

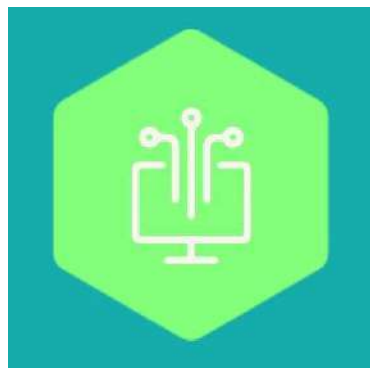


Adaptive tools to improve learning and assessment

Sacha Gomez

Universidad Autónoma de Madrid.

Spain

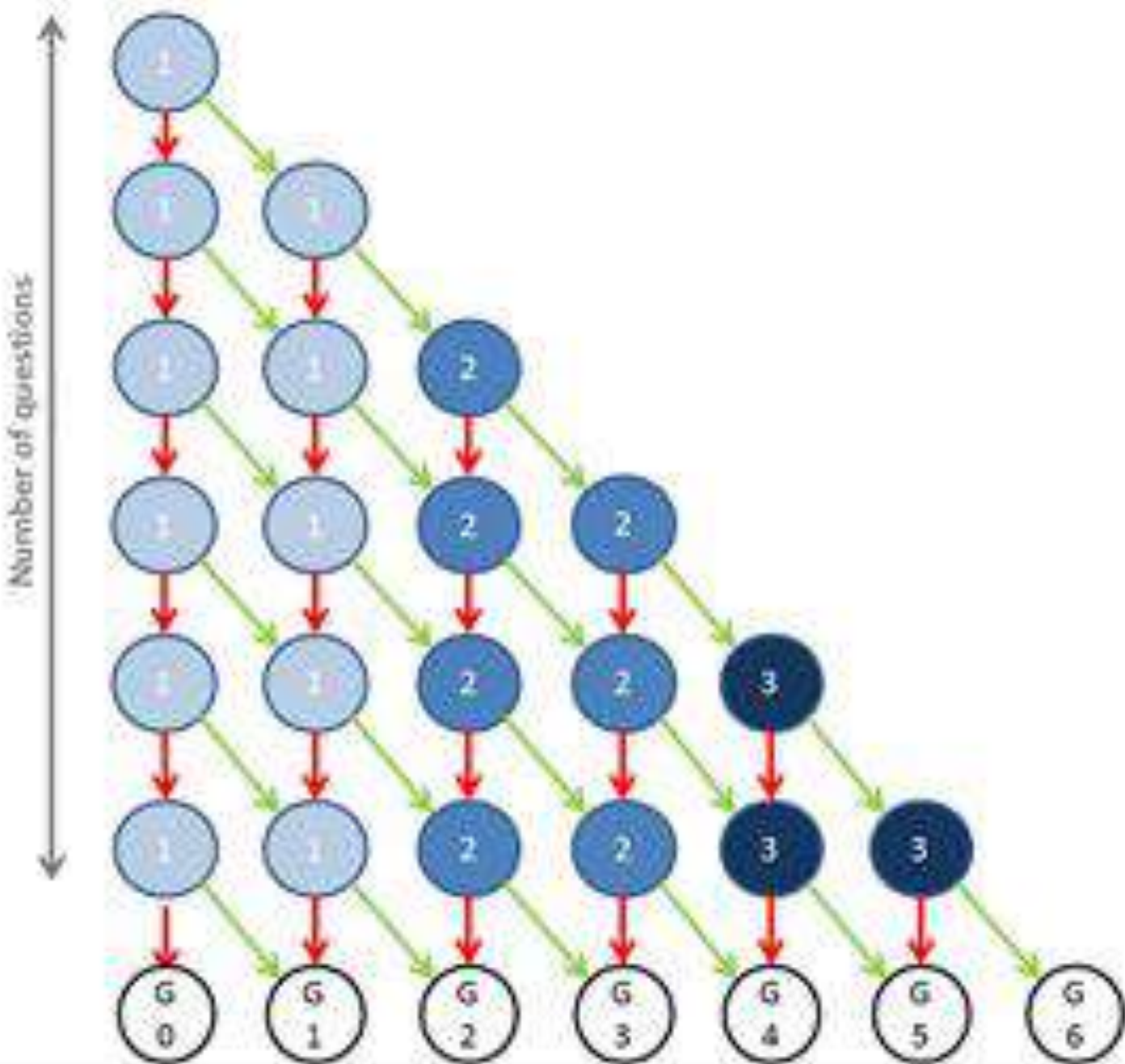


INFORMATION COMPETENCE AS BOOSTER
FOR PROSPECTIVE SCIENTISTS

Motivation

- How can we create good learning online material.
- Problem: We cannot see users' learning strategies and correct them face-to-face.
- Visualization in our case: it is not about how to show results. It is about how to get accurate information.
- After getting and analyzing information, we can develop the contents for online learning applications.

e-valUam: Evaluation platform based on adaptive testing



Elige una materia:

Evaluación Global Informática Aplicada 2017

Ver todas las preguntas

Añadir una nueva pregunta

Elige la dificultad:

1

- ¿La pregunta tiene una imagen principal?
- ¿La pregunta tiene feedback personalizado? ⓘ
- ¿La pregunta tiene parámetros? ⓘ

Pregunta:

Calculad el producto de las siguientes matrices y devolved el valor del determinante de la matriz resultante, donde $a=5$

Imagen:

Pregunta18.PNG

¿Necesitas ayuda con los parámetros?

Fichero con script de respuesta:

Examinar...

Pregunta18.m

Tipo de Script:

Matlab

Número de parametros:

1

Utiliza la coma (,) como separador decimal en los formularios del rango de parámetros

Nº1

Valor Mínimo

1

Valor Máximo

5

Guardar

-**Statement** with explicit indication of the modifiable parameter(s).

-**Minimum and maximum values of each modifiable parameter.**

-**Programming code** (Matlab in our case) that calculates the solution to the problem.

A)



Oficina para el desarrollo de las Enseñanzas

¿A qué punto de la EDAR se recirculan los sobrenadantes que se generan en los diversos tratamientos?

¿A qué punto de la EDAR se recirculan los sobrenadantes que se generan en los diversos tratamientos?

al sedimentador primario

al lecho de gruesos

al sedimentador secundario

B)



Oficina para el desarrollo de las Enseñanzas

Responde a la pregunta planteada en el enunciado.
Para ello debes introducir el valor correcto.

Responde a la pregunta planteada en el enunciado.
Para ello debes introducir el valor correcto.

Calcula la concentración de sólidos en suspensión de un agua residual bruta (mg/L), sabiendo que P3,1 es 93.864 mg P3,2 102.3 mg y el volumen de muestra filtrado es de 30 mL.

Responde

Introduce el valor correcto.

