

The Teacher of the Future

Dr. ir. [Alexandru Iosup](#),
representing a whole team*



Major Technical University in the Netherlands (Top-20 in the World*)



- “P-in-eeen” of an important BSc track **<40%**
- Completion “in time” of the BSc **<35%**

Exercise: The Blame Game

- Team work, first 2 minutes
 1. Form team of 2-3 persons
 2. Think about own experience
 3. Convince your team before proposing an answer
- Open discussion, next 2 minutes
 - Tell everyone the answer

Q: **Who is responsible** for the current outcome of higher education?

Voting on best answer

We're In This Together (My Answer)

- New generation of students
- New types of students, especially multi-culti
- It's not you, it's me
- New ambition of our faculty, but cannot select students



<https://quotablequoteunquote.files.wordpress.com/2008/08/walkingcomputergeek.jpg>

We're In This Together (My Answer)

- New generation of students

- New types of students



The main challenges for the future?

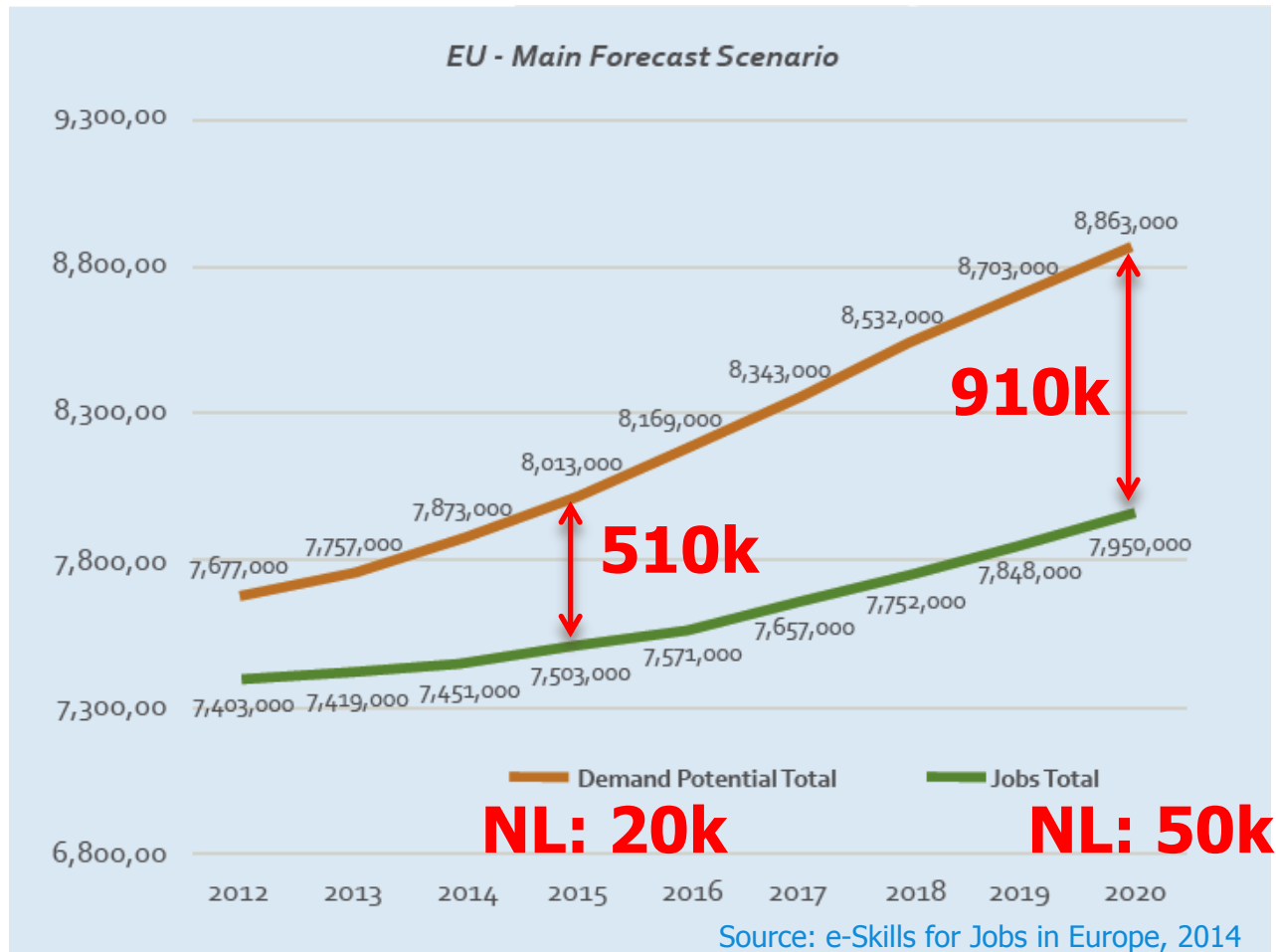
**Every student counts!
Every student is different!**

- New ambition of our faculty,
but cannot select students



<https://quotablequoteunquote.files.wordpress.com/2008/08/walkingcomputergeek.jpg>

Let's Extrapolate to Europe: The Workforce Gap in ICT



Let's Extrapolate to Europe: The Workforce Gap in ICT

EU - Main Forecast Scenario

9,300,00

The main challenges for the future?

Every student counts!
Every student is different!



Source: e-Skills for Jobs in Europe, 2014

Let's Extrapolate to Europe: The Workforce Gap in ICT

EU - Main Forecast Scenario

9,300,00

The main challenges for the future?

Every student counts!
Every student is different!

Q: **Who** is the Teacher of the Future?

7,300,00

Demand Potential Total

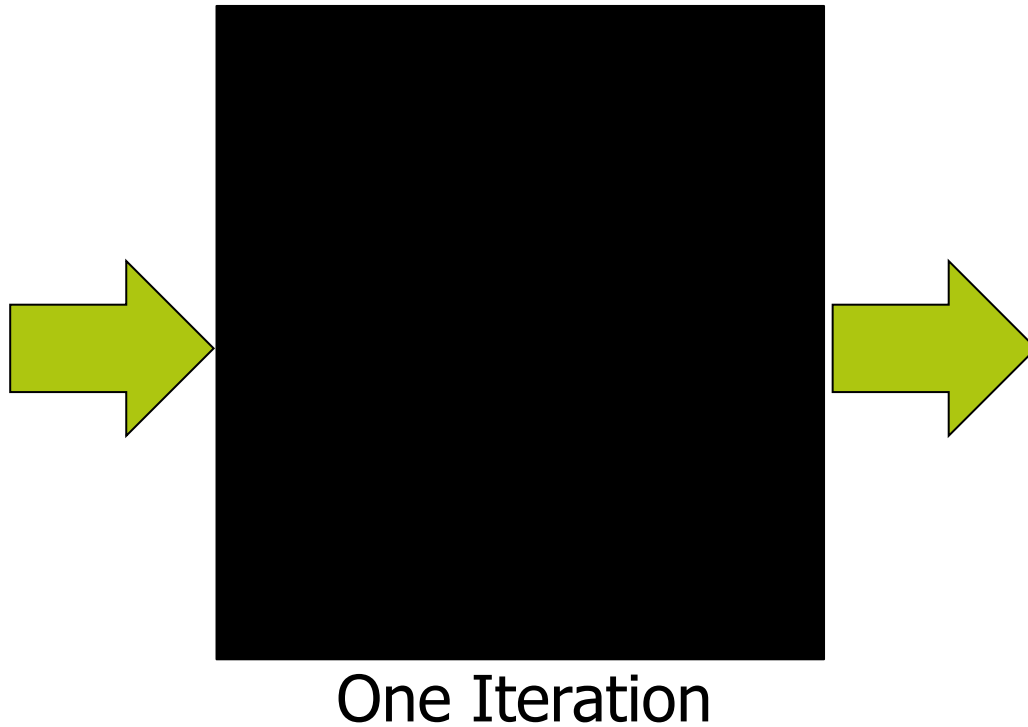
Jobs Total

6,800,00

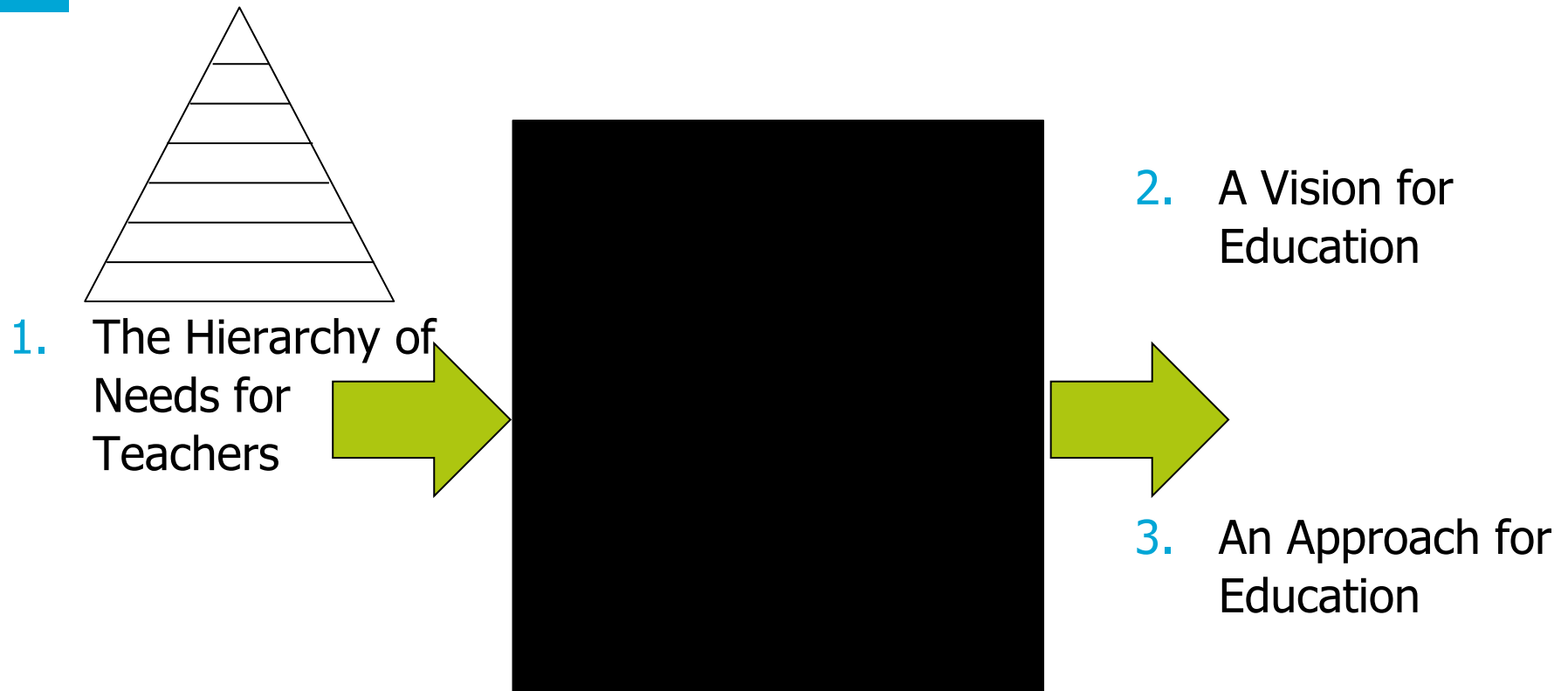
2012 2013 2014 2015 2016 2017 2018 2019 2020

Source: e-Skills for Jobs in Europe, 2014

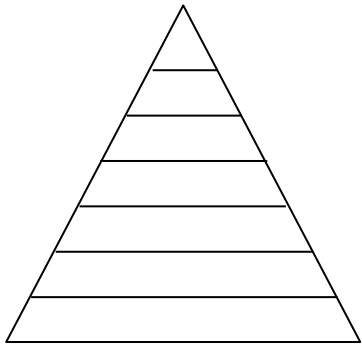
Who Is the Teacher of the Future?



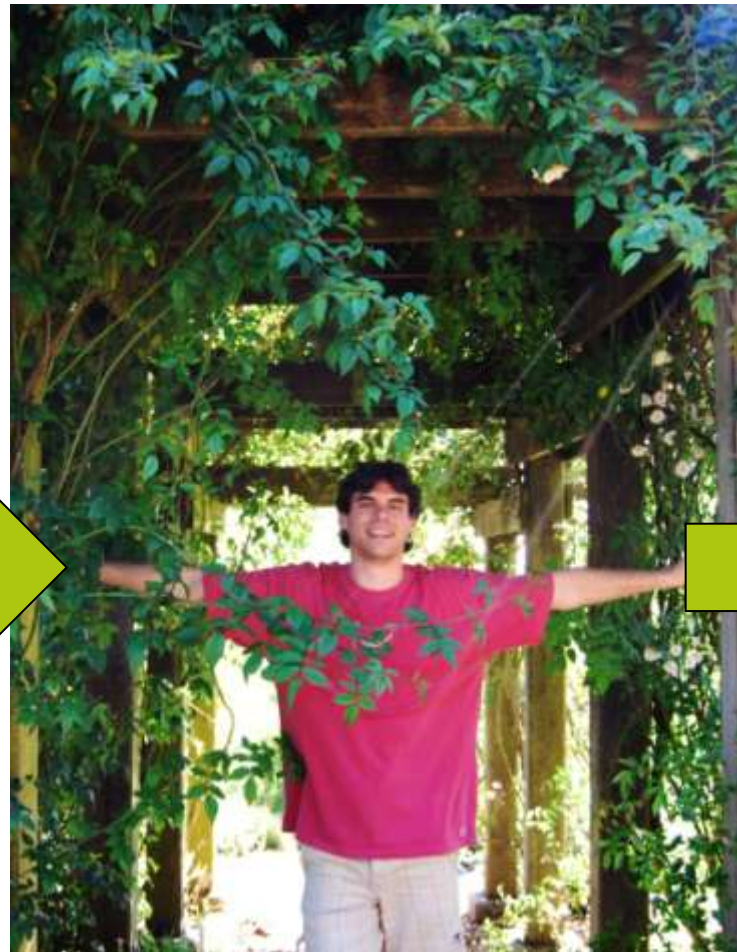
Who Is the Teacher of the Future?



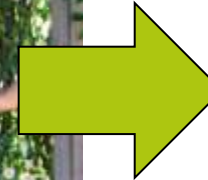
Who Is the Lecturer of the Future?



1. The Hierarchy of Needs for Teachers

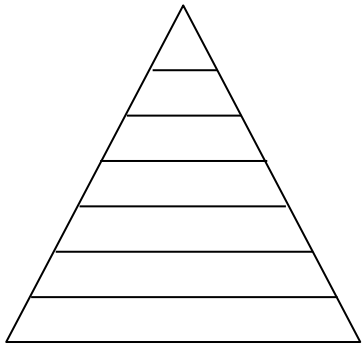


2. **Every Student Counts!**
A Vision for Education

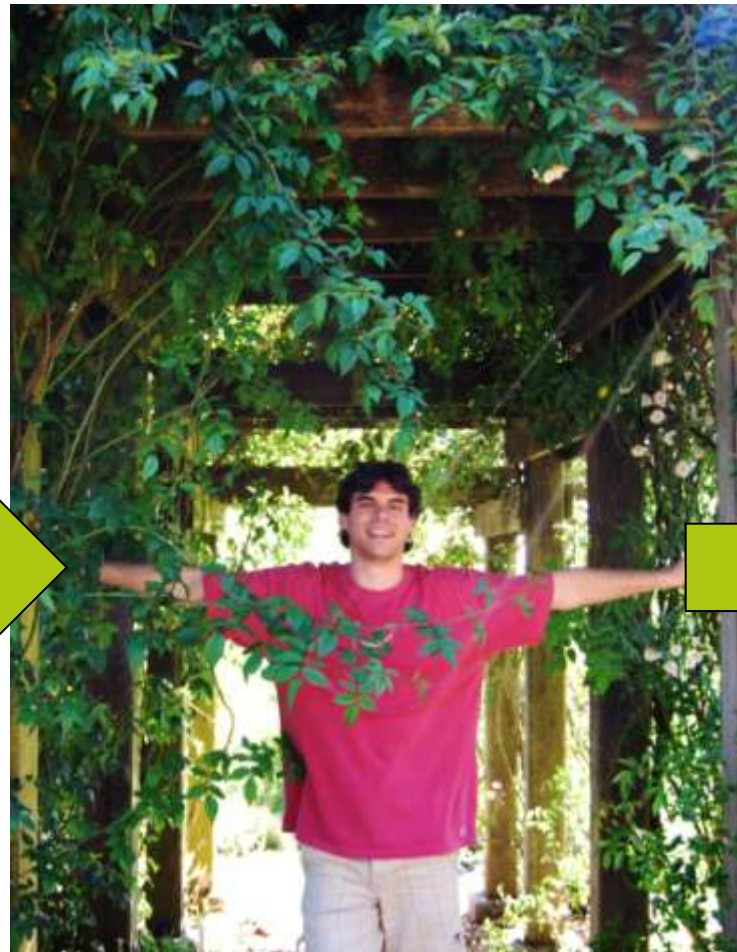


3. Gamification:
An Approach for Education

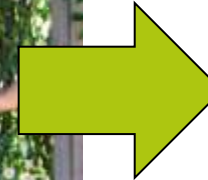
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1. **The Hierarchy of Needs for Lecturers**

