Design and Evaluation of a Gamification-based Information System for Improving Student Attendance

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Outline

- Background and motivation
- Information System Architecture
  - Main concepts
- Evaluation
  - Procedure
  - Results
- Conclusions

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Background and motivation

- Problem
  - Student attendance is declining
  - Poor performance is often associated with low attendance
- Tackling the issue
  - Ideally increase “Intrinsic motivation”
    - Better/more engaging teaching material/methods
- Our complementary approach
  - External motivation using “Gamification”
  - Compete at a personal and group level

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Background and motivation

- Gamification
  - “the application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, such as work, education, etc.”

Sebastian Deterding’s slide (slide 10 of 95-theses-on-the-power-and-efficacy)

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Information System Architecture

- Student attendance is already monitored
  - NFC card readers at the entrance of lecture rooms
- Further motivation by means of Gamification
  - How the attendance records are *presented*
  - How the students perform **personally** *in comparison* with others
  - Implicit team formation and how students perform in **groups** – special interest in studying how they react when their choices affect their group by means of cohort comparisons

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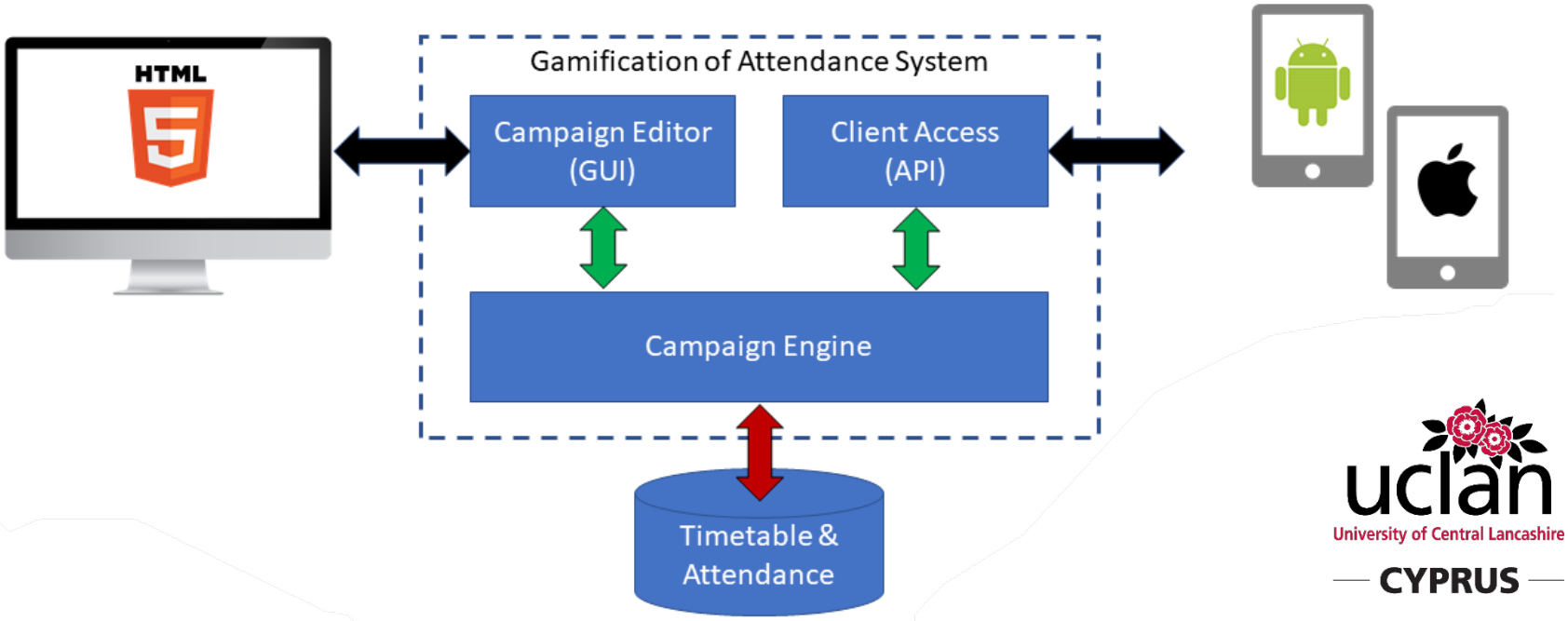
Information System Architecture

- Campaigns
  - A central concept which *models* a “Game” that has some **objectives**, some selected **participants,** some **rules** and some **rewards**.