Enviar

Some relevant data

- Facultad de Formación de Profesorado y Educación
 - Grado en **Maestro/a en Educación Infantil**
- Facultad de Ciencias
 - Grado en **Ingeniería Química**
 - Grado en **Química**
 - Grado en **Biología**
 - Grado en **Física**
 - Grado en **Ciencias Ambientales**
 - Máster de **Física Teórica y Astrofísica**
- Facultad de Filosofía y Letras
 - Grado en **Estudios Internacionales**
 - Grado en **Ciencias y Lenguas de la Antigüedad**

- Facultad de Ciencias Económicas y Empresariales
 - Grado en **Gestión Aeronáutica**
- Facultad de Medicina
 - Grado en **Medicina**
 - Grado en **Farmacía**
- Facultad de Filosofía y Letras
 - Grado en Filología **Francesa**

Students in pilot experiences

- Curso 2014/2015: 51
- Curso 2015/2016: 50
- Curso 2016/2017: 97
- Curso 2017/2018: 665 (Project Erasmus+)
- **Curso 2018/2019: around 150**
- **Curso 2019/2020: around 400**
- **More than 1000 students involved in pilot experiences**

Participants

[Universidad Autónoma de Madrid](#)

Santiago Atrio Cerezo, M^a de los Ángeles de la Rubia Romero, Noemí de Haro García, Alejandra Gámez Abascal, María Yáñez-Mó, Daniel Riaño Rupilanchas, Yago Ascasibar Sequeiros, Alicia Palacios Cañas, Cristina Díaz Blanco, Patricia Sánchez-Blázquez, Alberto López Bueno, Óscar Bomati, Marta Comas López, Kajetan (Kyle) Piotr Hincz.

Teresa González, Marisol Celemín, Tina Fernández, Gema Sanz, Beatrice Marnet, Javier González Patiño, Aranzazu Gil, 3 teachers from Medicine.

7. Some relevant data

Participants

European Partners

Vlad Petcu y Laura Malita (West University of Timisoara). Rumanía.

Mikko Vesisenaho y Marika Peltonen (Jyväskylän Yliopisto). Finlandia.

Santiago Fort y Laia Subirats (Fundación Eurecat). Cataluña.

Abel Jiménez. (Jiménez Puertas Asesoría de Empresas). Granada.

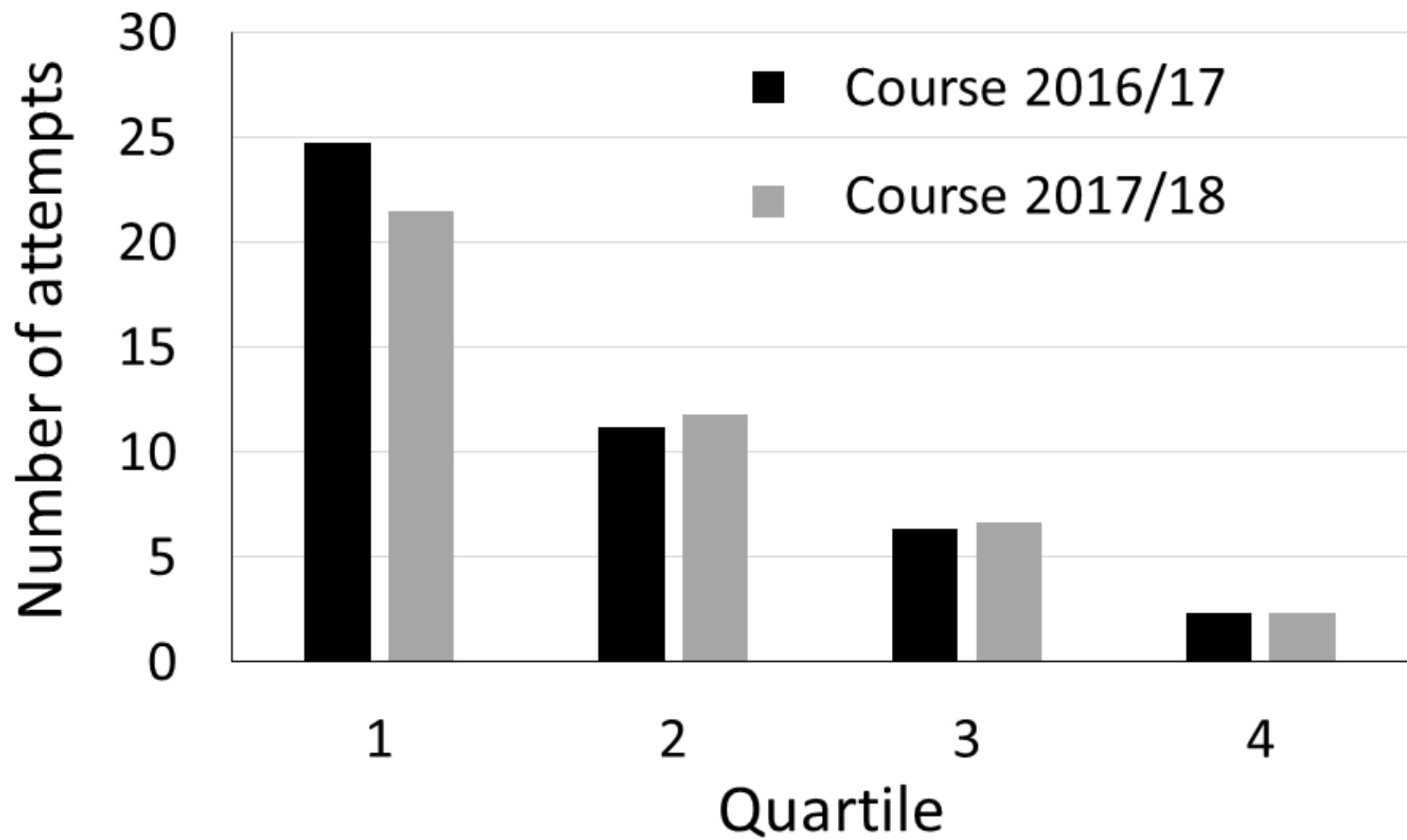
Patricia Huion y Guido Cajot (UC Leuven-Limburg) Bélgica.

Mirela Mazalu (European University College Association). Bélgica.

Sacha Gómez. (Universidad Autónoma de Madrid). (Coordinador).

How can we increase motivation?

- By using the same tool for self-evaluation and final exams.
- Students feel the tool very useful in their learning process because they are going to be evaluated with the same format.
- We can also detect a lot of information from students along their learning because they use the tool often.