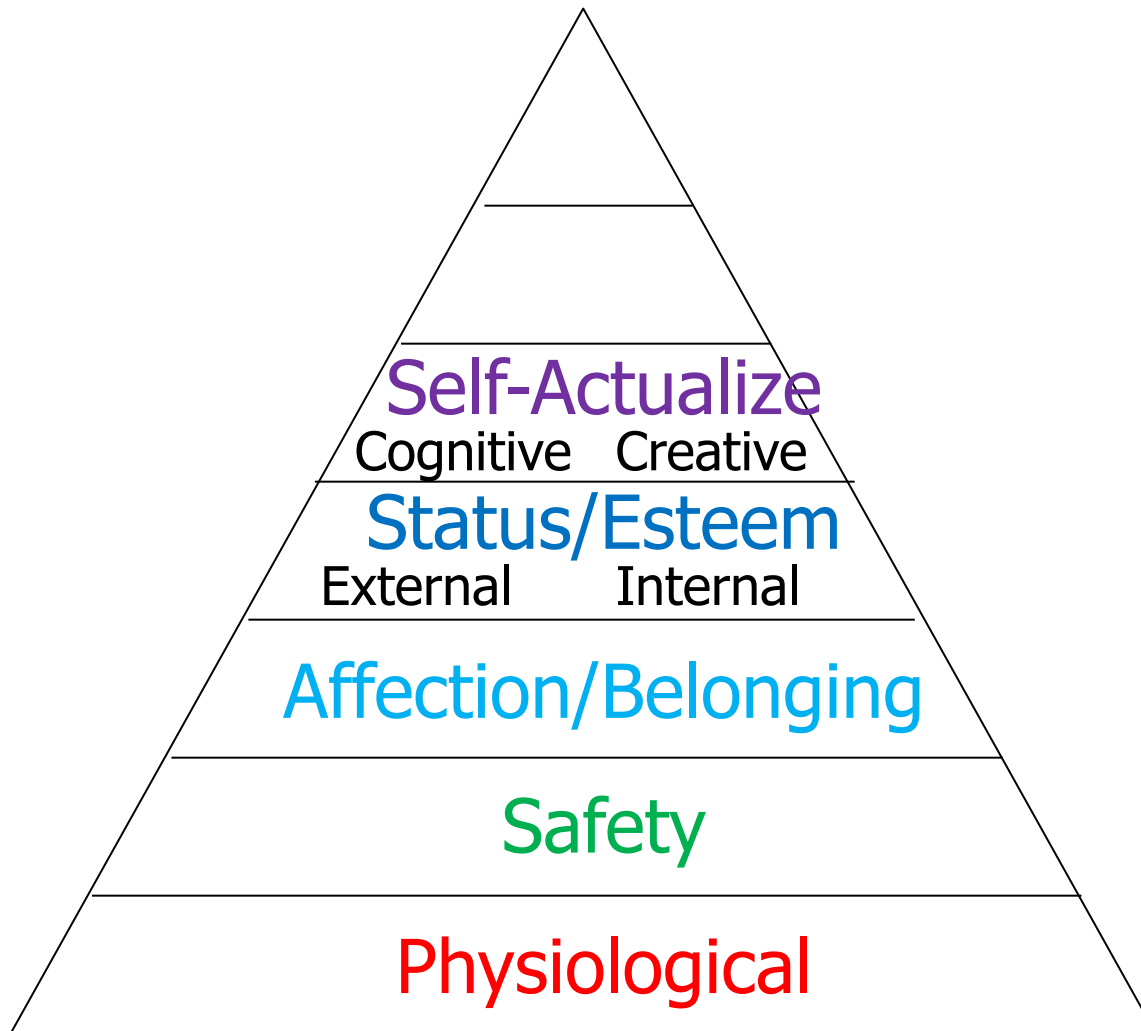


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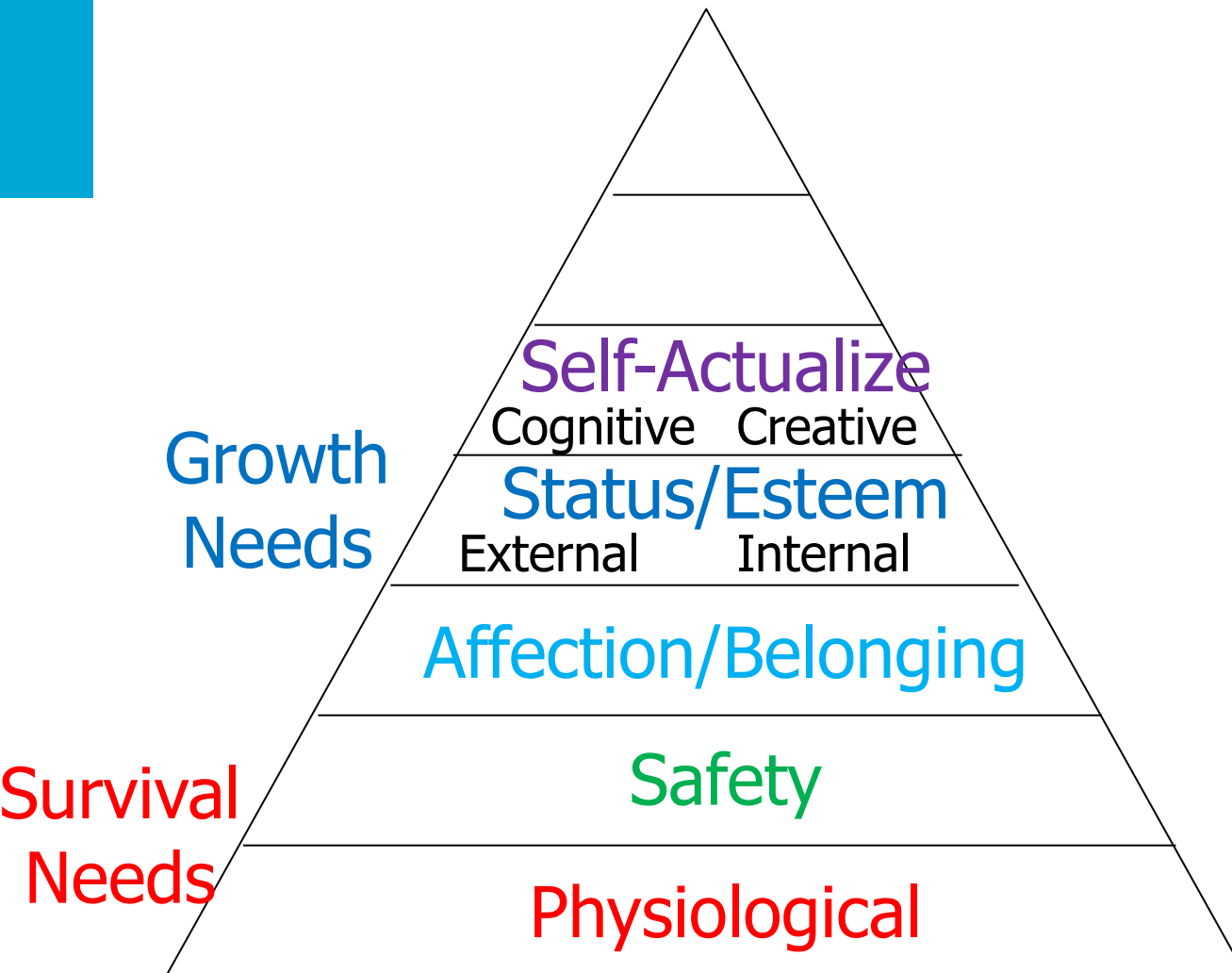
3. Gamification:
An Approach for Education

Maslow's Hierarchy of Needs (1943)



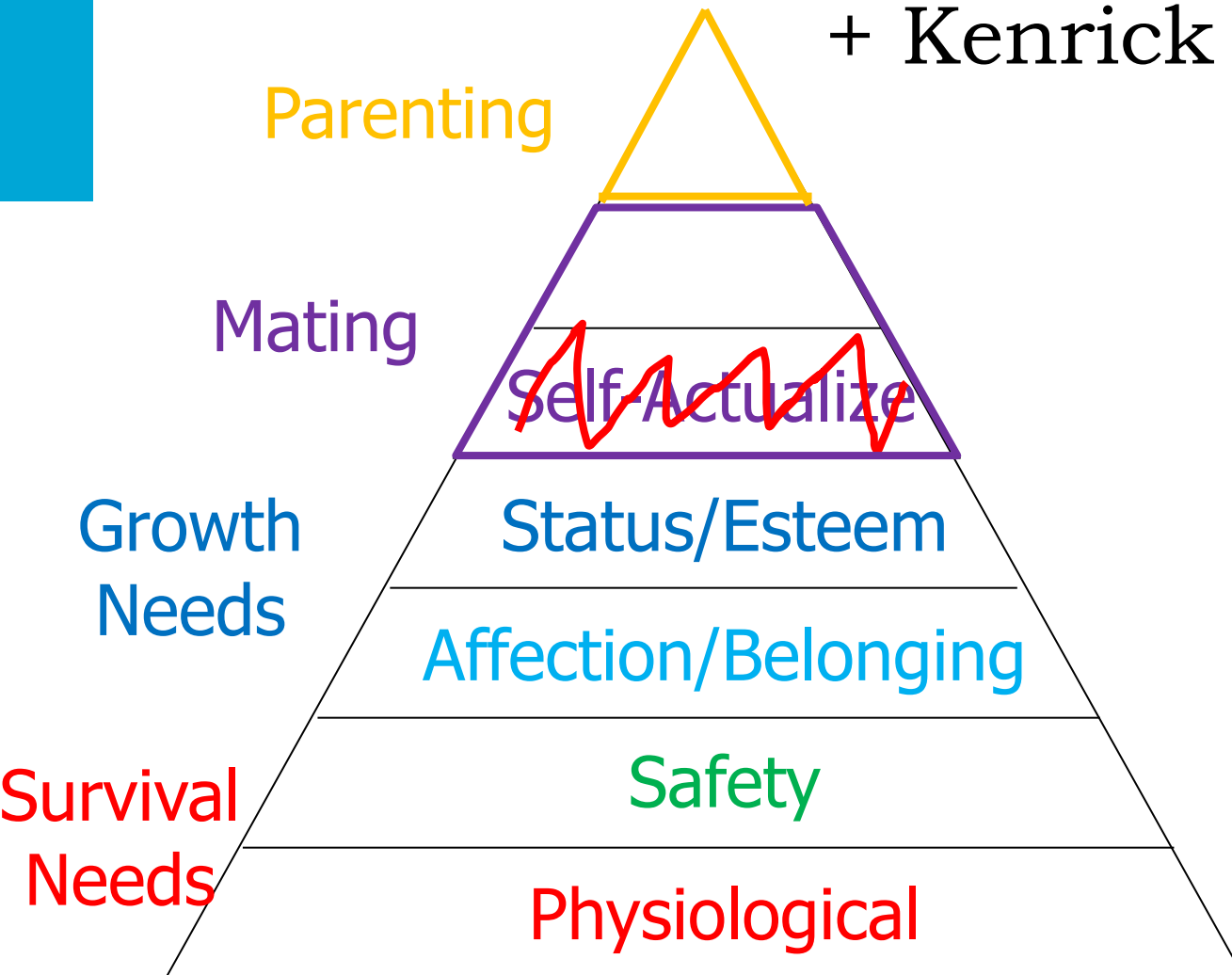
Abraham Maslow

Maslow's Hierarchy of Needs (1943)



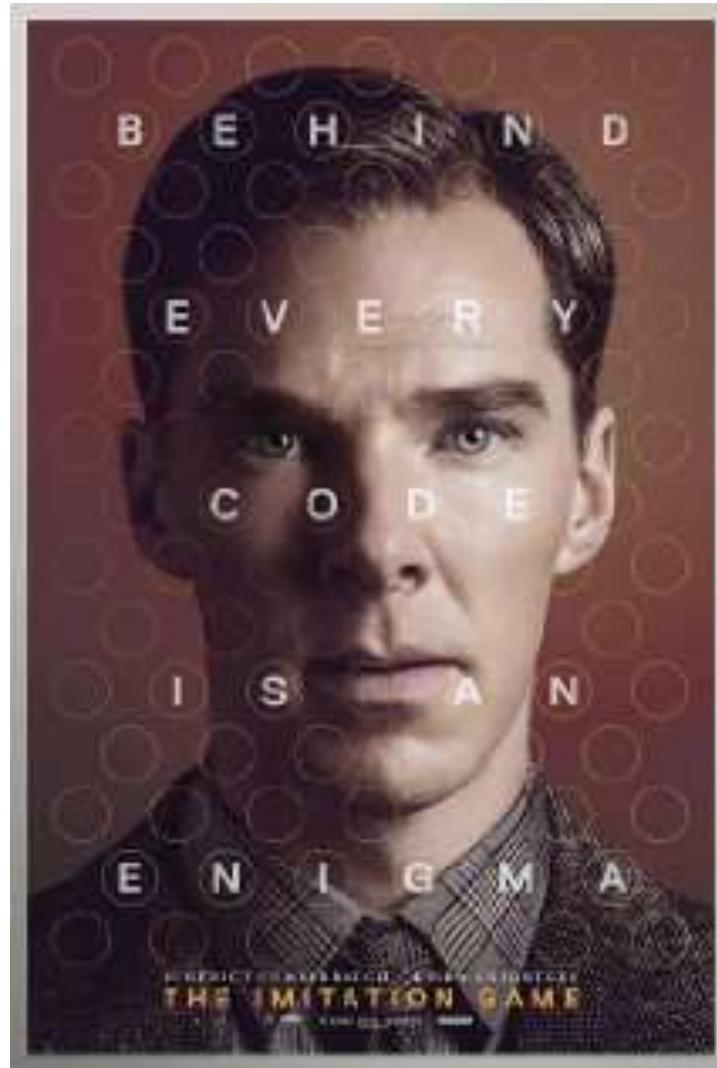
Abraham Maslow

Maslow's Hierarchy of Needs (1943) + Kenrick et al. (2010)