- Specified in JSON
  - Defines valid period (starting and ending times)
  - A domain (does it include a specific module, a course, etc.)
  - A group-by (does it rank persons, modules, schools, etc.)
  - Badges (rewards for the top achievers)

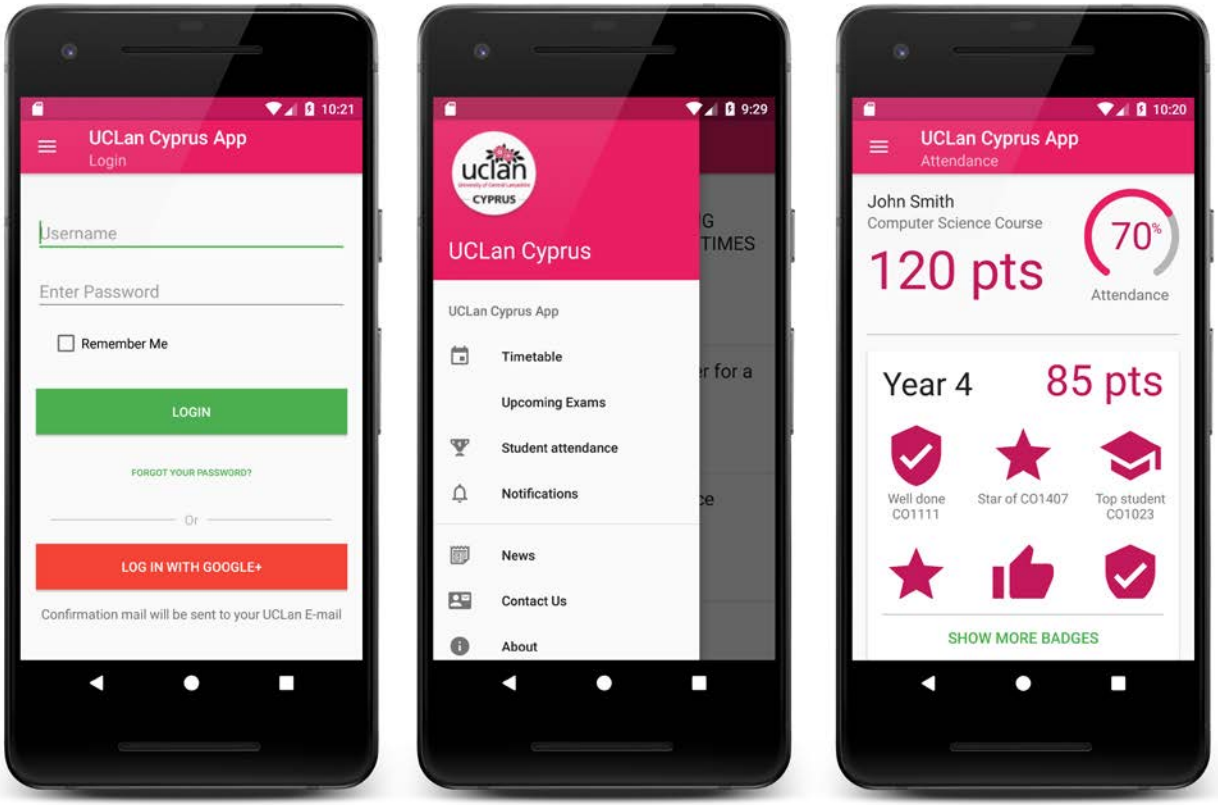
Information System Architecture

- Architecture
  - Includes three main components: **Campaign editor** (web based), **Client access API** (enables mobile clients) and the **Campaign engine** (periodically processes the rules and updates the rankings).



Information System Architecture

- Mobile app
  - Android and iOS apps developed
  - Integrated in a more widely useful university app



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Evaluation

- Procedure
  - Offline processing of attendance data for two periods
  - First period right before deploying the gamification system
  - Second period right when the gamification system was deployed and advertised to students and staff

- Participants
  - Some 948 students
  - From 71 courses
  - Organized under 3 individual schools

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Evaluation results

- Impact measured over refined dimensions: School, Module, Student

School	Impact
School of Sciences	6.09%
School of Business & Management	3.75%
School of Law	26.60%
Min	3.75%
Max	26.60%
Average	12.15%

Module	Impact
Count (total)	229
Count (positive)	138 (60%)
Average (positive)	19.25%

Student	Impact
Count (total)	500
Count (positive)	249 (50%)
Average (positive)	15.80%

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Evaluation results

- Impact on attendance at School, Programme, Module and Student dimensions, with summarizing notes

Programme	Impact %	Programme	Impact %
ULACCO134	-1.84	ULACCO140	2.04
ULBABA140	0.03	ULBABA134	-0.47
ULEGLG103	3.80	ULHOTO100	3.75
ULHOTO134	2.21	ULEDLE583	2.68
ULBUAD581	-4.59	ULBUAD583	3.92
ULLAWS140	31.57	ULLAWS100	25.11
ULLAWS580	32.52	ULLAWS183	30.48
ULLAWS180	21.05	ULCOMP100	3.99
ULMATH100	1.08	ULPSYC134	8.94
ULPSYC100	-2.30	ULSEXS140	3.23
ULCYBS580	-2.12		

Median	3.23%
Min	-4.59%
Max	32.52%
Average	7.86%
Average (positive)	11.03%
Average (negative)	-2.26%

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Conclusions

- Studied the effectiveness of a gamification-based attendance system
  - Presented the motivation
  - System architecture
  - Evaluation approach and results

- Future work
  - Further measurements (additional years)
  - Further analysis by segmenting over properties (e.g. age, gender, etc.)

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Questions?

- Thank you!

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