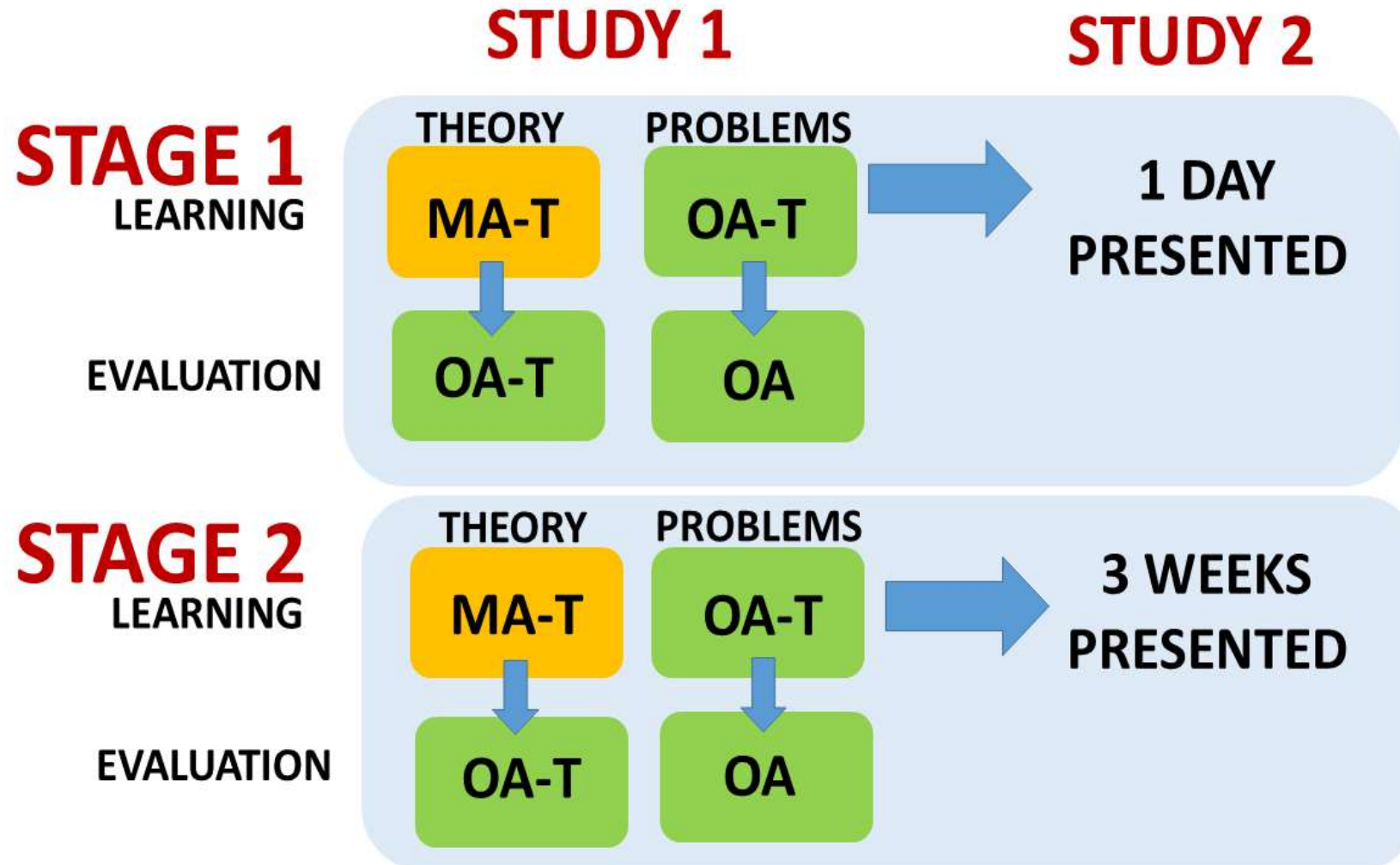


What kind of contents fits better with our adaptive tools

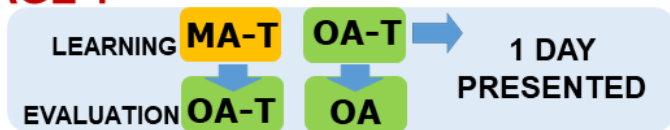
- We have developed tests for many different contents with different characteristics.
- For example, subjects that only include theoretical contents vs subjects that include practical laboratory lessons.

Adaptive test system for subjects that simultaneously include theoretical content and numerical problem solving.

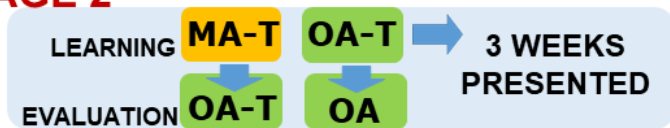
M. Comas-Lopez, M.A. de la Rubia and G. M. Sacha.
International Symposium of Educational Computation. Accepted 2018.



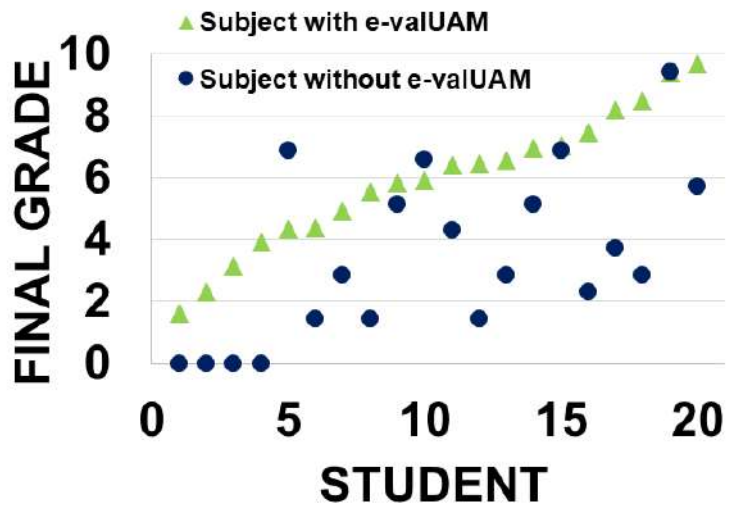
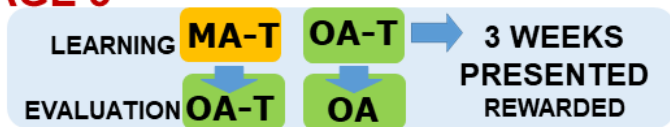
STAGE 1 **STUDY 1** **STUDY 2**
THEORY PROBLEMS



STAGE 2



STAGE 3



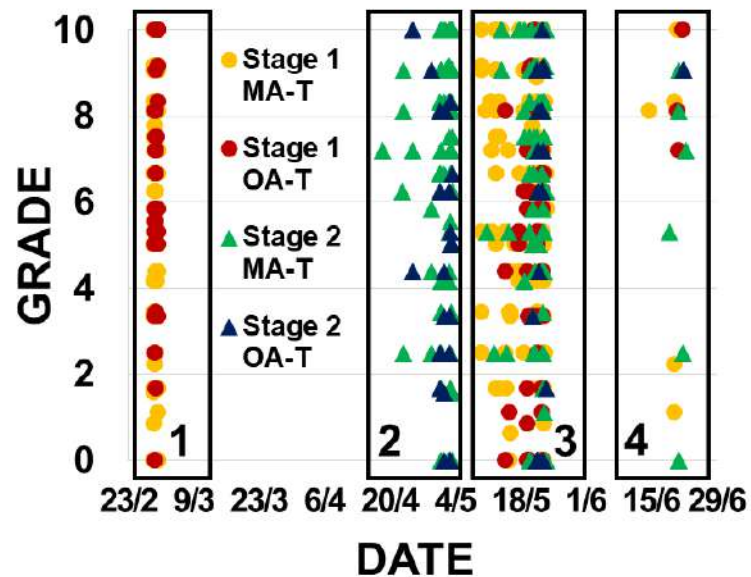
Oficina para el desarrollo de las Enseñanzas

Respuesta incorrecta. La respuesta correcta era: 2,7486.
 Pídele ayuda para ver la pregunta anterior

19 minutos restantes Ocultar

Calcula la concentración de sólidos en suspensión de un agua residual bruta (mg/L), sabiendo que P3,1 es 93.864 mg P3,2 102.3 mg y el volumen de muestra filtrado es de 30 mL