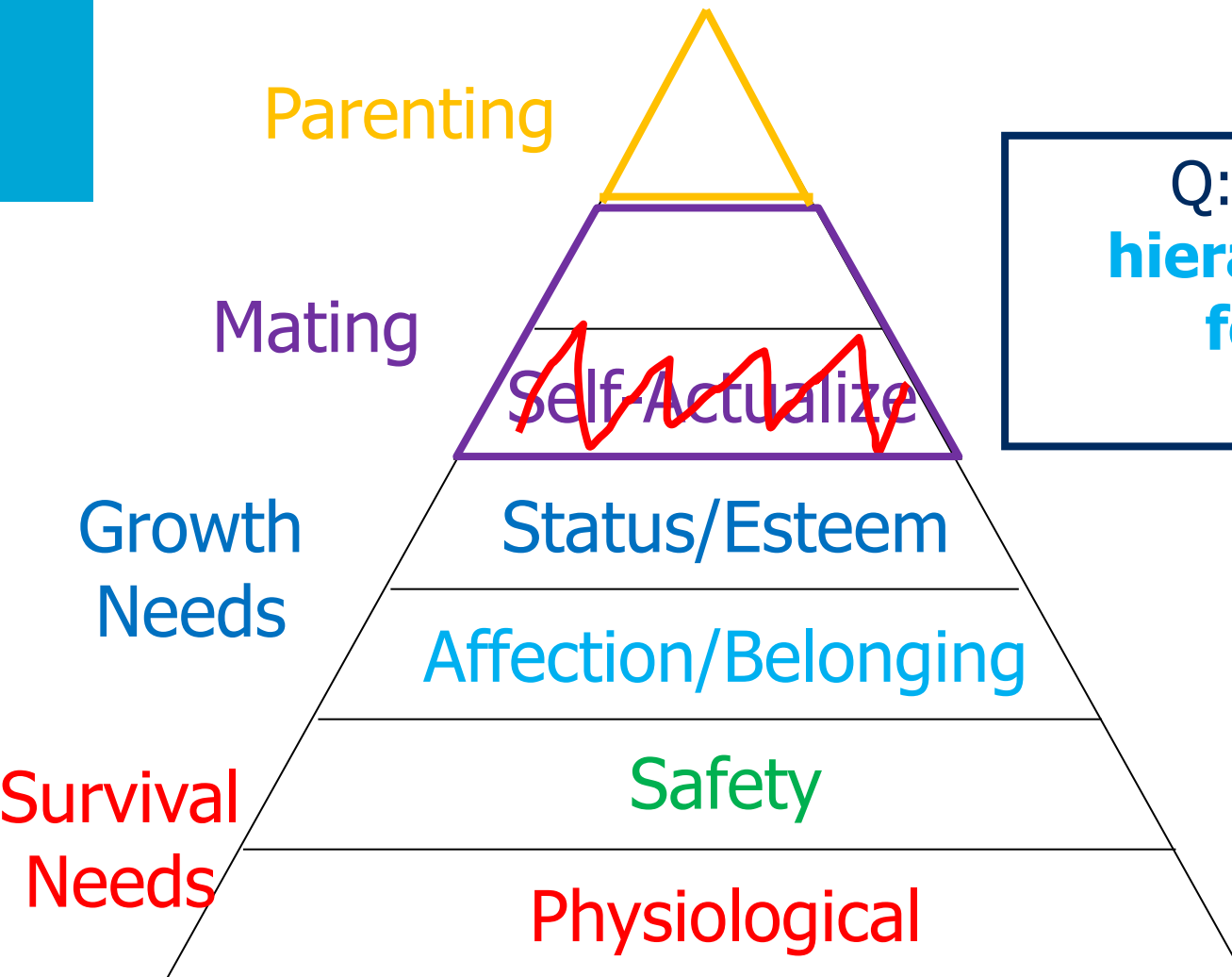


Abraham Maslow

Exercise: The Imitation Game



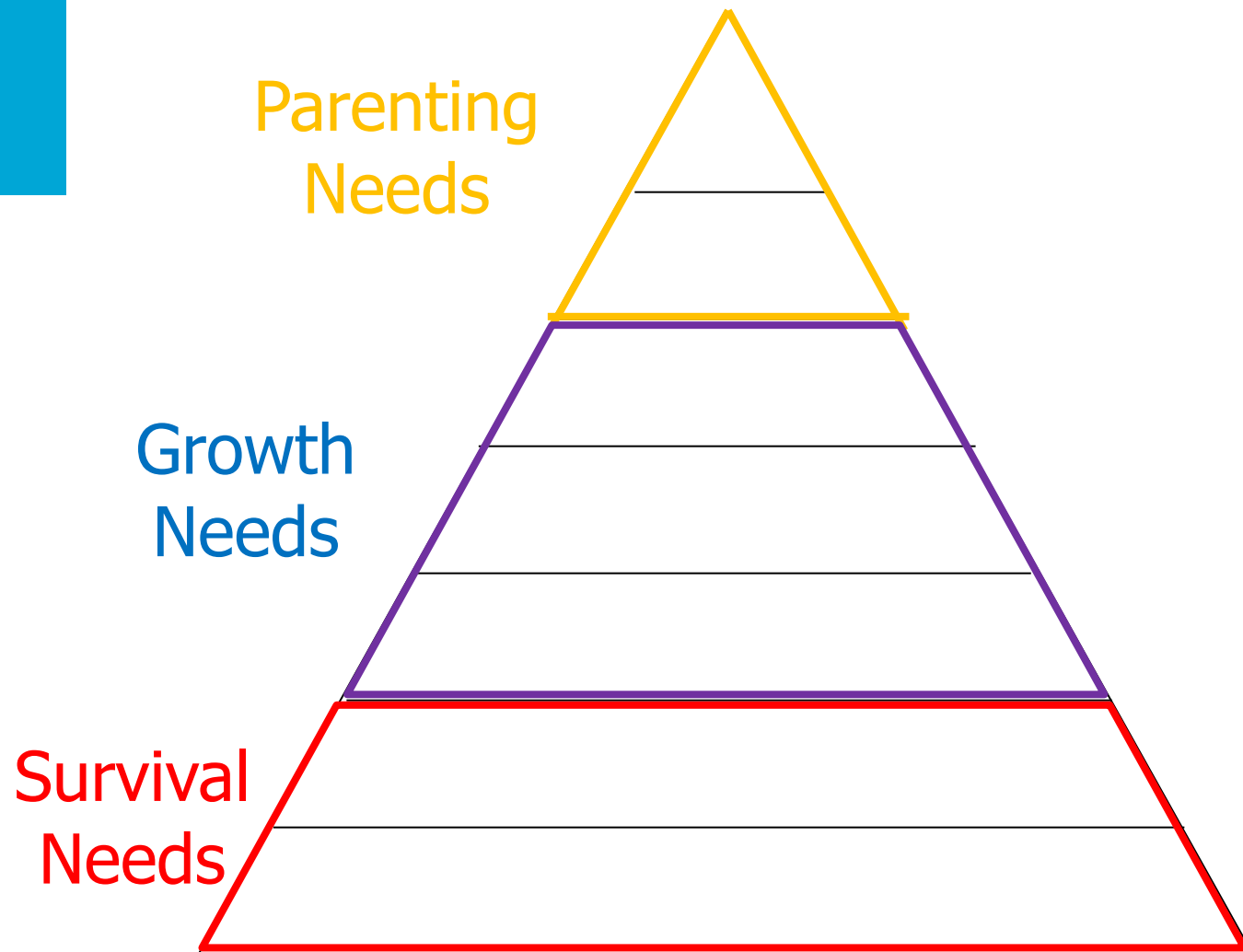
Exercise: The Imitation Game



Q: How would **a hierarchy of needs for teachers** look like?

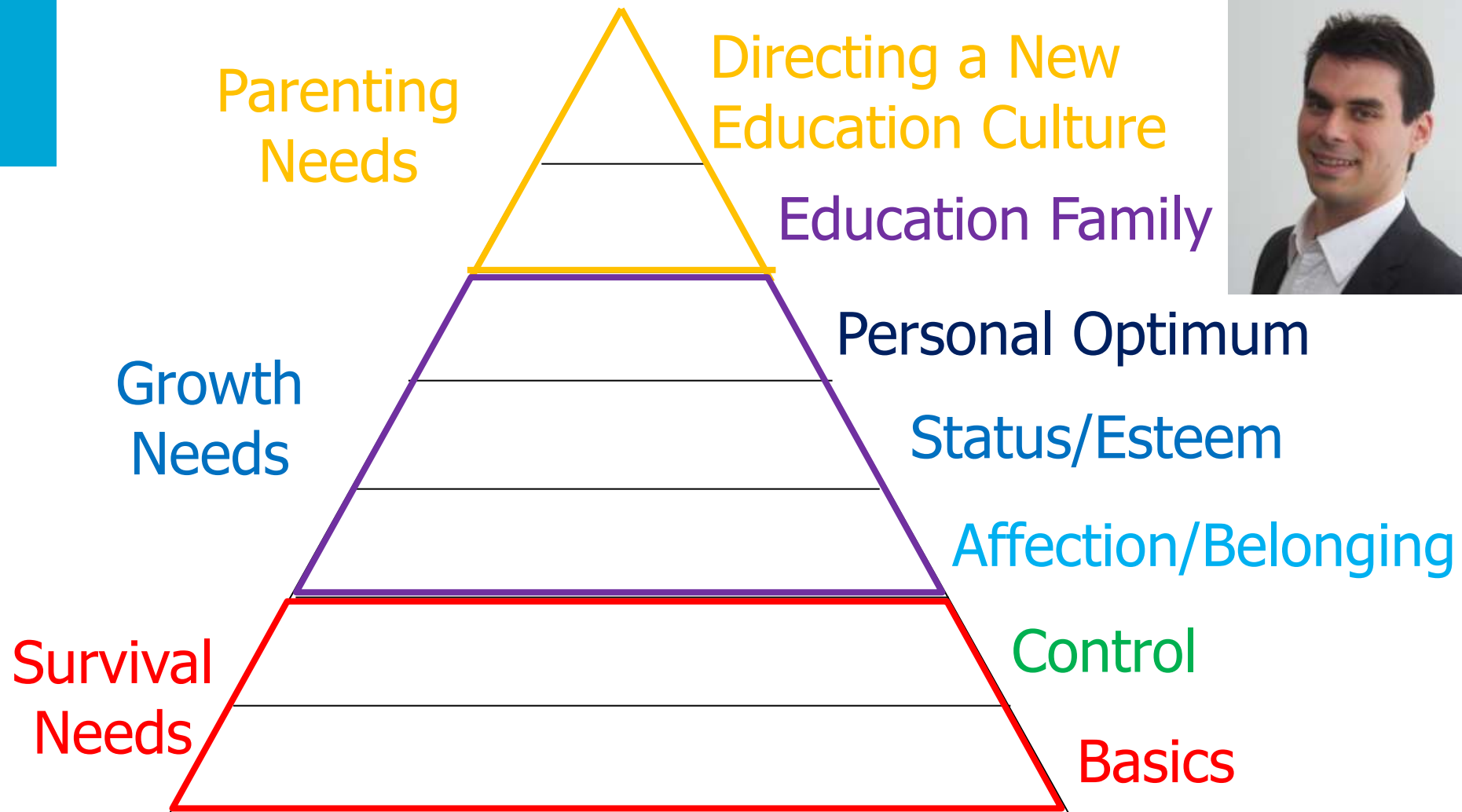
The Hierarchy of Needs for Teachers

Alexandru Iosup (2015)



The Hierarchy of Needs for Teachers

Alexandru Iosup (2015)



The Hierarchy of Needs for Teachers (2015)

- We all know about the basics of teaching
- But:
 - Need to improve the BKO, especially for new conditions
 - Need a “diurnal” cycle (sleep=research)
 - Need much better content-authoring **tools**, especially for new conditions (MOOCs, blended, ...)



Survival
Needs

Basics

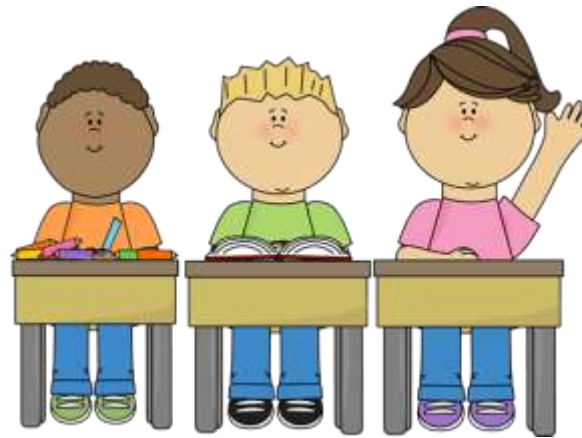


The Hierarchy of Needs for Teachers (2015)

- Address threats, better chances of success
- But
 - Need **tools** for simple, online learning analytics (Excel?!)

-

Need monitoring and testing **tools**, e.g., clickers



Survival
Needs

Control

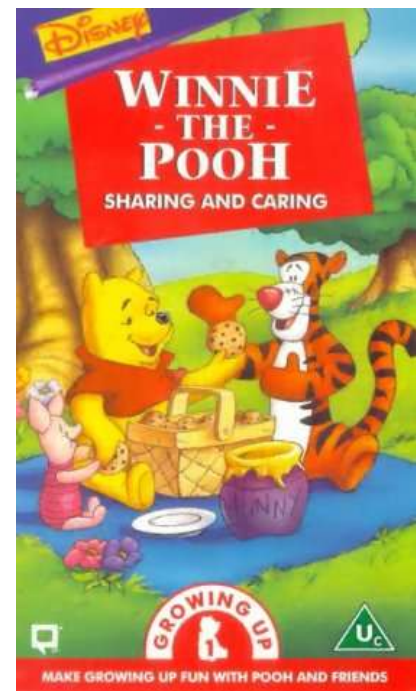
Basics

The Hierarchy of Needs for Teachers (2015)

- Social needs
- But
 - Need a culture of “sharing is caring”
 - Need a culture of professional education
 - Need **tools** for management of course teams (Blackboard can be too slow, Facebook could break privacy laws)

Growth
Needs

Affection/Belonging



The Hierarchy of Needs for Teachers

(2015)

- Internal feeling of mastering education
- External status, recognition, glory

- But
 - Need **tools** for detailed learning analytics
 - Need governance to recognize value of education

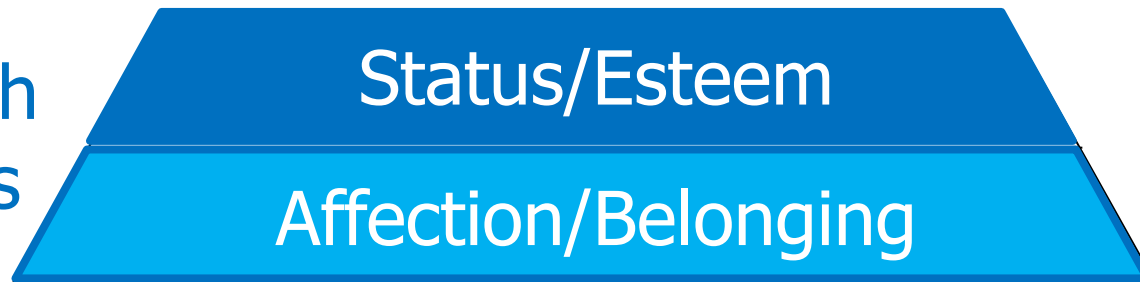
SELF-ESTEEM DETECTIVE



MIKEY HELLER © 2014 TIMETRABBLE.COM



Growth
Needs



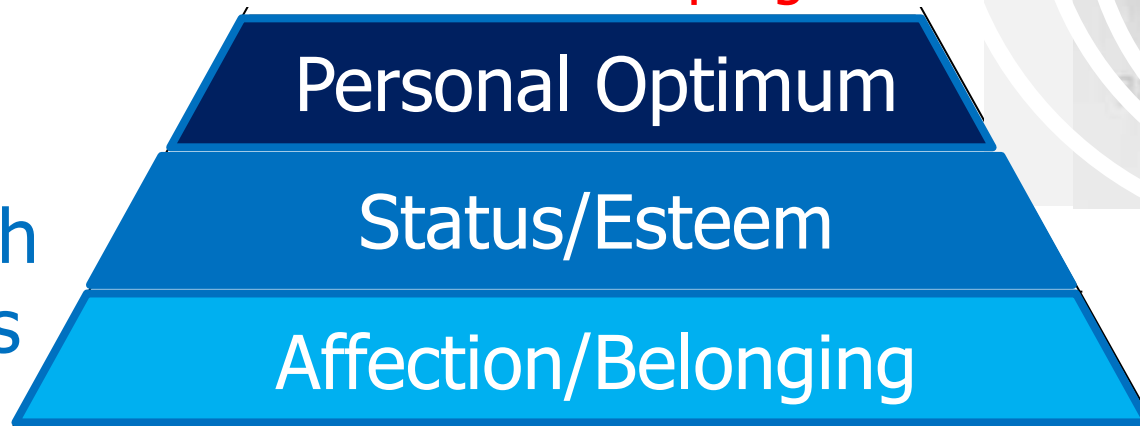
The Hierarchy of Needs for Teachers (2015)

- Learn and Create new education techniques

- But

- Need to formulate personal vision
- Need environment to create
- Need **tools** to validate progress

Growth
Needs



The Hierarchy of Needs for Teachers (2015)

- Teach the teachers!
- But
 - The Education Genealogy Project
 - Need **tools** to advise and collaborate with friendly teams
 - Need **tools** for detailed analytics
 - Need **governance** support

Parenting
Needs

Education Family



The Hierarchy of Needs for Teachers (2015)

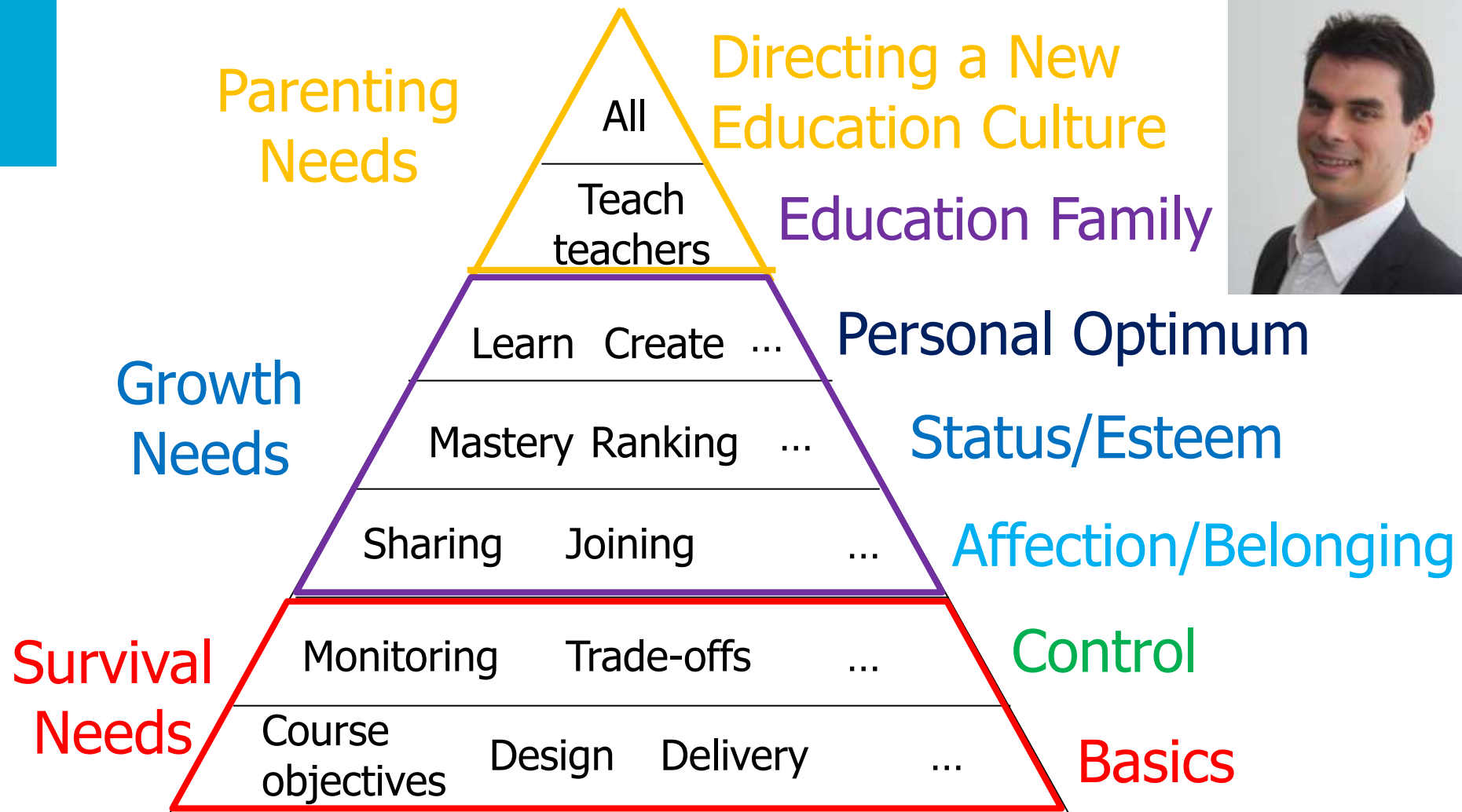
- Establish **a new education culture**:
 - In research, **1,000 citations is the golden standard**
- But
 - Need **tools** to create at large scale
 - Need **governance** support and **involvement**

