Some successful and unsuccessful stories

Analytics for Teachers, Students and University Staff

Jordi Conesa i Caralt
The UOC: A paradise for data scientists...
... but also a hell for data scientists
00.1 What are the main agents affected by Analytics?

- Teachers
- Students
- Staff
00.1 Some analytic systems focused on Teachers

- Emotional termometer
- Present@
- Suport@
- PAC Plagi
- Dropout analisys
- Treball@
Emotional Thermometer

**Goal:** To determine the emotional climate of the classroom from the students messages.

Developed at 2016. Now testing

- Using machine learning techniques to find out polarity of messages
- Learning continuously
**Goal:** To provide a dashboard to monitor how teaching is going

**Testing in October**

http://goo.gl/VE93xF
Goal: Are our academic programs providing useful and updated professional knowledge?

2014 – still testing

Analytical tool addressed to the academic staff of the UOC to evaluate the alignment between their academic offer (subjects, degrees, masters, etc) with the new trends and labor market needs.

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Once (or twice) per year

Natural Language Processing

Very often

1. Job Positions related with each subject/academic program
2. Knowledge offered that have not relevance in labor market.
3. Knowledge offered that have relevance in labor market.
4. Learning Outcomes not offered at the UOC that are relevant for the labor market.
5. Relevant trends dealt in the UOC.
6. Relevant trends not dealt in the UOC.
1. Select the academic offer to analyze
3. See how the related information distributes geographically

2. See the information resultant from the analysis (job positions for example)
00.1 Treball@
Some analytic systems focused on Students

- **AdVisor**
- **ICT-Flag for circuit design + PyPAC**
- **eOrient@**
- **Booter**
- **Pinball**

*Data Mining of the classroom activity*
00.1 TeSLA

**Goal:** To perform final exams/assessments virtually

**2015 – Still developing and testing**

- A platform that verifies the identity of students and prevents from illegitimate behaviors, using
  1. Facial recognition,
  2. Voice recognition,
  3. Patterns of keystrokes,
  4. Anti-plagiarism systems

- More information in slides of 1st leadership school
  ([https://goo.gl/FFJqe6](https://goo.gl/FFJqe6))

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Goal: To help students to choose the more suitable academic programs to achieve their professional goals

2015 – In stand by

• Addressed to solve the following questions:
  1. Is my professional knowledge outdated?
  2. Do I have the skills needed for the new challenges of the society?
  3. What knowledge do I lack to qualify for a job I like?
  4. What universities can I address to get knowledge that improves my employment expectations?
A User Experience (Ux) job offer is selected

Skills required

**Acquired skills**
- saas

**University skills**
- analytics
- google
- python
- stock options
- ux

**Missing skills**
- customers
- angularjs
- backend
- celery
- ux designer
- s3
- postgres
- 401k
## What courses can provide the required skills for Ux

<table>
<thead>
<tr>
<th>Course</th>
<th>Completed courses</th>
<th>Not completed courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Postgraduate in Computer User Interaction</strong></td>
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<tr>
<td>UX</td>
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<tr>
<td><strong>Postgraduate in Business Intelligence</strong></td>
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<tr>
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<tr>
<td>saas</td>
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<tr>
<td><strong>Postgraduate in Videogames: Design and Programming</strong></td>
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<tr>
<td>python</td>
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</tbody>
</table>
00.1 Booter

**Goal:** To use a robot as an interface to support students in their learning experiences and management

2016 – still developing

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**ICT Flag for circuit design + PayPAC**

**Goal:** To engage students and promote the realization of practical exercises in circuit design

2015 – still living

VHDL:

\[ X1 \leftarrow \text{A1 nand A2}; \]

<table>
<thead>
<tr>
<th>A1</th>
<th>A2</th>
<th>X1</th>
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<tbody>
<tr>
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<td>0</td>
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</tbody>
</table>
Hola David Bañeros Besora, el saldo disponible és 21 ★

**Beneficis disponibles**

- Representació de la informació
- Circuits combinacionals
- Circuits seqüencials
- Estructura bàsica d’un computador
- Avaluació continuada

### Examen

**EX + 0,5p**

- +0,5p
- Descripció ☑
  - 224 (Disponibles: 3)
  - Adquirir

**EX + 1p**

- +1p
- Descripció ☑
  - 224 (Disponibles: 0)

**EX - 1ACT**

- Descripció ☑
  - 336 (Disponibles: 11)
  - Adquirir

**EX Virtual**

- Descripció ☑
  - 448 (Disponibles: 9)
  - Adquirir
### Pinball

**Goal:** To inform the student what are the probabilities of passing the subject according to their current deployment

2016 – still deploying

**PAC1**

- N: 75% (0.76%)
- D: 20% (99.44%)
- C+:
- C:
- B: 5% (95.61%)
- A:
  - Progés: 84.31%

**PAC2**

- N: 75% (0.01%)
- D: 20% (97.81%)
- C+:
- C:
- B: 5% (95.61%)
- A:
  - Progés: 91.14%

**PAC3**

- N: 75% (0.65%)
- D: 20% (97.32%)
- C+:
- C:
- B: 5% (95.61%)
- A:
  - Progés: 96.21%
Some example of analytics focused on staff

A Support System for recognizing prior learning

UOC Index

Analytical data store of campus data
A Support System for recognizing prior learning

**Goal:** To find out the potential equivalences between previous learning of students for each subject

2012 – 2014
00.1 Analytical data store of campus data (the DataMart)

**Goal:** To provide all the data relevant to the analytical processes from an analytical data store.

**2012 – still living**

- To provide an analytical data store to support learning analytics.
- Big data approach, both for size, heterogeneity and velocity.
- Data is stored locally.
- It has been used mainly for dropout analysis.
- It is being repurposed from a service point of view and support broader data → DataLab
- New projects are being developed: Suport@, pinball, emotional thermometer, etc.

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Goal: To provide an API that facilitates accessing the analytical data of the virtual campus at different aggregation levels.

2015 – still living

- Define a set of indicators that are generic and can be provided at different abstraction levels (classroom, subject, academic program).
- The indicators can be accessed from an API REST

\[
Influence_{en} = \left( \frac{\text{messages_fwd}(n,e) + \text{messages_reply}(n,e)}{\max_{\forall i \in \text{Students}_n} (\text{messages_fwd}(n,i)) + \max_{\forall i \in \text{Students}_n} (\text{messages_reply}(n,i))} \right) \times 100
\]
Analytics: Once started is easier to keep on
Conclusions

• Data is there and can help us in any way we imagine
• Right use of data can support learning, but also teaching and managing
• The difficulty is not only in creating analytic systems, but on implanting them in real environments
  → In fact, according to data, it is more difficult ;)
• In future, we plan to be creative to promote implantation of developed projects in real environment, by
  • doing thorough analysis of the impact of the developed systems,
  • Involving more people in the validation of the tools, creating communities of interest,
  • Sharing more effectively projects done and results obtained
Let’s evolve our information systems to facilitate tasks that can be automated in order to allow us to focus in doing tasks of added value.