Respuesta:
 Introduce tu respuesta
 Enviar

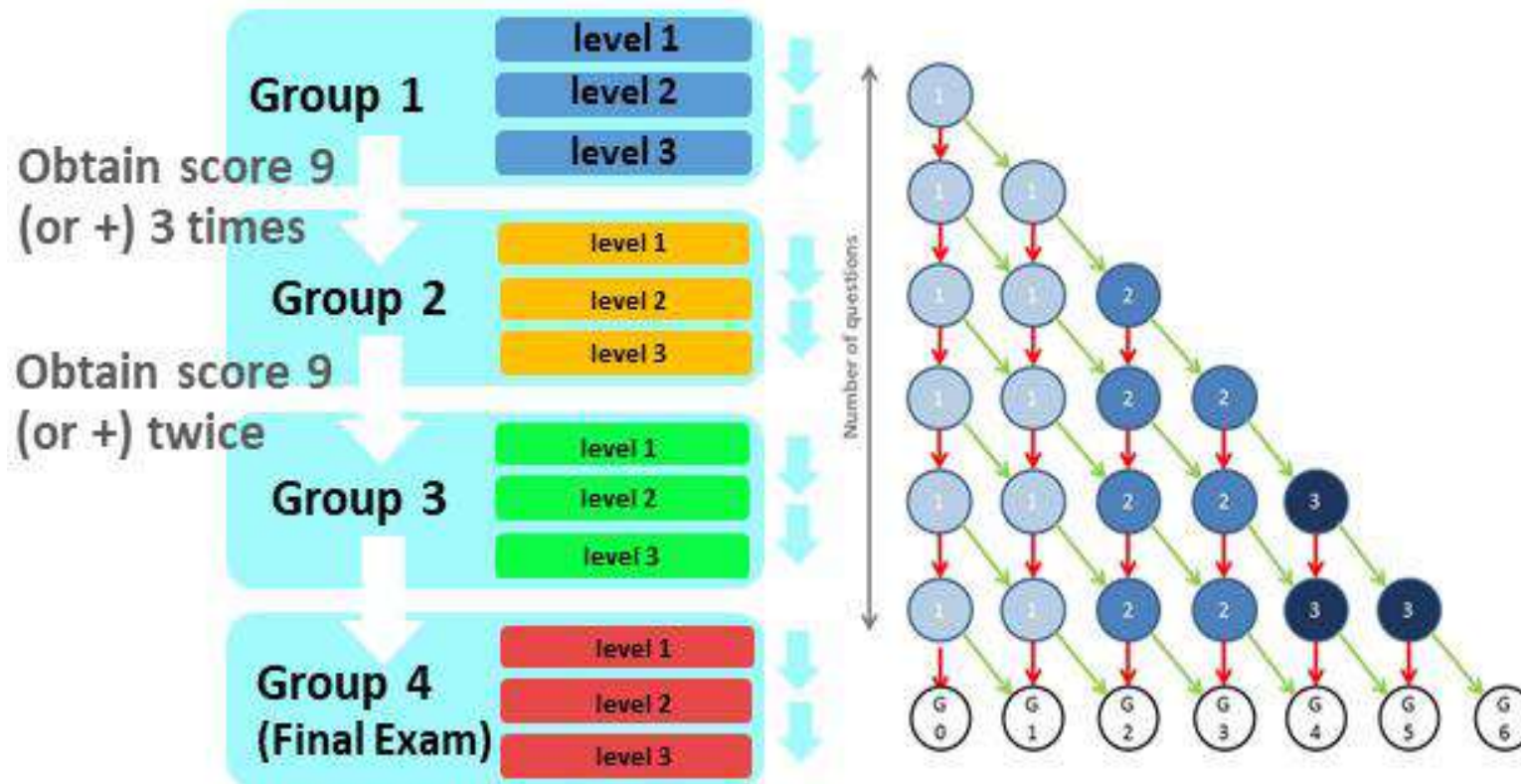


How do we detect wrong learning strategies

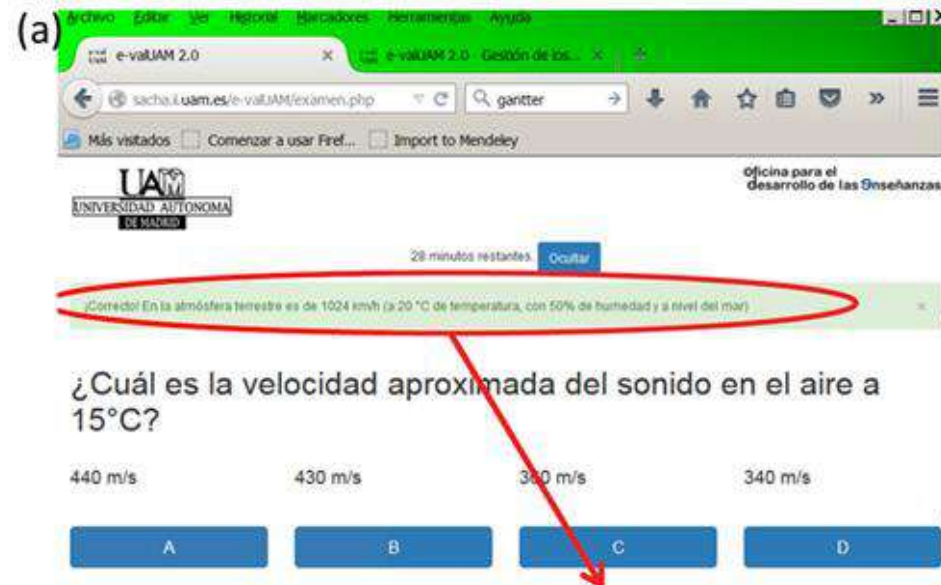
- Sometimes, students use learning tools in a wrong way.
- For example, they learn answers to the questions instead of learning contents
- We have developed an adaptive method that takes this fact into account

Sequential adaptive tests to improve the assimilation of contents during learning

M. Comas-Lopez, P. Molins-Ruano, S. Atrio and G. M. Sacha.
International Symposium of Educational Computation. Accepted 2018.



***Each 10 right answers advance one level**

(a) 

¿Cuál es la velocidad aproximada del sonido en el aire a 15°C?