HilkiArtists.com

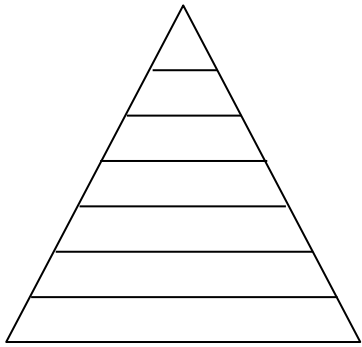


The Hierarchy of Needs for Teachers

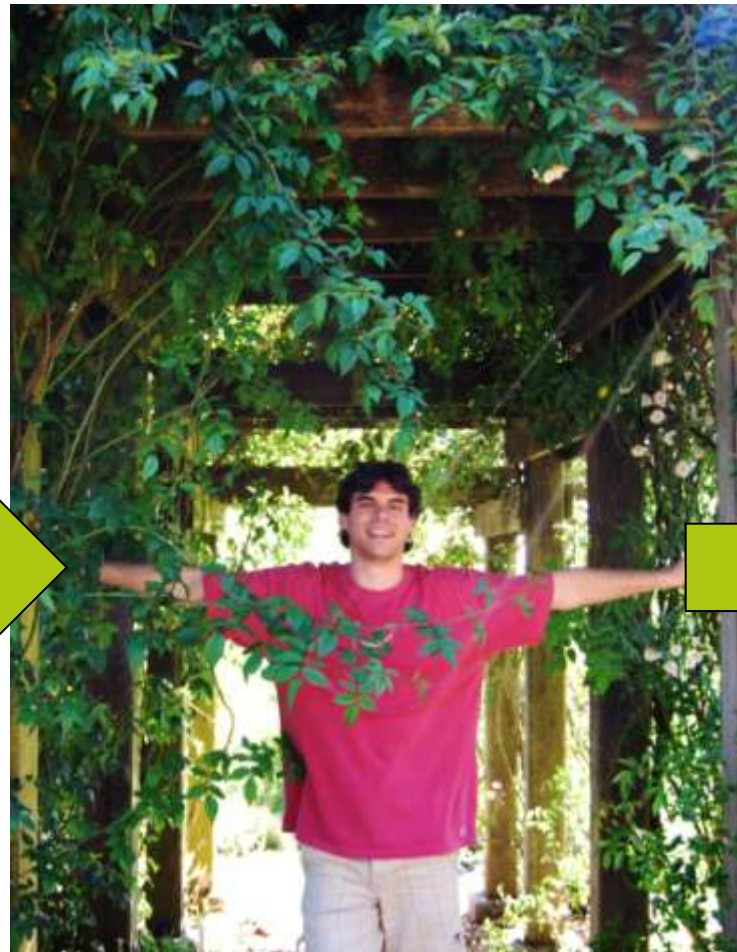
Alexandru Iosup (2015)



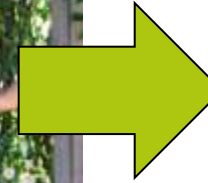
Who Is the Lecturer of the Future?



1. The Hierarchy of Needs for Lecturers



2. Every Student Counts!
A Vision for Education



3. **Gamification:
An Approach for Education**

2014: How to spend 1 Billion?

A: ICT and Gamification for education!



Q: What is **gamification**?

A: The use of techniques designed for gaming in non-gaming settings, e.g., in education.

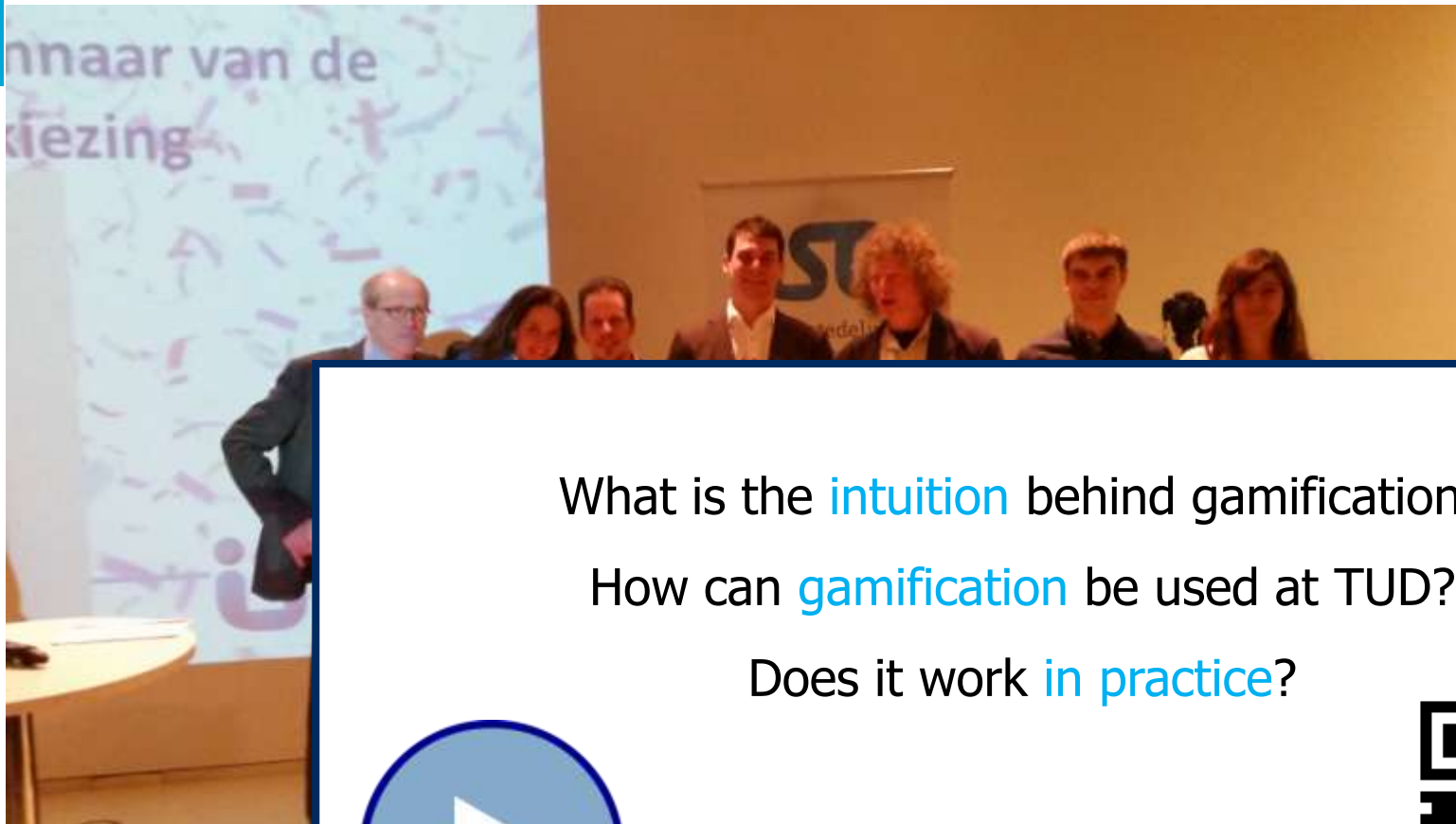


<http://goo.gl/v97zSW>



2014: How to spend 1 Billion?

A: ICT and Gamification for education!



What is the **intuition** behind gamification?

How can **gamification** be used at TUD?

Does it work **in practice**?



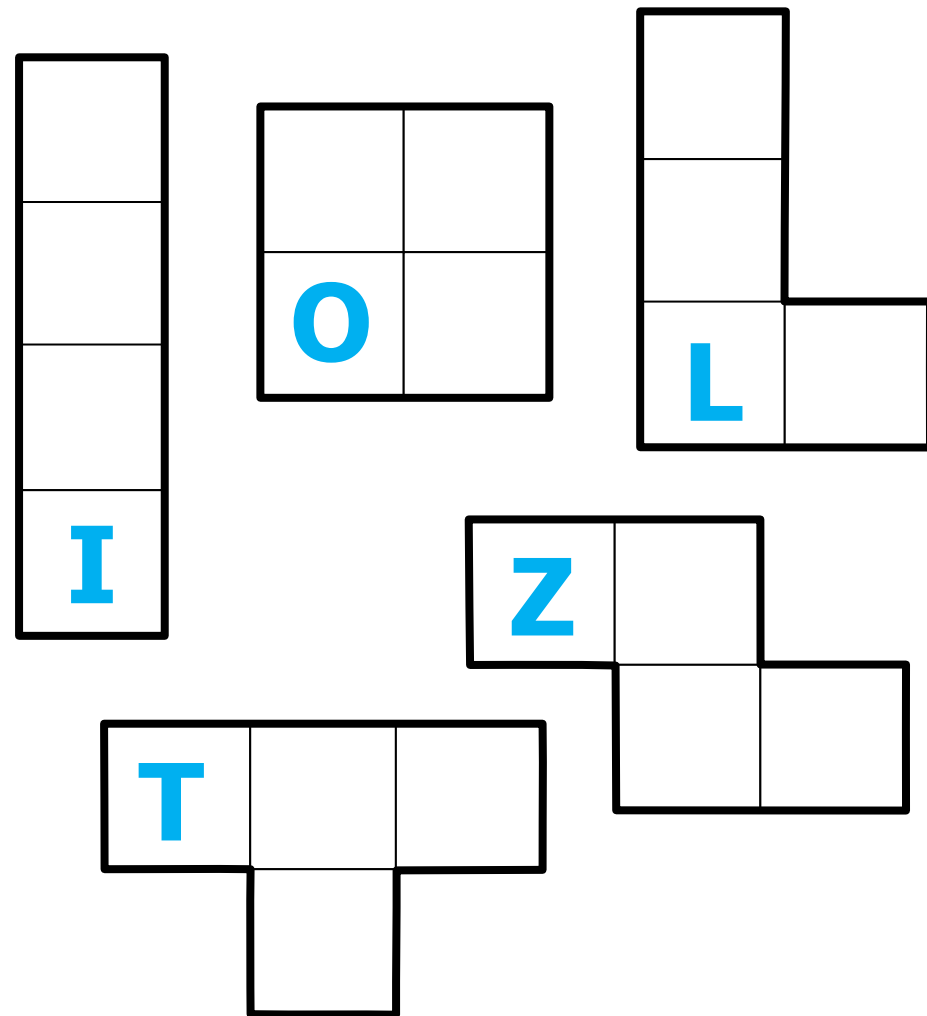
<http://goo.gl/ILSNeB>



Do You Know This Person?







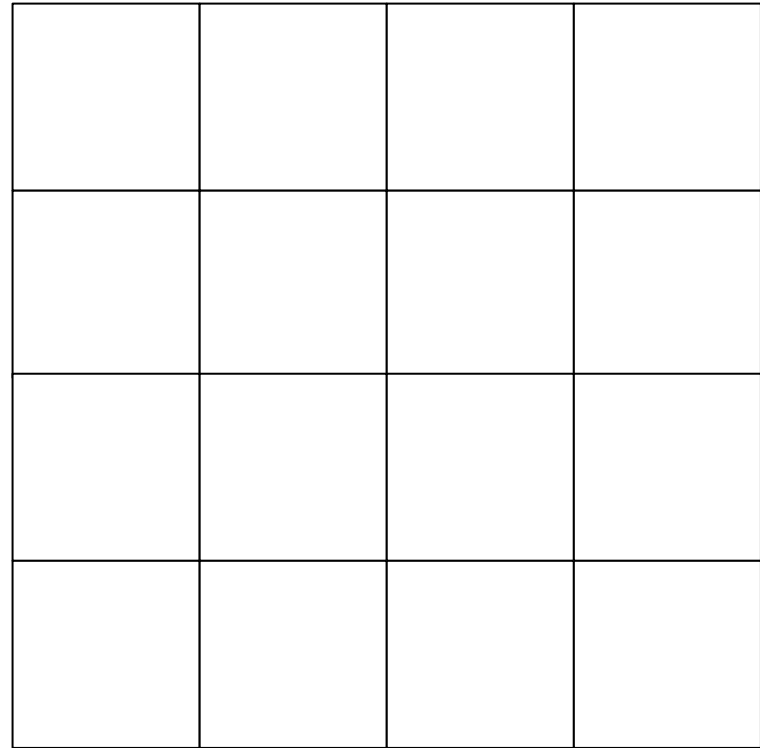
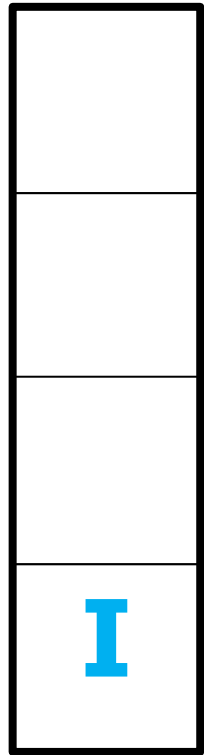


