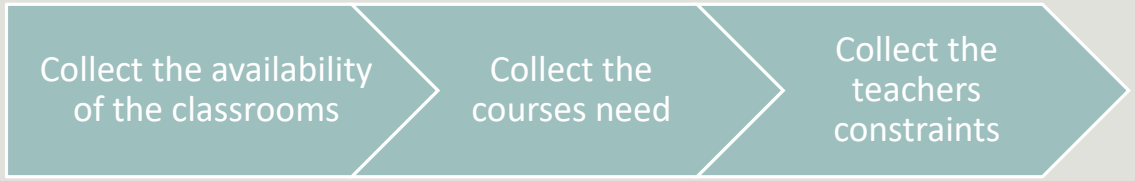
Collect the availability of the classrooms

- *Classrooms are shared with other degrees*
- *The number of courses could change*

How do you imagine the process for defining the timetable?

- *The number of hours per course could change*
- *The number of students could change*

How do you imagine the process for defining the timetable?

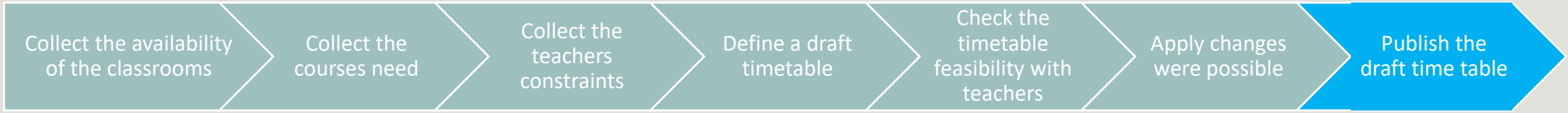


- *Teachers express hard constraints (e.g. on Monday I am already teaching at …)*
- *Teachers express soft constraints (e.g. I prefer 3 hours on Monday morning and 2 on Tuesday afternoon)*

How do you imagine the process for defining the timetable?

- *Timetable must be compliant with resources and constraints (at least hard ones)*

How do you imagine the process for defining the timetable?



- *In practice many iterations and adjustments are required*

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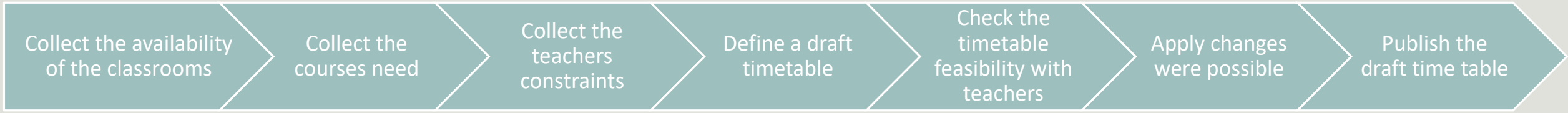

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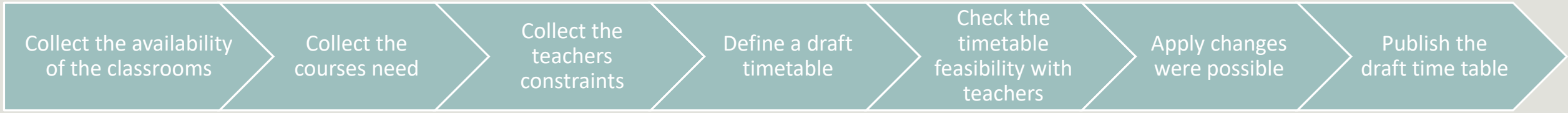

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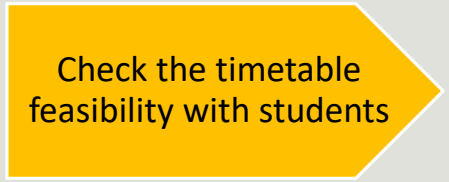

- *Typically overlaps with other courses*

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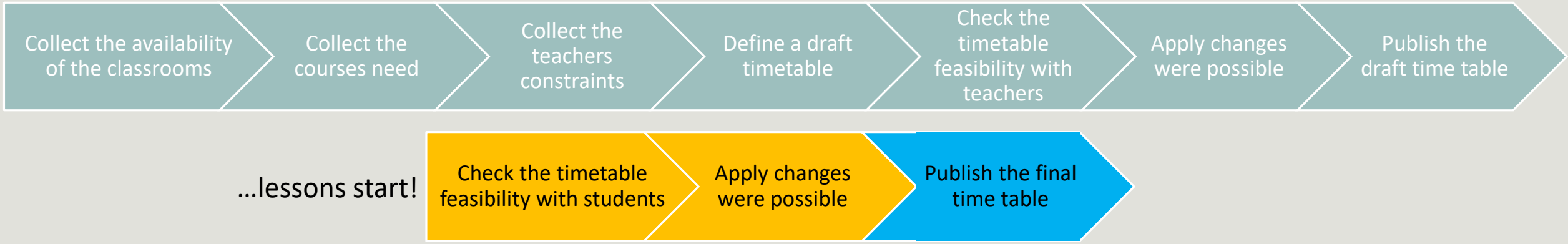

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- *The teachers*
- *Teaching commission*
- *The Secretary's office*
- *The students*

Define the linear responsability chart

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	Collect the availability of the classrooms	Collect the courses need	Collect the teachers constraints	Define a draft timetable	Check the timetable feasibility with teachers	Apply changes were possible	Publish the draft time table	Check the timetable feasibility with students	Apply changes were possible	Publish the final time table
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Qualitative goodness criteria are:

- *Maximize the number of satisfied soft constraints*
- *Distribute the daily load for students and teachers*
- *Minimize the number of course overlapping*

Counting overlapping

A naive counting would sum up the number of hours shared by the courses, but:

- *Several courses run in parallel! Overlaps are the norm!*
- *Not all overlaps have the same severity*

How can we measure overlap severity?

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$$weight(i,j) = \begin{cases} 1 & if\ compulsory(i)\ \wedge compulsory(j) \wedge sameyear(i,j) \\ 0{,}5 & if\ compulsory(i)\ \wedge \neg compulsory(j) \wedge sameyear(i,j) \\ 0 & \neg\ sameyear(i,j) \end{cases}$$