440 m/s 430 m/s 300 m/s 340 m/s

A B C D

Feedback during the learning phase

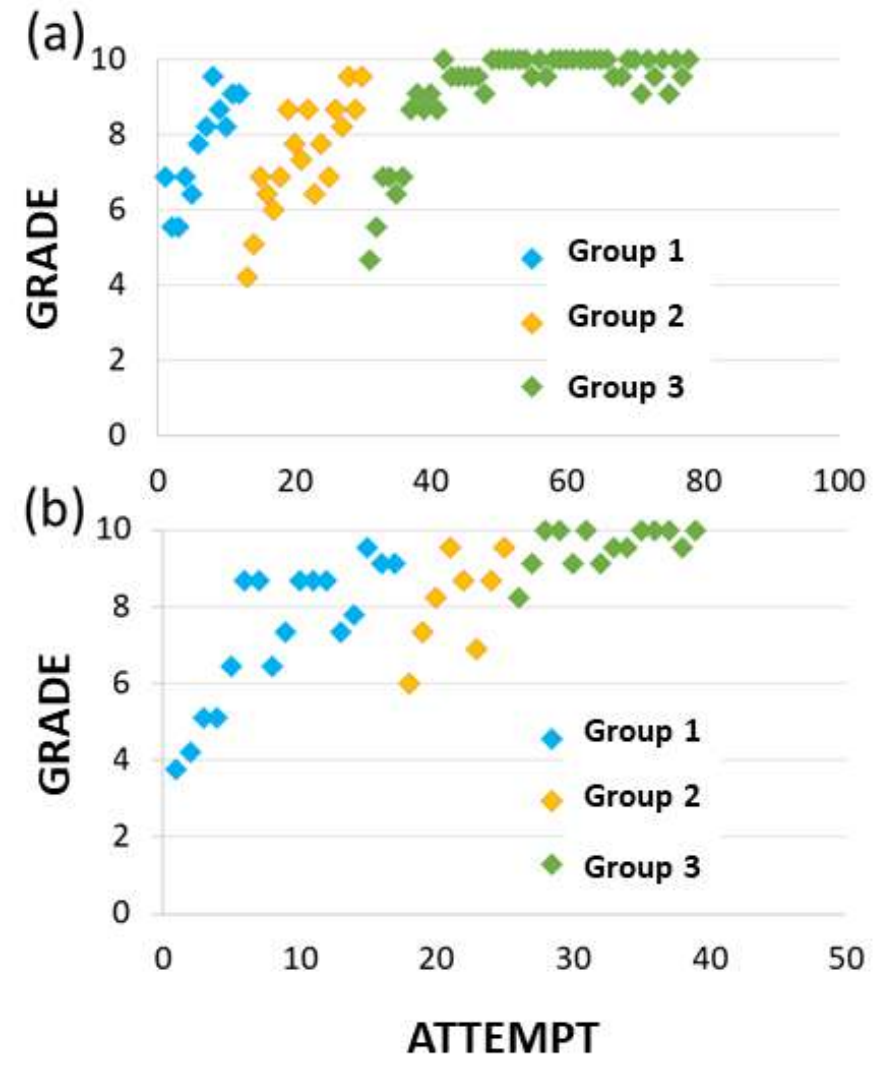
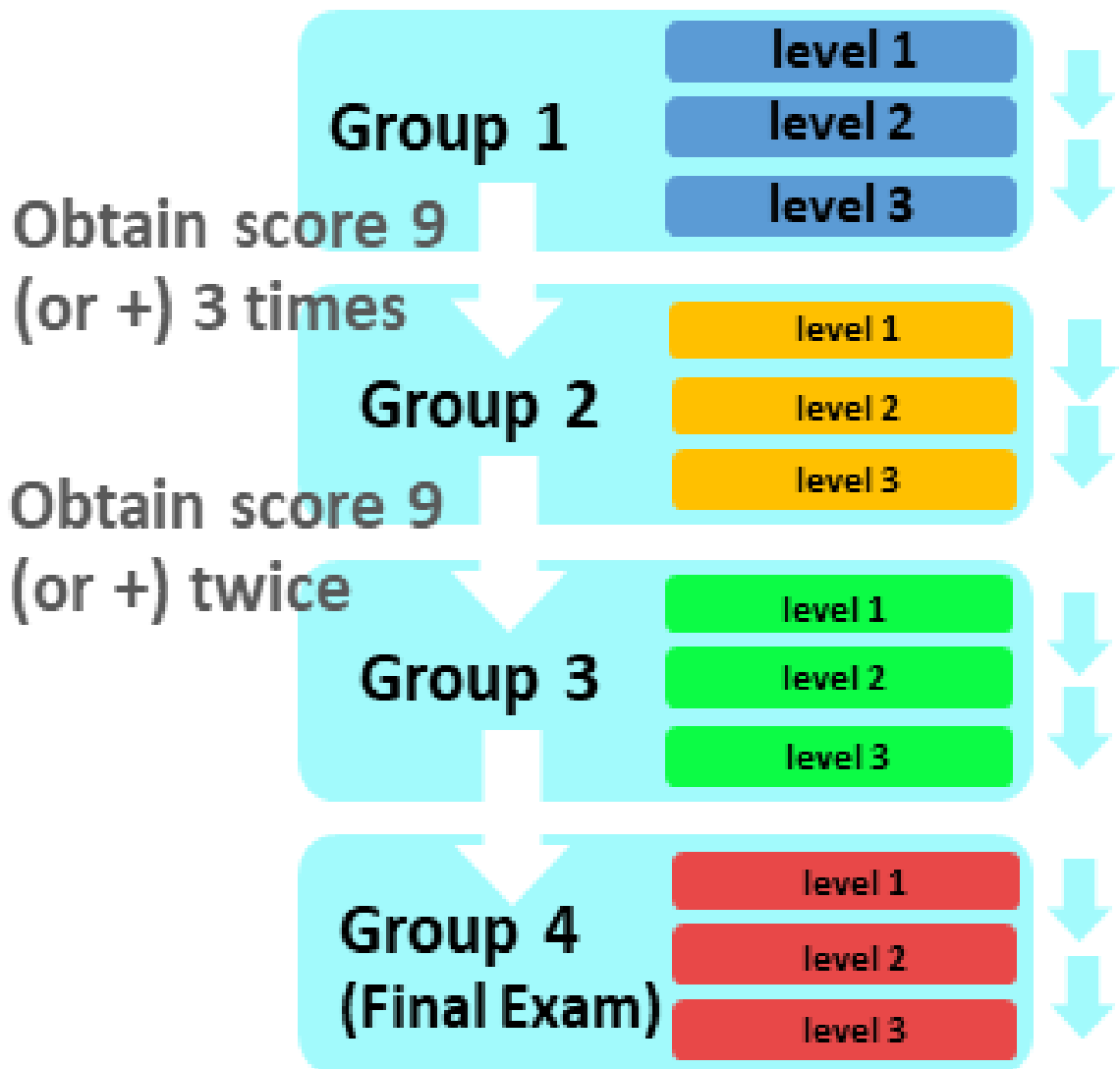
(b) 

https://e-valuam.uam.es/profesor/profesorRequest.php?tipo=c

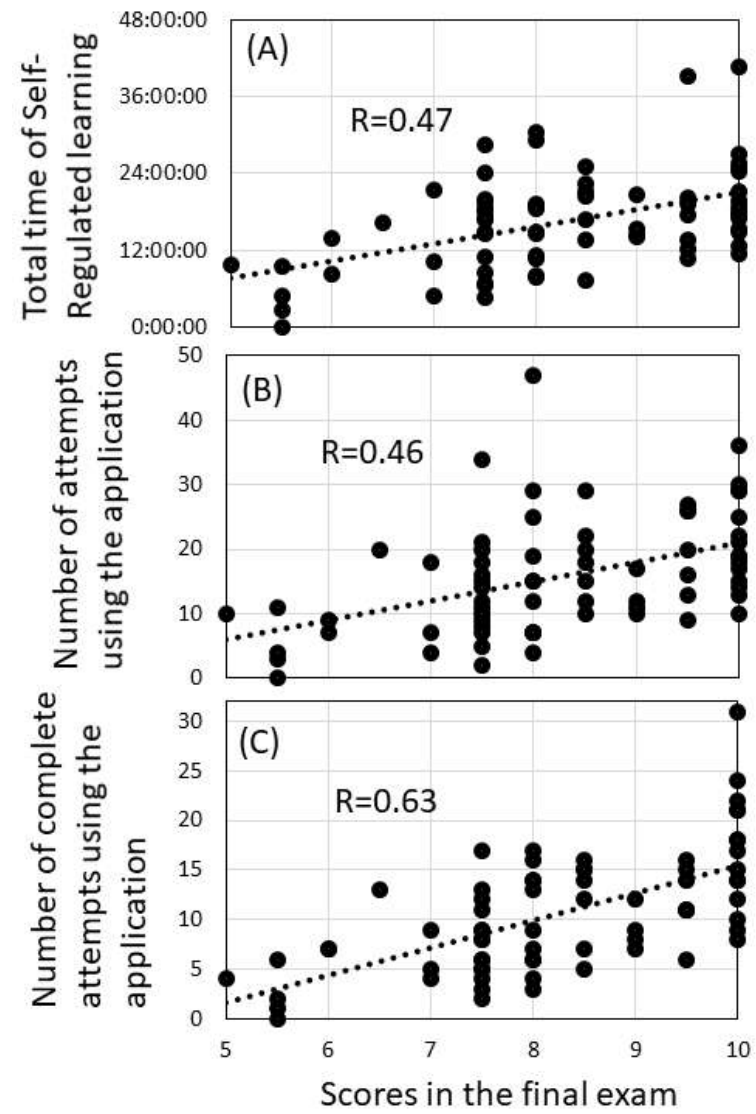
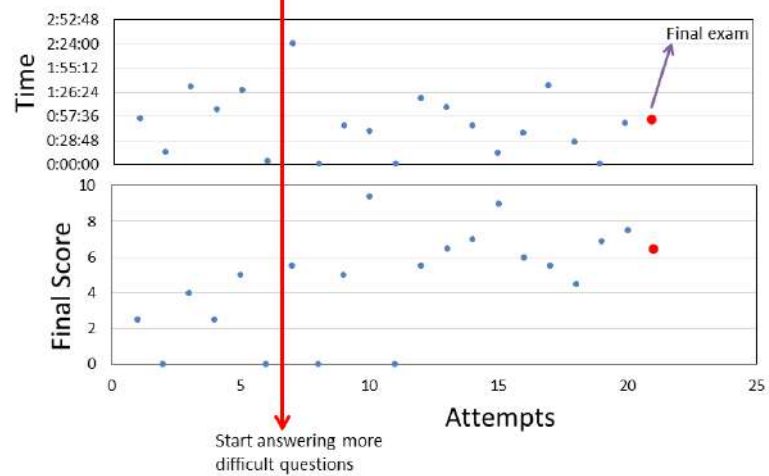
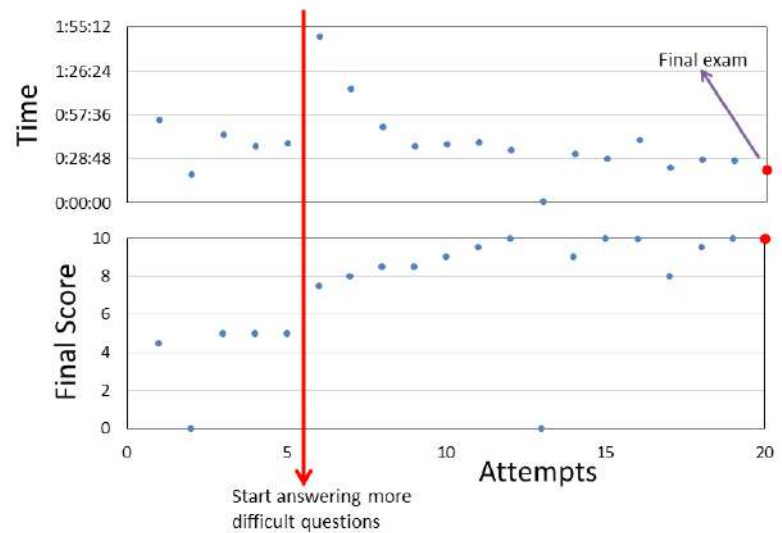
[Preg. #26] ¿Cuál es el nombre científico de esta especie vegetal?:

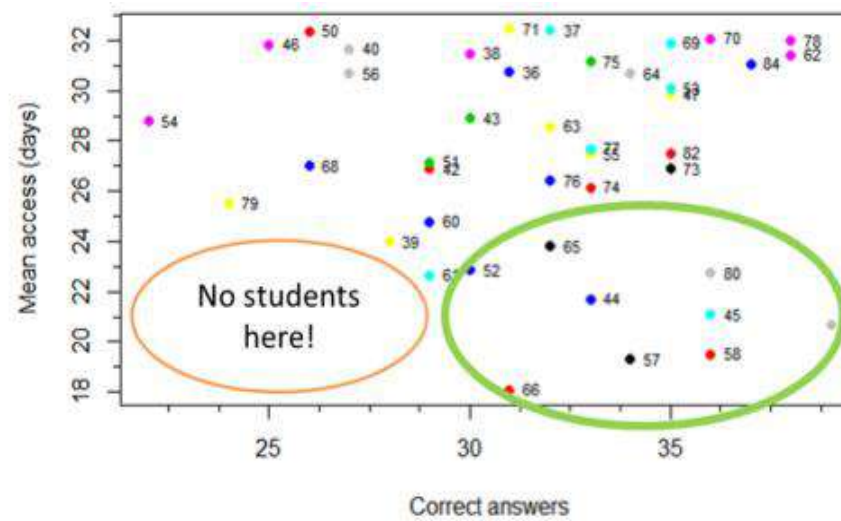
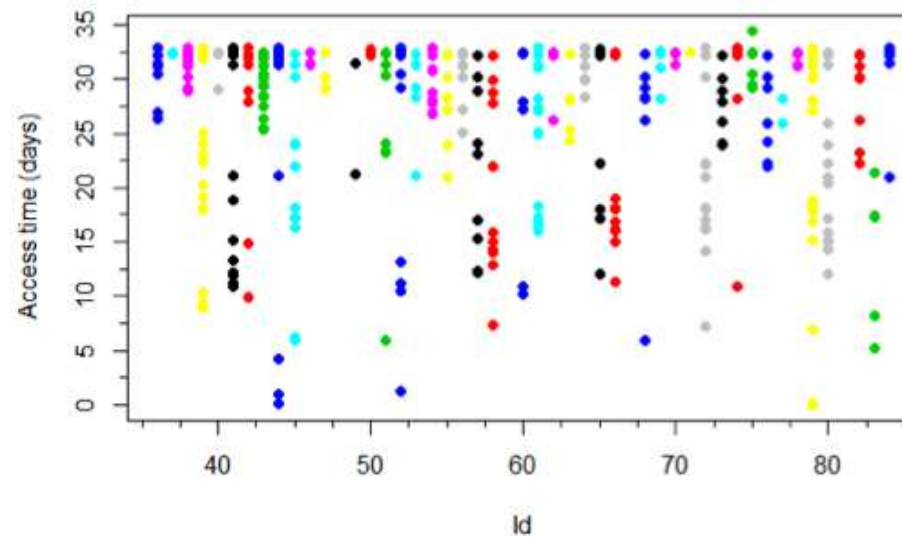
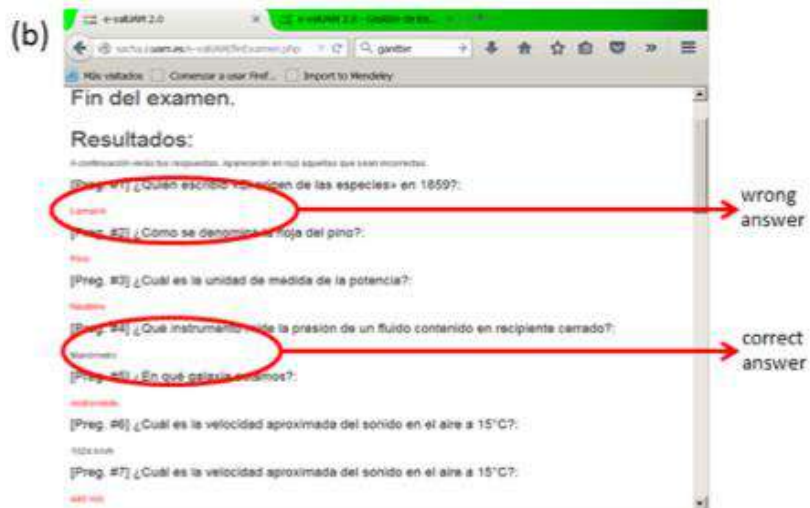
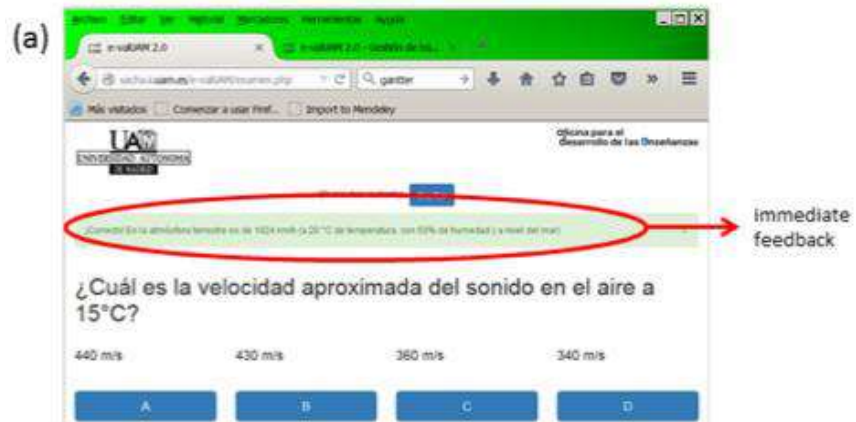