**Designing a course is
like creating a complex puzzle**

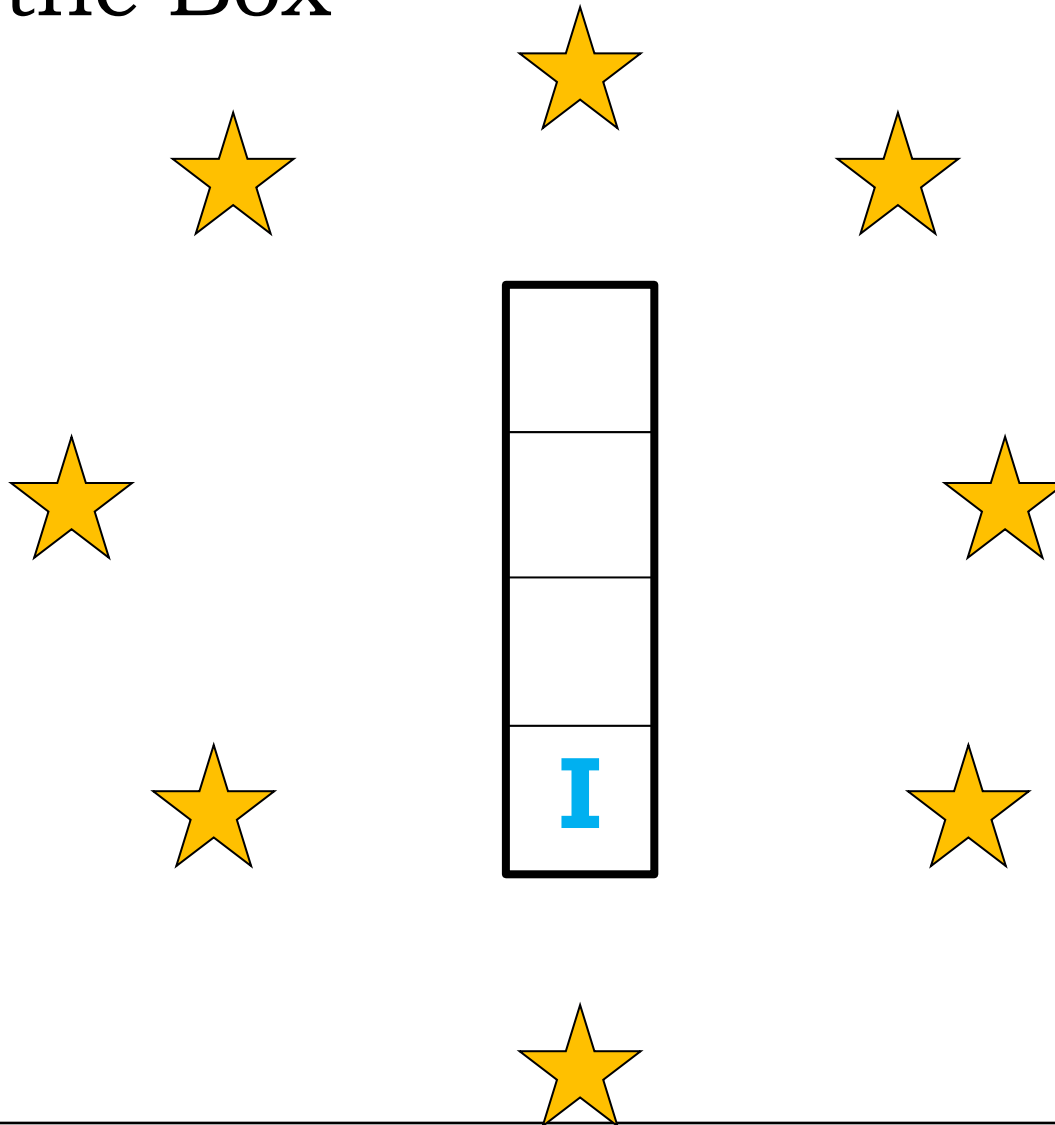


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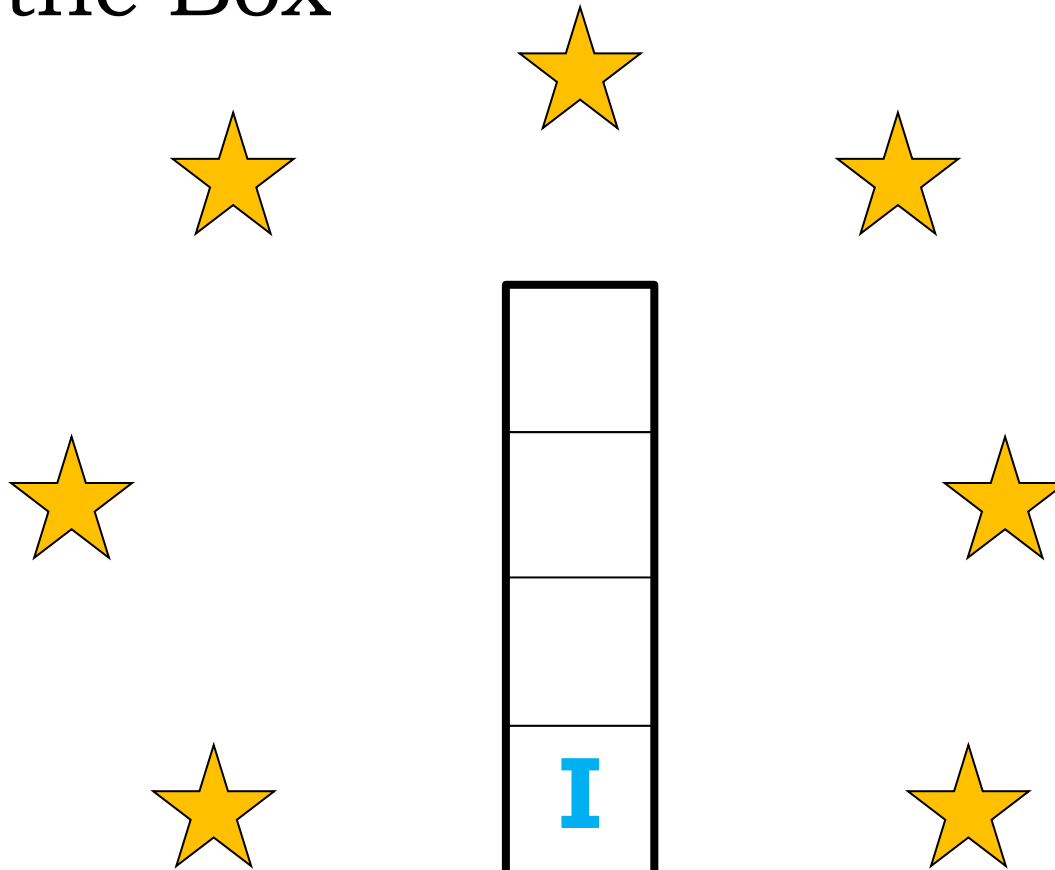
I in the Box



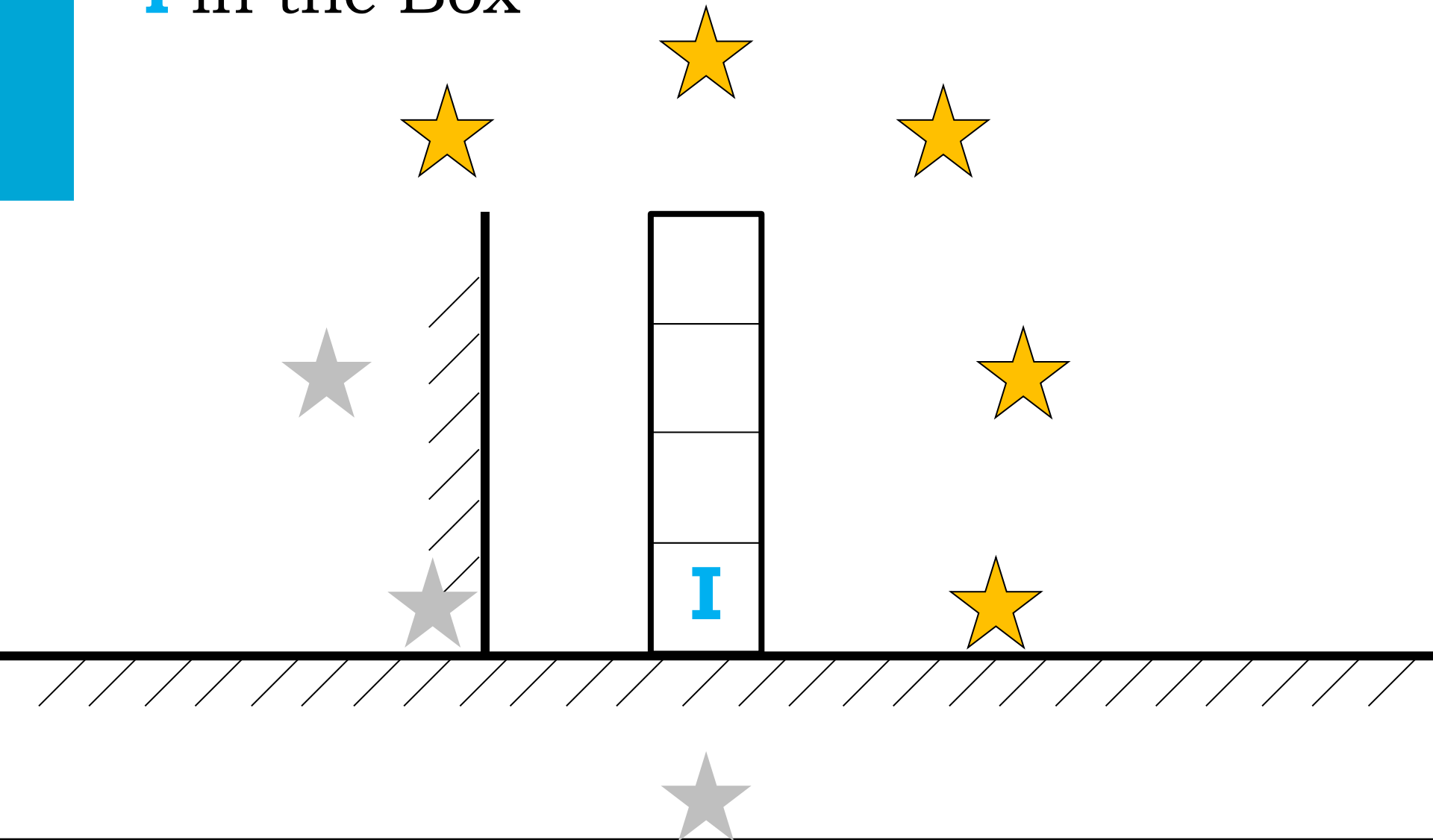
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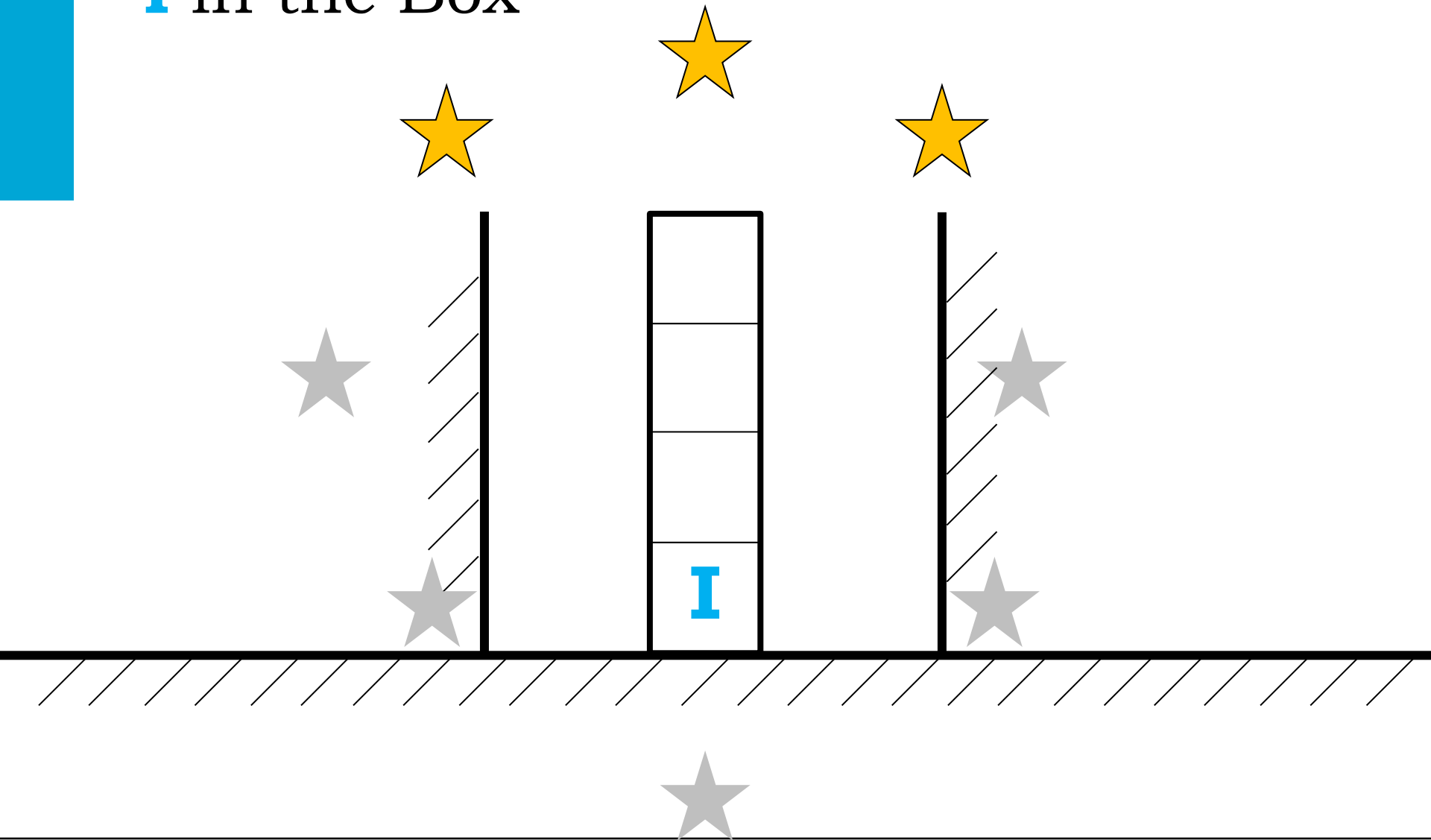
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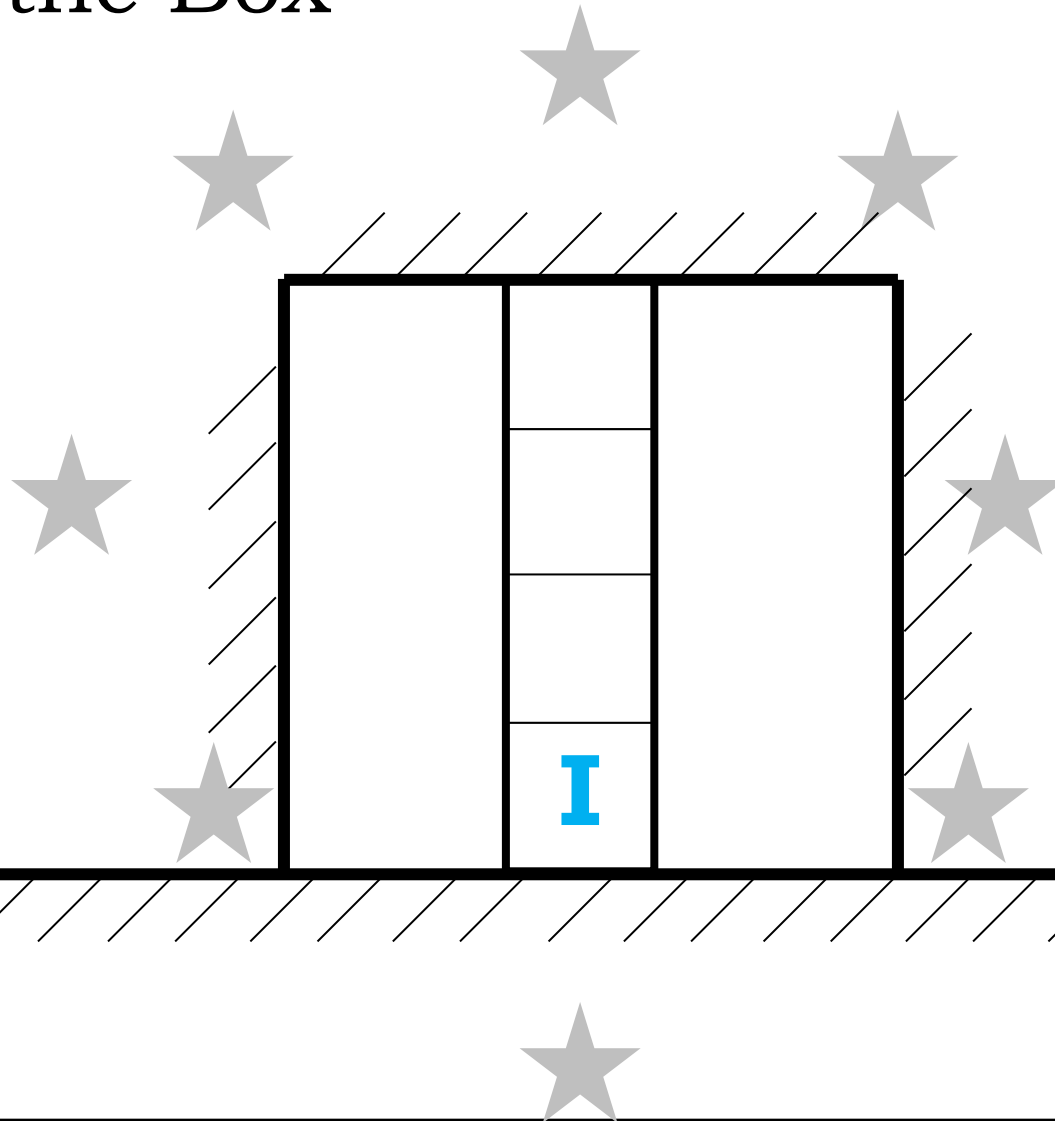
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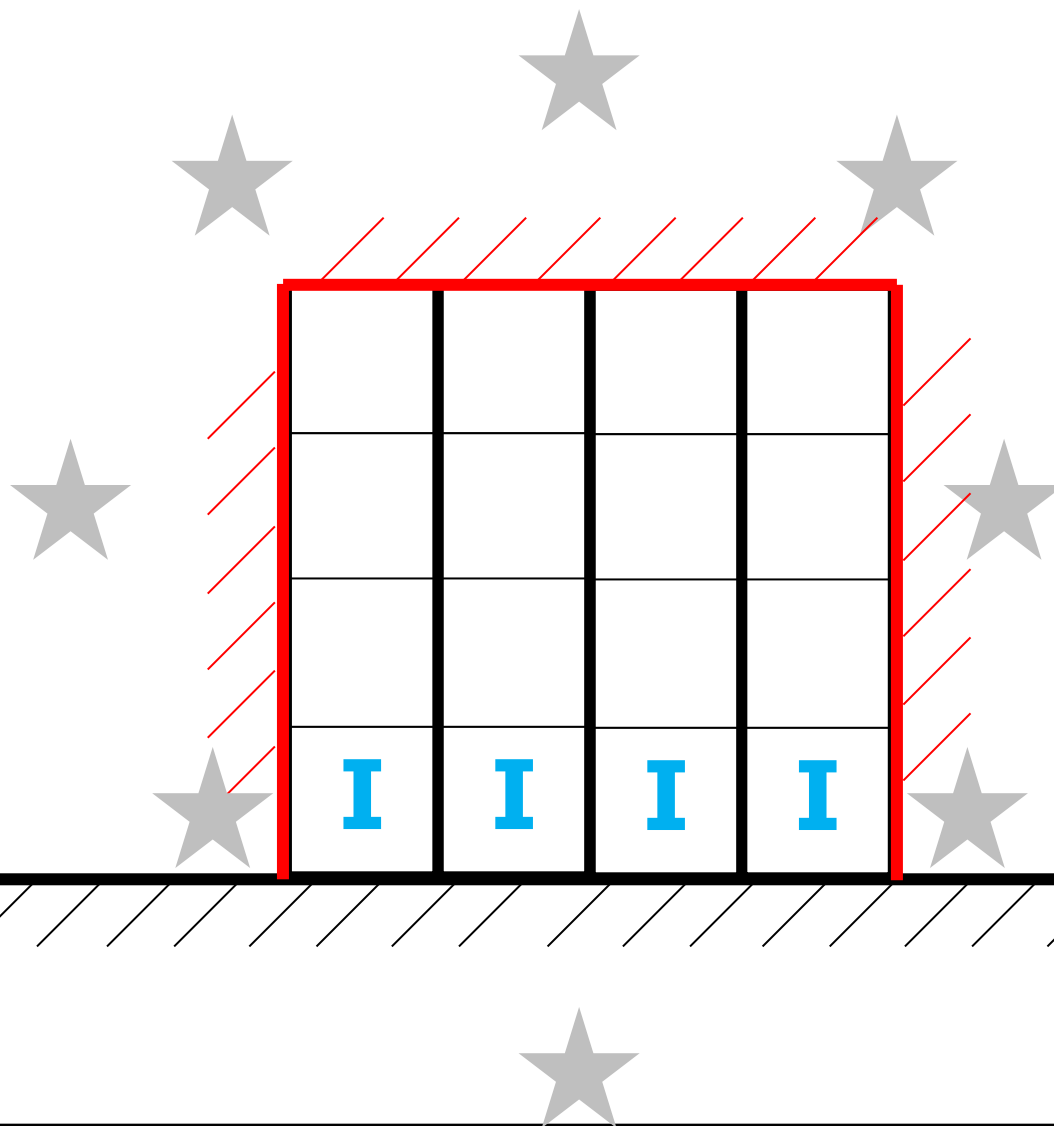


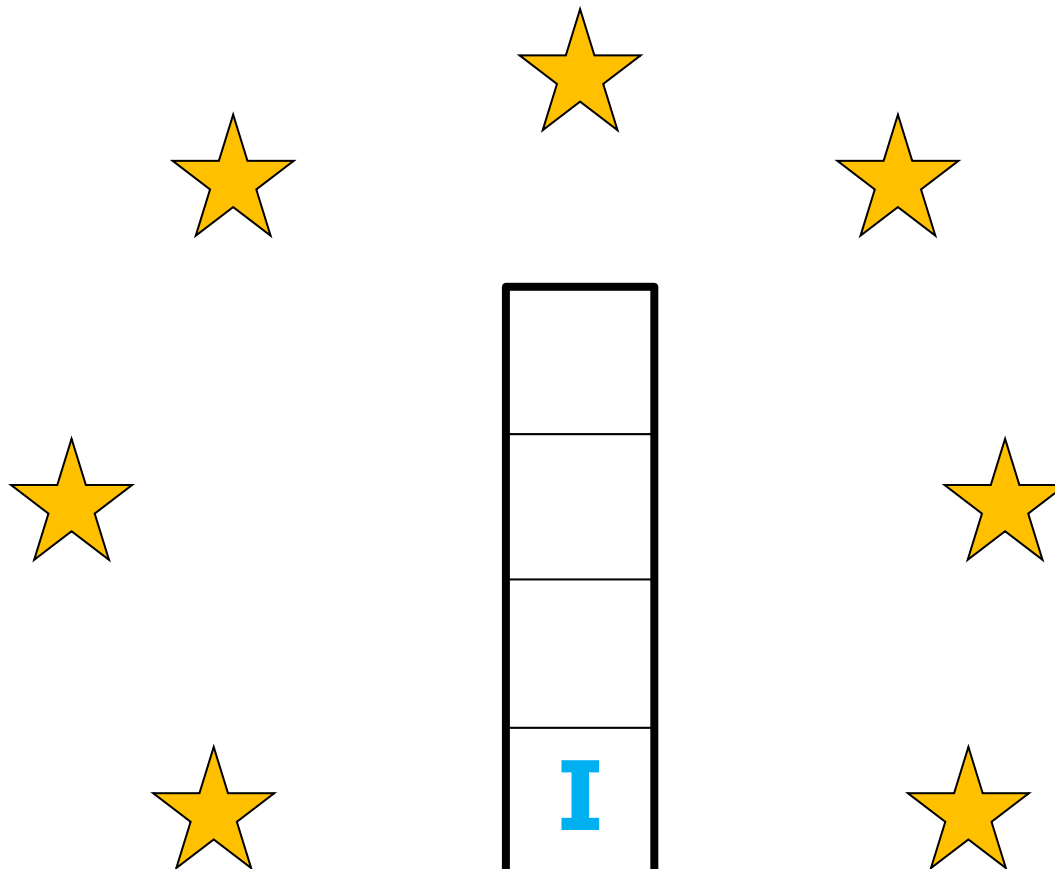
I in the Box



I in the Box



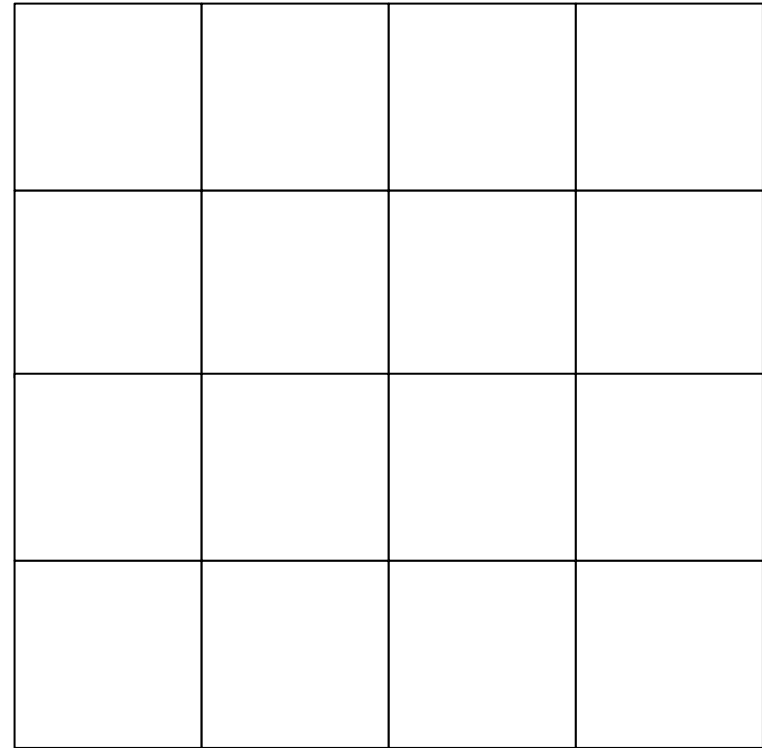
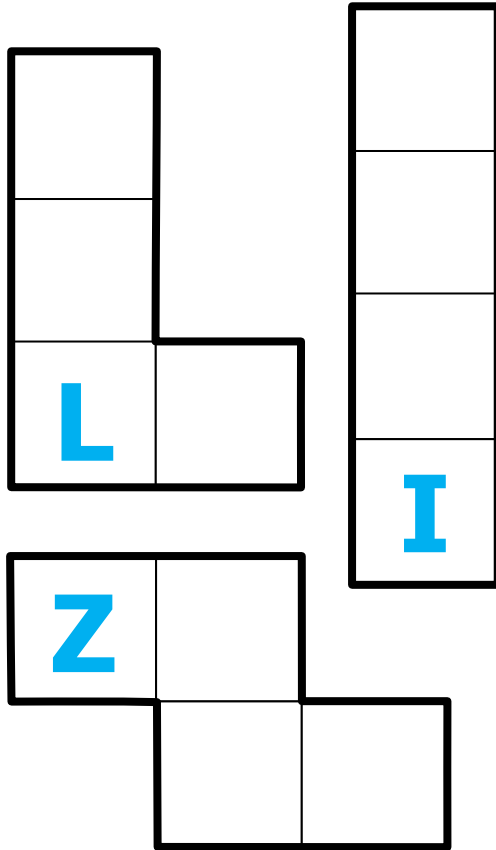