Olea mediterranea

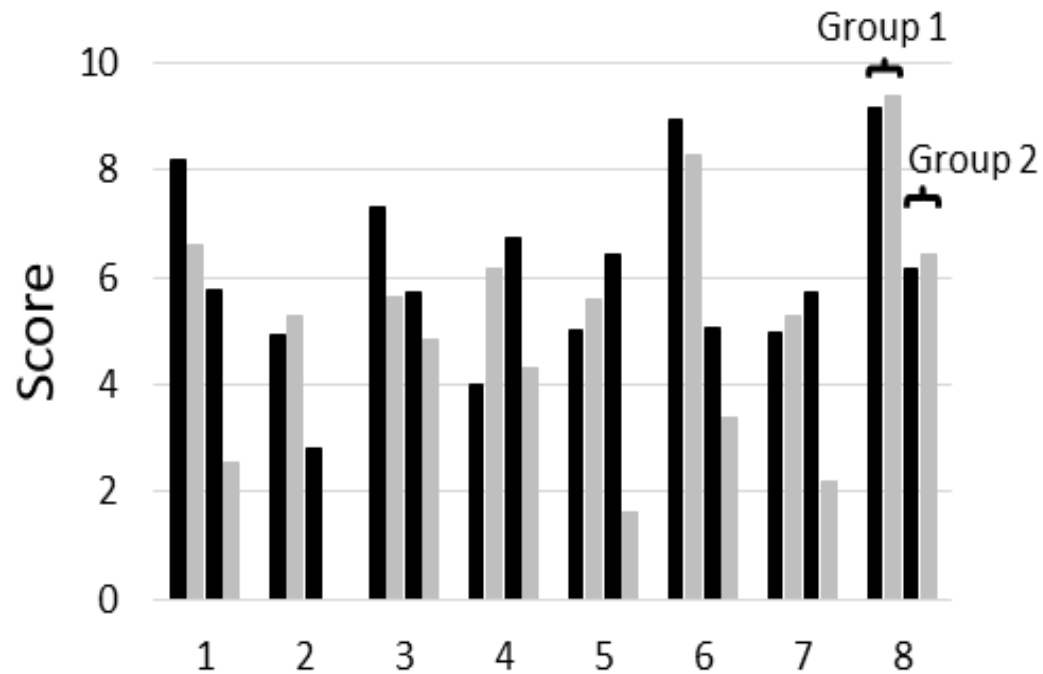


What are the most relevant parameters for a correct learning process?





What is better: teamwork or individually?



Scores (up) and score differences (down) of all the students in the 8 groups where a significant effect of the working groups has been detected. Black: Scores from the test done before the practical sessions. Grey: Scores of the final exam.

8 of the 10 groups formed, **one teammate is positively influenced** and **the other one is negatively affected**.

Conclusion: The pair tend to be leaded by one teammate and the other one only in passive attitude. This passive attitude has been found to be almost useless in our previous study.

What about soft-skills?

In this case, we cannot use objective learning tools.

We have used rubrics and a peer evaluation process between students.

e-valuam.ii.uam.es/profesor

Sacha.gomez@uam.es

We used “Low Risk, High Effort” criteria.

Data from course 2017/2018.

Groups of 5-6 students

9.8095	7.0476	8.5714	9.5238	9.619	3.0476	8.9216	9.3137	8.8235	8.9216	7.941	5.882	9.333	5.667	9	9.444	8.778	9.111	9.667	9.667	7.333	4.583	9.167	9.722	9.722	9.722	8.611
9.0741	8.6111	9.7222	7.3148	2.2222	9.537	8.8506	8.5057	8.8506	9.4253	8.506	9.861	9.722	6.389	6.528	9.583	7.778	8.406	8.783	8.899	6.261	5.536	7.639	9.074	7.222	5.833	8.889

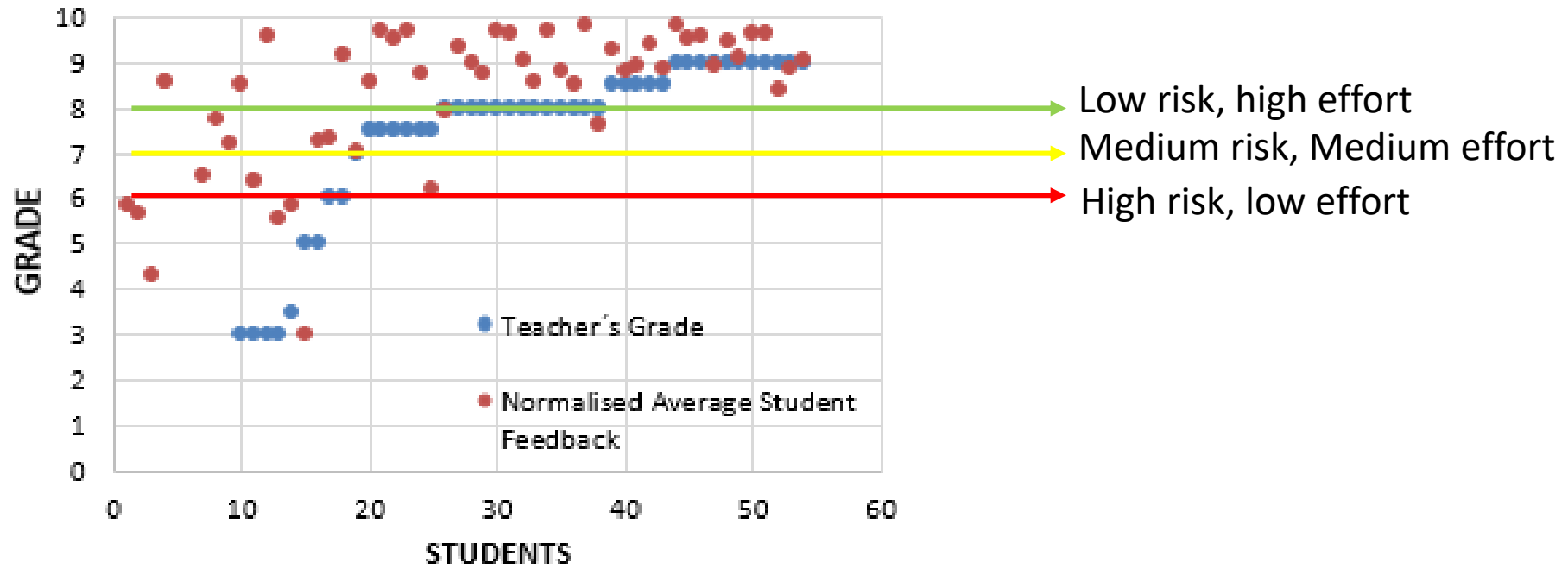
17/56 students found with a score <8

Data from course 2018/2019.