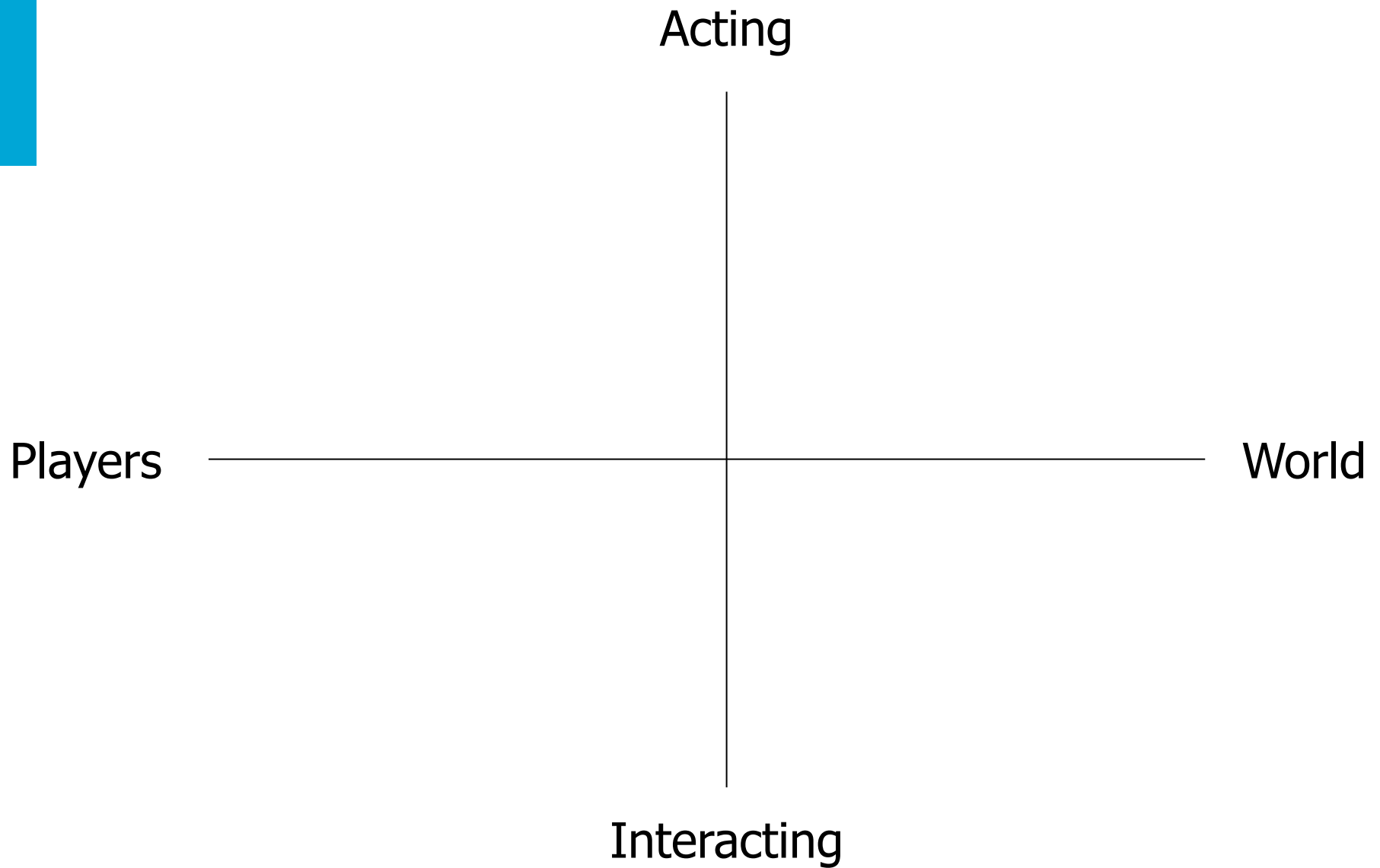


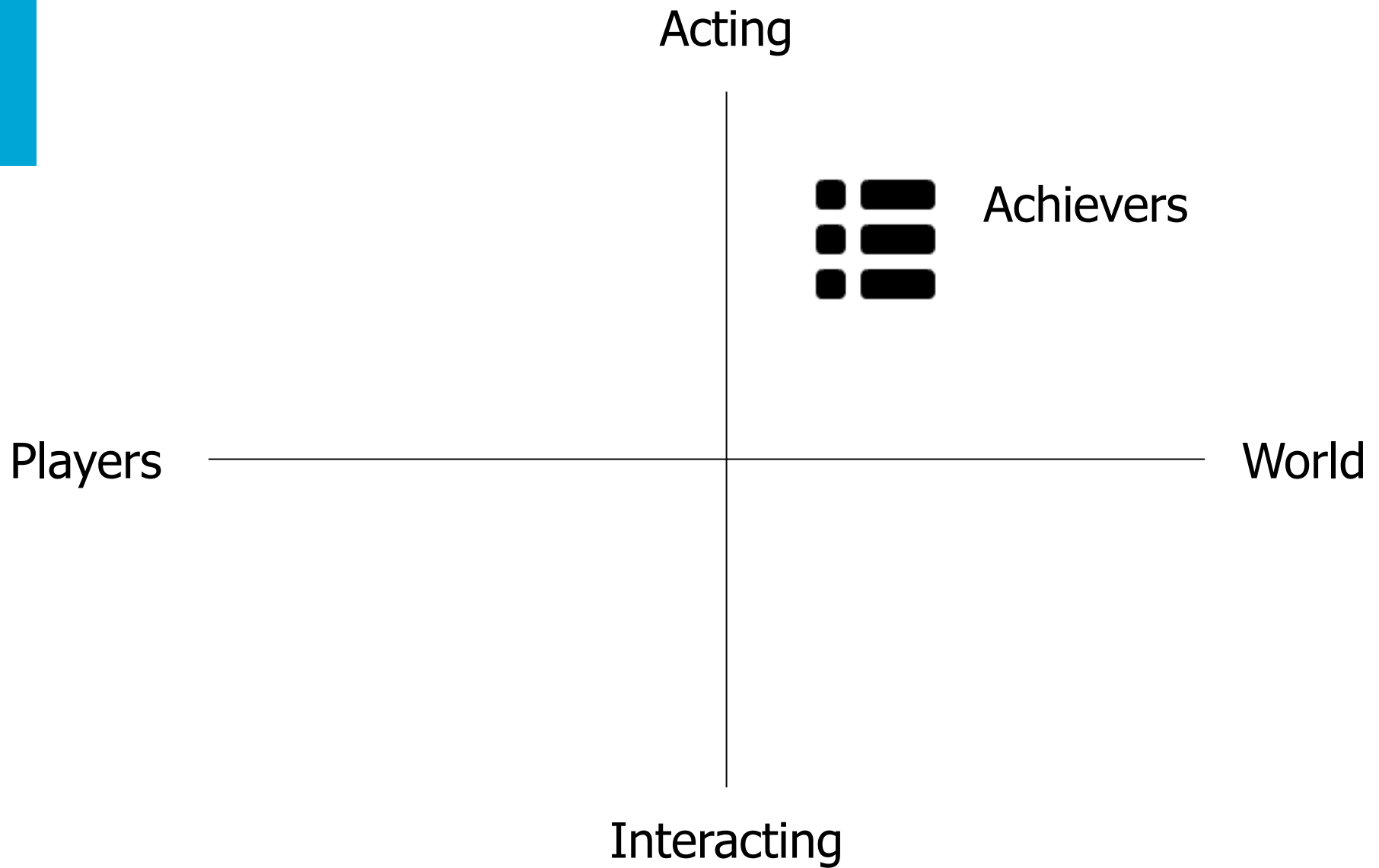


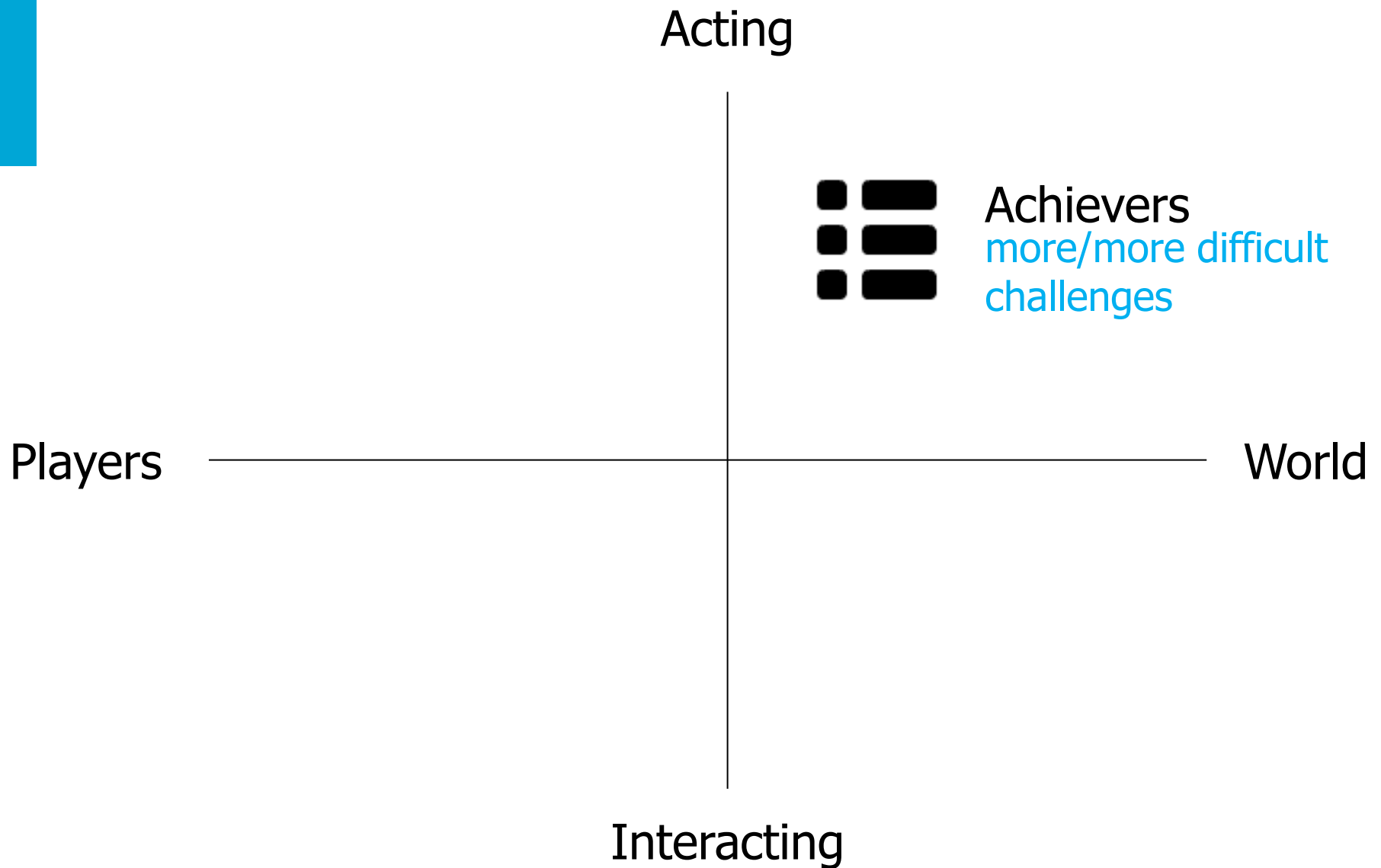
Content Unlocked!

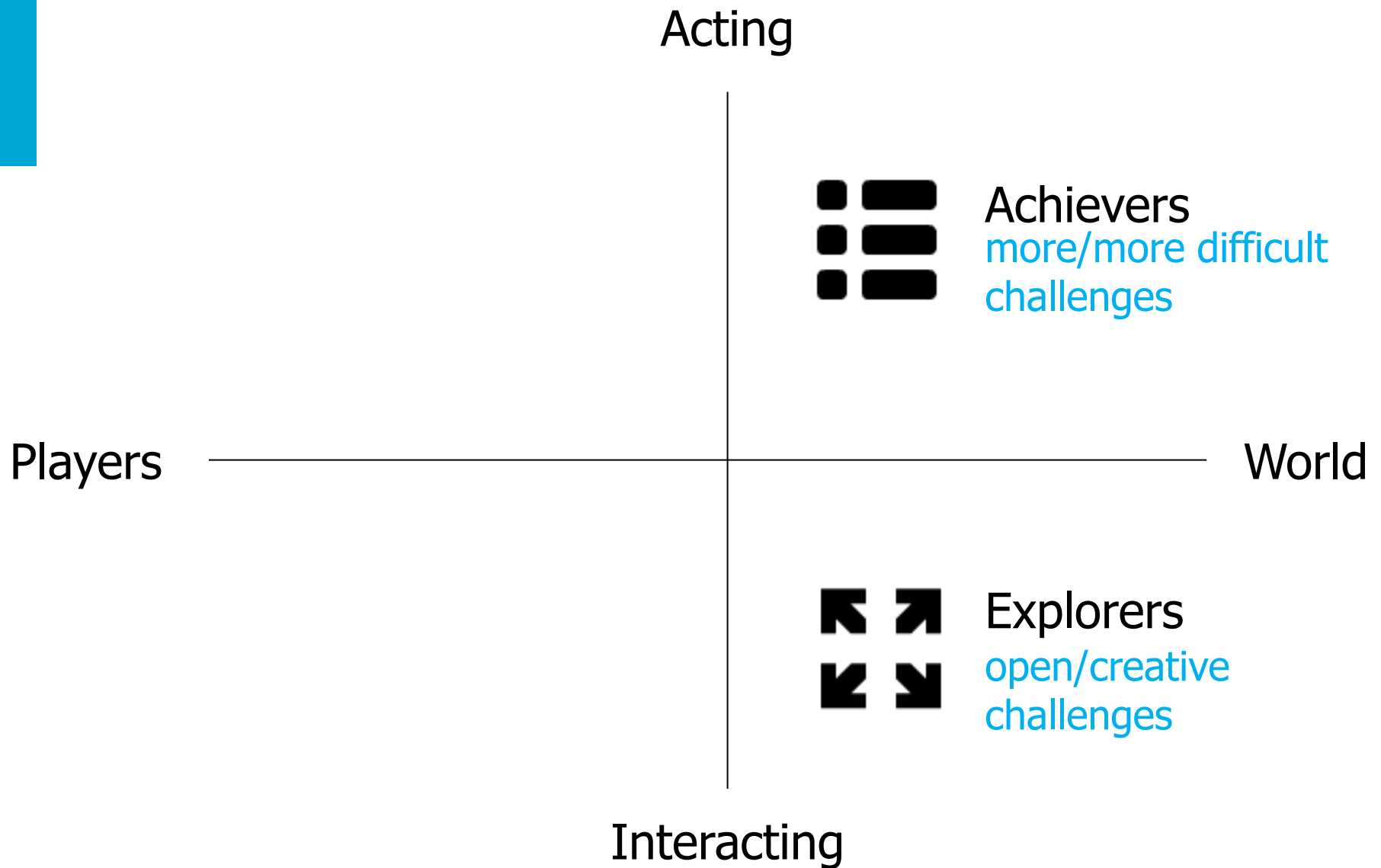
2 x

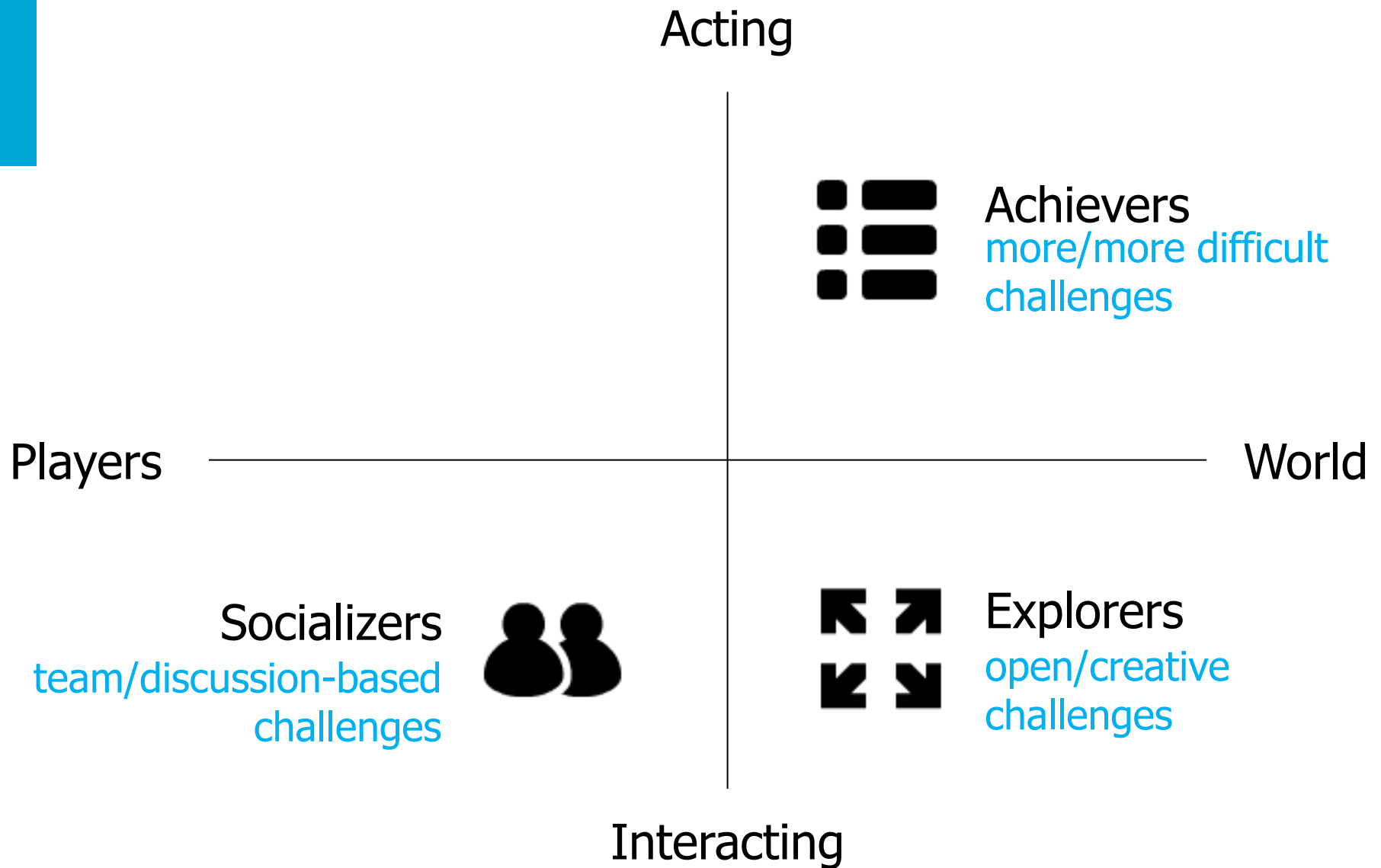












Acting

Winners

competitive/single-winner
challenges



Achievers

more/more difficult
challenges

Players

World

Socializers

team/discussion-based
challenges

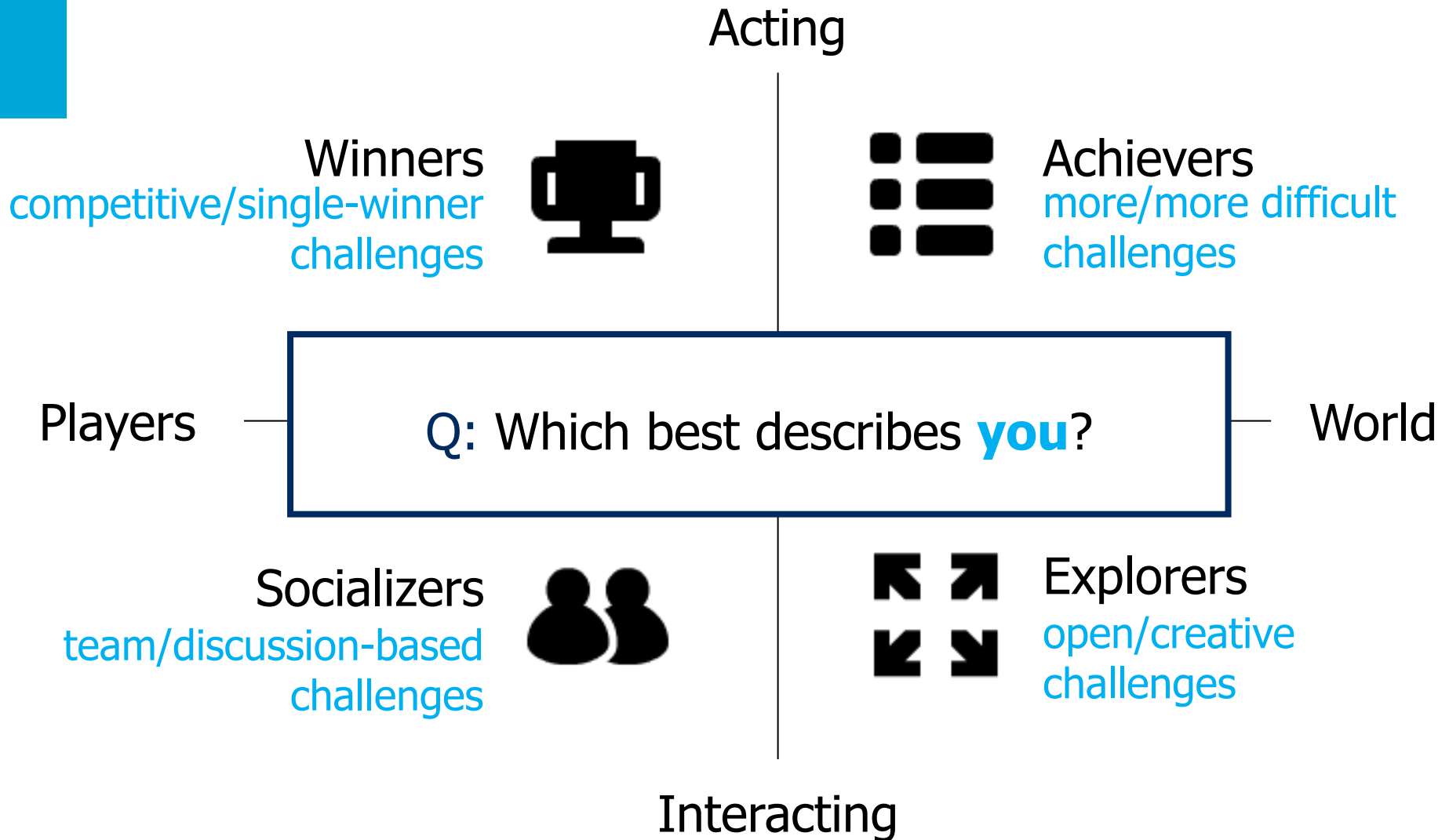


Explorers

open/creative
challenges

Interacting

Exercise: The “Who Are You?” Game



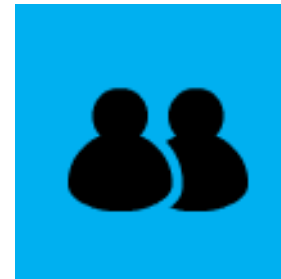
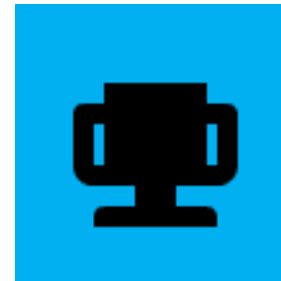
Assessment That Motivates!

10,000 points for a 10

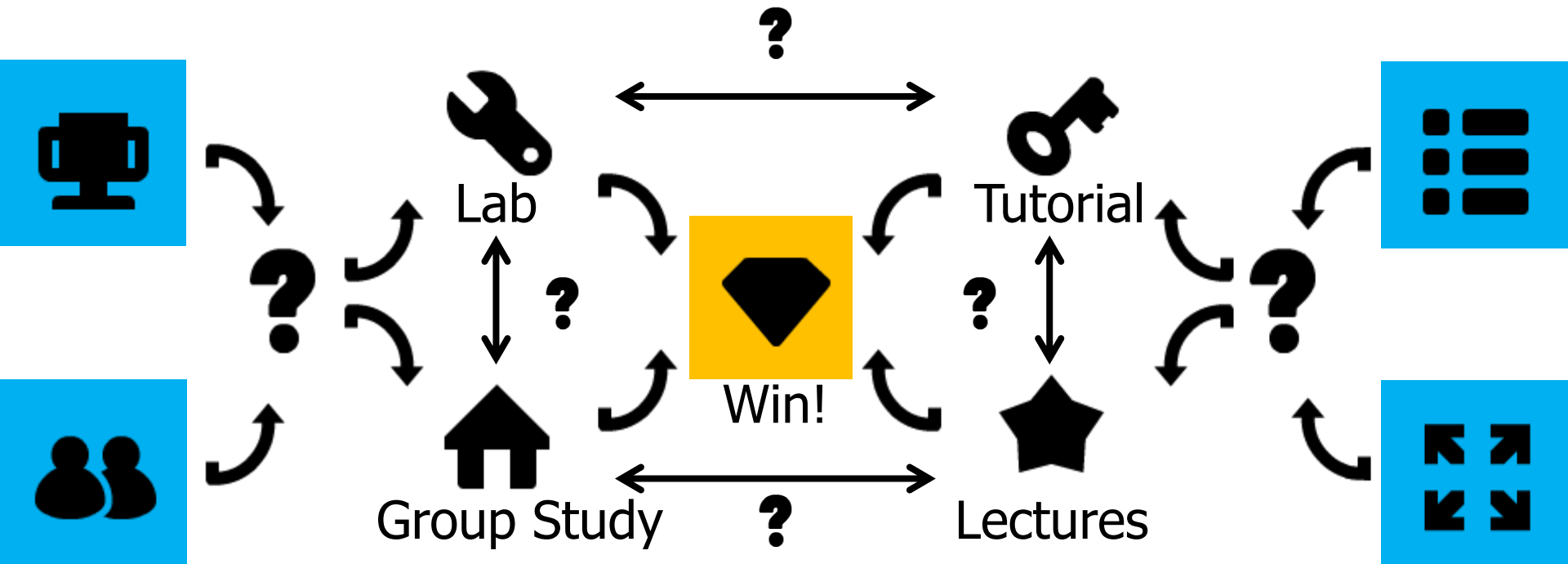
+50 for good activity

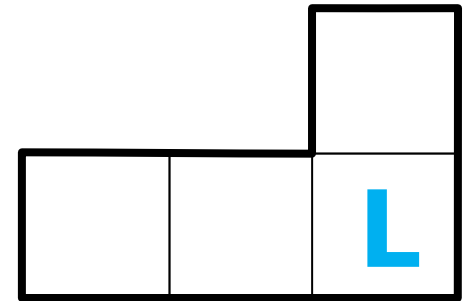
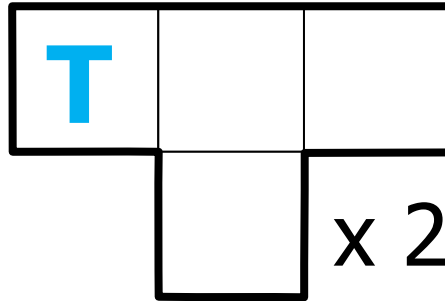
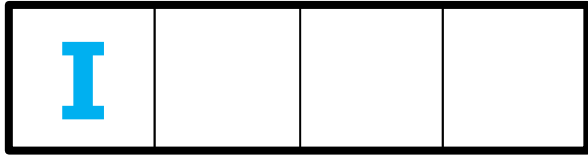
+1,000 for most challenging activity

Badges, unlocked content

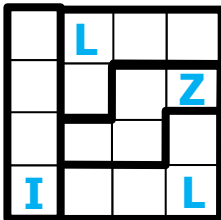
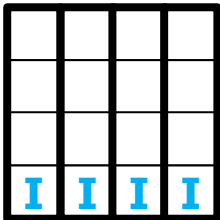


Designing a course is like creating a complex puzzle

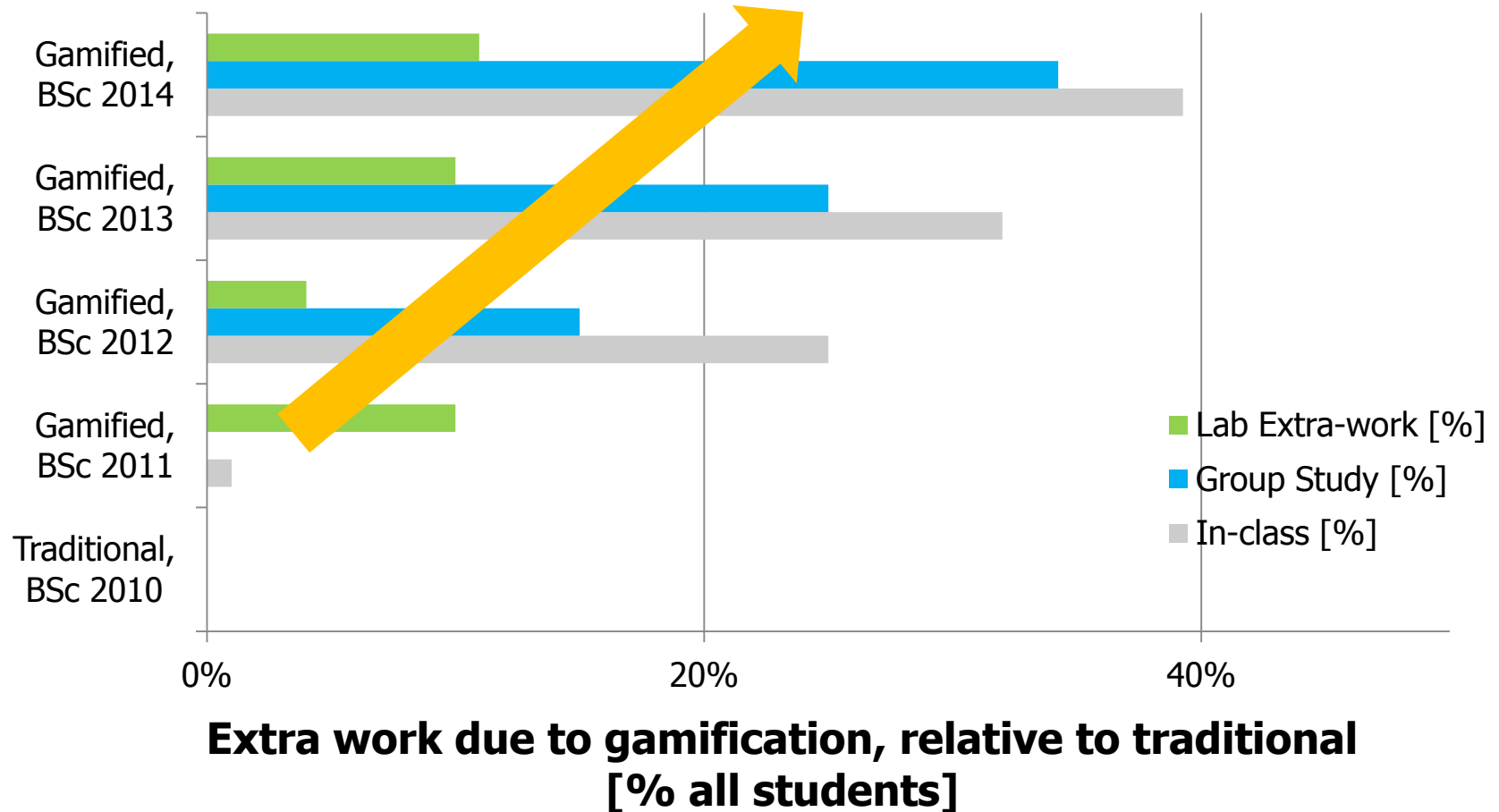




Does gamification work?



Gamification works!



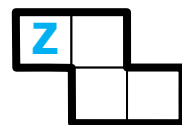
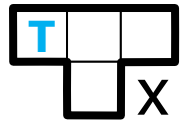
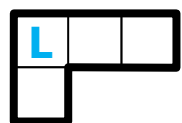
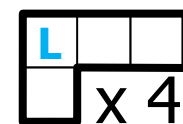
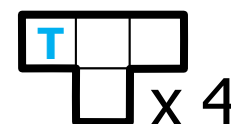
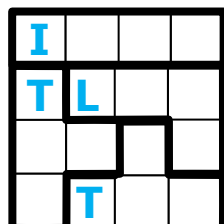
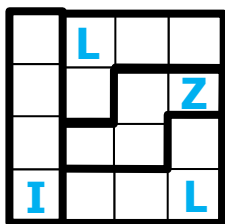
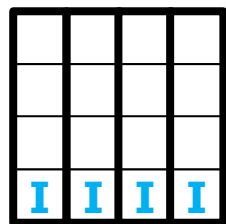
What Happens When A Student Does Not Like the Course Topic?

“ I want to thank you for showing that even though I'm not that good at written exams, I still can excel at other points in my study. I'd love to have a copy of my badge, as physical reminder of a course that made me eager to learn about things. Even when some of those things will never really have my interest.

This course, and the way it was given, learned me a few things about what motivates me, and only for that reason it was totally worth getting up for every lecture.

”

**Designing a course is
like creating a complex puzzle**



Gamification works!



Lumaxart Trophy Winner



Gamification works!



TU Delft Masterclass 2015: 8 new courses

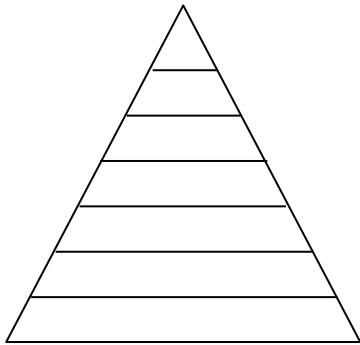
TU Delft Data Science: ICT tools to help out



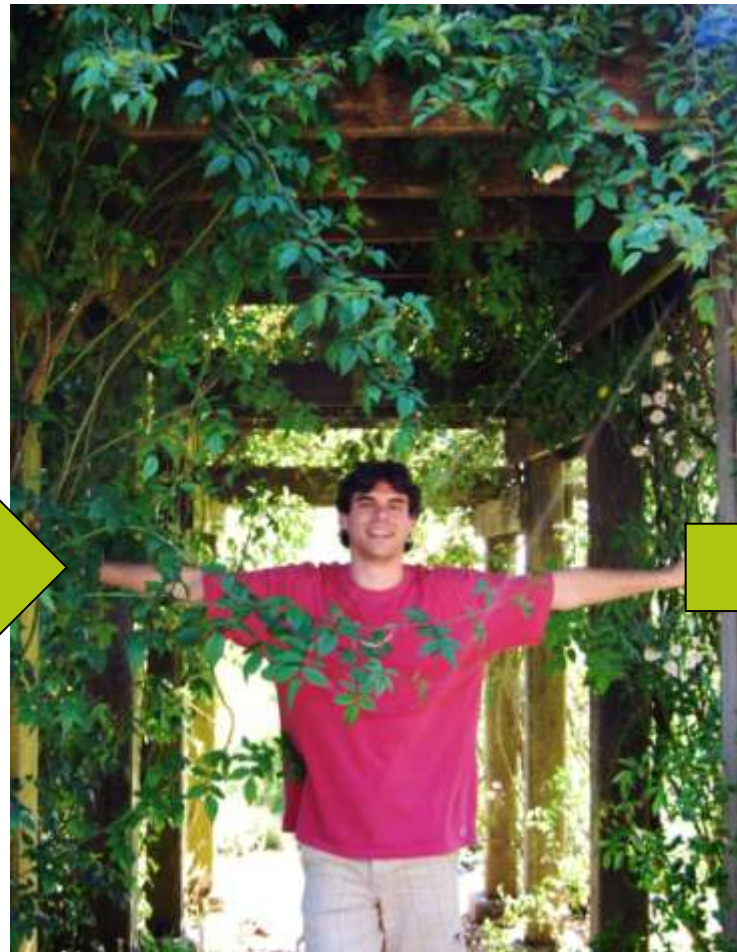
Lumaxart Trophy Winner

A. Iosup and D. Epema, An Experience Report on Using Gamification in Technical Higher Education, ACM SIGCSE'14. <http://goo.gl/V97zSW>

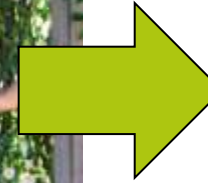
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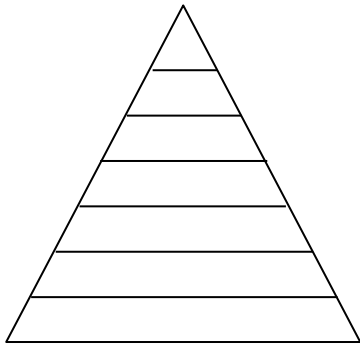
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A Vision for Education



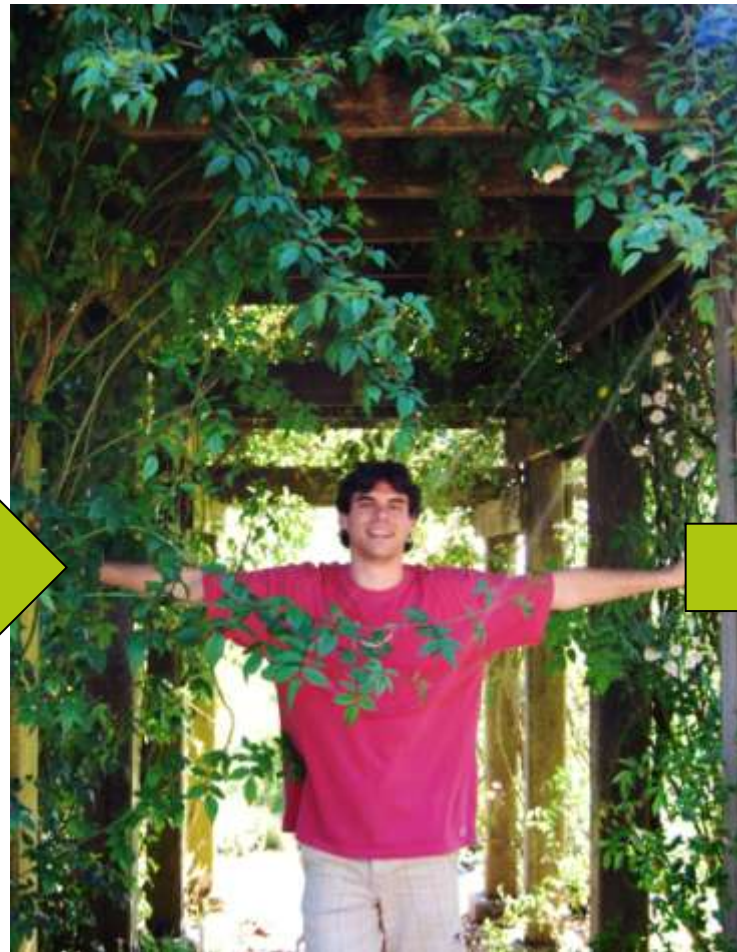
3. Gamification Works!



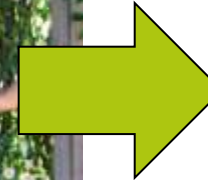
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1. The Hierarchy of Needs for Lecturers



2. **Every Student Counts!**
A Vision for Education



3. Gamification:
An Approach for Education

Every Student Counts! (my vision)

1. Enable “smart stuff”, both individually and in teams.
2. Achieve all learning objectives, including learning the process.
3. Activate all students to deepen vital skills, for a lifetime.
4. Educate great professionals, but also great citizens: to shoulder the society, to educate others, to be responsible and ethical.
5. Develop, validate, and share the education techniques that enable points 1—4 in *your* environment.

Exercise: The Critical Thinking Game – What is “smart stuff”?

- Team work, first 2 minutes
 1. Think about own experience
 2. Convince your team before proposing an answer
- Open discussion, next 2 minutes
 - Tell everyone the answer

Q: What would be for you “smart stuff”?

Voting on best answer

Q: What's in a name?

A: **Over 250,000,000 active players**

Social Gaming =
100,000k+ social players



1. Mechanics

Explore, do, learn,
socialize, compete
+

2. Dynamics, incl. Rewards

Player stats, badges,
others
+

3. Game Content*
puzzles, challenges,
extra-projects, culture

* Art class pending.



Our Work At GamificationU, >10+ Operational Years Since 2007

- B.Sc. Courses

- [TI140x Computer Organization](#) (5 years, ongoing)
- Bachelorseminarium (5 years, evolving form, I stopped 2013)

- M.Sc. Courses

- [IN4392 Cloud Computing](#) (3 years, co-teaching)
- [IN4391 Distributed Computing Systems](#) (2 years, new course)

Content Looks the Same ... Except It's Not!

BSc-CO, 6EC (168h)	MSc-CC, 5EC (140h)
Digital Logic and Data Representation	Overview of cloud computing
Computer Architecture and Organization	Scheduling and Resource Management
Interfacing and I/O Strategies	Data Centers and Energy Efficiency
Memory Architecture	Multi-tenancy concepts, incl. virtualization
Functional Organization	Cloud programming models
Multiprocessing	Case studies



Innovation [2/3]: through Diverse Gamification Elements

- Too many to list here
 - Scoring system is but one element
 - Badges? Only for B.Sc., some “random” [Manga cum laude](#)
- Onboarding (dynamics)
 - Entry quiz
 - Story every lecture
- Social Learning (dynamics)
 - In-class teams
 - Self-study as team effort
 - Involve Winners and Achievers in class
 - Involve Winners and Explorers in self-study
- Different player types
 - Ladders, ranking, end-lecture quiz: mostly for Winners
 - Content unlocking (dynamics): Explorers and Achievers

http://www.kunstbuch-shop.de/images/guido-mocafico-movement-03_462.jpg



2014: How to spend 1 Billion?

A: ICT and Gamification for education!



Q: But, Alexandru, surely not every course can use gamification!? I mean, there is no technique for my concept / activity / entire course...

A: Wonderful Advances in Gaming, Last 10 Years: diverse **individual** challenges

Beyond eyes



A: Wonderful Advances in Gaming, Last 10 Years: diverse **social** challenges