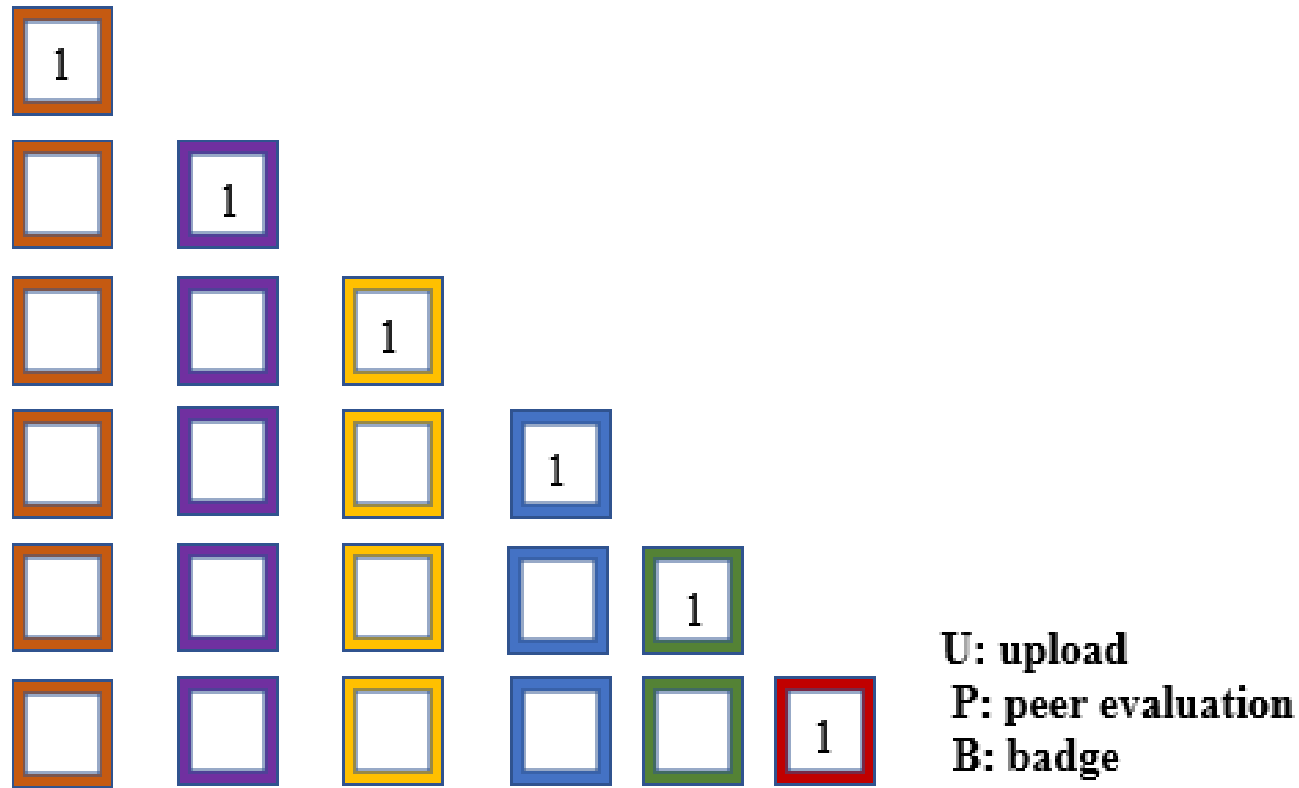
Groups of 4-5 students

9.0922	9.0922	9.0922	9.0922	8.9238	9.0922	8.7555	8.5871	8.3345	8.3345	8.335	8.208	8.587	8.755	9.092	9.092	8.84	8.84	8.082	7.956	8.208	8.208	6.819	5.683		
8.082	8.5871	8.5871	7.0717	8.3345	8.7134	8.082	7.7031	0	8.5871	8.082	8.966	7.703	8.335	8.713	7.324	8.966	8.966	8.713	8.461	8.461	8.461	6.945	8.84	8.713	8.587

9/50 students found with a score <8. Teacher will meet them individually before the final exam. Conclusions of this study Will be analyzed in the following months since final exams are not over yet



Different adaptive models used in our project



ALL ones lead to the final step.

The 'create' level generates an open

[ADeAPTIVE] Entrepreneurship course

Home / My courses / ADeaptiveEntrepreneurship

General

Your progress 📊



Announcements

Introduction

Introduction

Well-being

FRESH START 1. Creating an international entrepreneurship mind-set Lesson

FRESH START 2. Becoming your own pilot Lesson

Elevator pitch example (video)

The Successful Elevator Pitch (2010)

Asper School of Business student Andrea Legary explains how to give a successful elevator pitch. She's a member of Asper's business team A2K Technologies, which recently won all the Alerus Entrepreneurship Challenge competitions awards: Most Innovative Idea, Best Elevator Pitch and Grand Champion. A2K also won the Lightning Round at the University of Oregon's New Venture Championship and they won the Georgia Bowl in Atlanta. The Asper School of Business has a world record 46 first-place finishes in business competitions since 1995 and A2K's successes have won them a berth into Global Moot Corp., the world championship business competition. This marks the eighth consecutive year the University of Manitoba has won a berth. The Asper School is the only Canadian school, and one of only a handful in the world, to accomplish this.

Game

My journey

Assignment 1

Assignment 2

Question 1.1

Restricted Not available unless: You achieve a required score in **My journey** (hidden otherwise)

Question 1.2

Restricted Not available unless: You achieve a required score in **Question 1.3** (hidden otherwise)

Question 1.3

Restricted Not available (hidden) unless any of:
• You achieve a required score in **Question 2.1**
• You get an appropriate score in **Question 1.4**

Restricted Not available unless: You achieve a required score in **Question 1.5** (hidden otherwise)

Question 1.5

Restricted Not available unless: You get an appropriate score in **Question 1.1** (hidden otherwise)

Question 2.1

Restricted Not available (hidden) unless any of:
• You achieve a required score in **Question 1.1**
• You achieve a required score in **Question 1.4**
• You achieve a required score in **Question 1.2**
• You achieve a required score in **Question 2.3**

Question 2.2

Restricted Not available unless: You get an appropriate score in **Question 2.1** (hidden otherwise)

Question 2.3

Restricted Not available unless: You achieve a required score in **Question 2.2** (hidden otherwise)

Question 2.4

Restricted Not available unless: You get an appropriate score in **Question 2.3** (hidden otherwise)

Question 2.5

Restricted Not available unless: You get an appropriate score in **Question 2.4** (hidden otherwise)

Question 3.1

Restricted Not available unless: You achieve a required score in **Question 3.2** (hidden otherwise)

Question 3.2

Restricted Not available unless: You achieve a required score in **Question 3.3** (hidden otherwise)

Question 3.3

Restricted Not available unless: You get an appropriate score in **Question 3.4** (hidden otherwise)

Question 3.4

Restricted Not available unless: You achieve a required score in **Question 2.1** (hidden otherwise)

Question 4.1

Restricted Not available (hidden) unless any of:
• You achieve a required score in **Question 3.1**
• You achieve a required score in **Question 4.2**
• You achieve a required score in **Question 4.3**

Question 4.2

Restricted Not available unless: You get an appropriate score in **Question 4.1** (hidden otherwise)

Question 4.3

Restricted Not available unless: You get an appropriate score in **Question 4.2** (hidden otherwise)

Question 5.1

Restricted Not available (hidden) unless any of:
• You achieve a required score in **Question 4.1**
• You achieve a required score in **Question 5.2**

Question 5.2

Restricted Not available unless: You get an appropriate score in **Question 5.1** (hidden otherwise)

Question 5.1

Restricted Not available unless: You achieve a required score in **Question 5.1** (hidden otherwise)







Announcements

Introduction

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