

# iKlassroom: Real-Time, Real-Place Teaching Analytics

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**Abstract.** This paper presents the concept of iKlassroom as a real-time and real-place teaching analytics application. We present design sketches and screenshots, outline a usage scenario for classroom practice and identify potential contributions to learning sciences research.

**Keywords:** teaching analytics, interactive classrooms, technology enhanced teaching, perception of affordances, appropriation of affordances, technological intersubjectivity.

## 1 Introduction

In this article, we describe the concept of a real-time and real-place teaching analytics applications, present design sketches and screenshots, outline a usage scenario for classroom practice and identify potential contributions to learning sciences research.

According to Vatraps and colleagues<sup>1</sup>

Teaching Analytics is conceived as a subfield of learning analytics that focuses on the design, development, evaluation, and education of visual analytics methods and tools for teachers in primary, secondary, and tertiary educational settings. Teachers' professional practices with visual analytics methods and tools are a central concern of teaching analytics. Teaching analytics methods and tools aim to develop innovative solutions to assist and augment teachers' dynamic diagnostic decision-making in the classrooms of the 21<sup>st</sup> century.

Current instructional support technologies such as classroom response systems [1] (also known as "clickers"), classroom behavioural management systems such as ClassDojo<sup>2</sup>, and emerging software solutions from the learning analytics research field<sup>3</sup> support different modes of interaction across (asynchronous vs. synchronous) and space (distributed vs. collocated). For example, classroom response systems from

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<sup>1</sup> <http://www.next-tell.eu/iwta-2013/>

<sup>2</sup> <http://www.classdojo.com/>

<sup>3</sup> [http://en.wikipedia.org/wiki/Learning\\_analytics](http://en.wikipedia.org/wiki/Learning_analytics)

TurningPoint Technologies<sup>4</sup> support synchronous and collocated mode of interaction in the classroom. In other words, classroom response systems support real-time interactions in the actual space classroom with support for both anonymous and non-anonymous responses from students.

However, as far as we know, there are no learning analytics and/or teaching analytics solutions out there that support not only real-time interactions but also real-place interfaces. One application, Learning Catalytics<sup>5</sup> maps its user interface to the actual physical configuration of the classroom). We envision real-time + real-place teaching analytics solutions that support the following:

- User interface for teachers is in direct correspondence to the physical classroom
- Dashboard view of students corresponds in real-time and real-place to the students in the classroom
- Solicitation, communication and interpretation of emotional information
- Linkages between classroom information management and teachers' gaze management
- Multi-grained classroom engagement ranging from individual students, collocated or distributed or groups of students to geographical sections of the classroom

## **2 iKlassroom: Real-Time + Real-Place Classroom Management**

With iKlassroom, the spatial characteristics of the real-world classroom are replicated in the user interface. For instance, the floor plan and the seating arrangement of a lecture auditorium are modelled into the dashboard interface. Students “check-in” to the lecture auditorium by selecting a particular seat like they do for flights and in some cases for movie theatres. The teacher’s dashboard in iKlassroom re-presents the actual spatial configurations of the physical classroom with empty seats, occupied seats, the aisles, the stairs and such.

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<sup>4</sup> <http://www.turningtechnologies.com/>

<sup>5</sup> <https://learningcatalytics.com/>

## 2.1 Design Sketch

Figure 1 presents the design sketch of the real-time + real-place interface. The central idea is that all classroom engagement between students and teachers with regard to formative assessment, affective states and such are mapped to this model of the actual classroom.

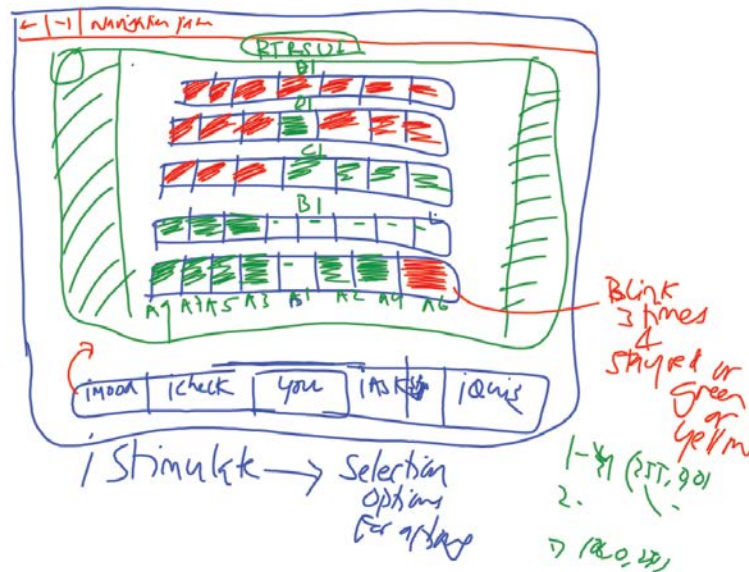


Figure 1: iKlassroom: Design Sketch

## 2.2 Prototype

Figure 2 presents a picture of Auditorium 1 at the IT University of Copenhagen in Denmark. Figure 3 presents the conceptual sketch of physically addressable classrooms. Figure 4 presents the screenshot from the iKlassroom prototype.



Figure 2: Picture of a Classroom (Auditorium of ITU, Denmark)

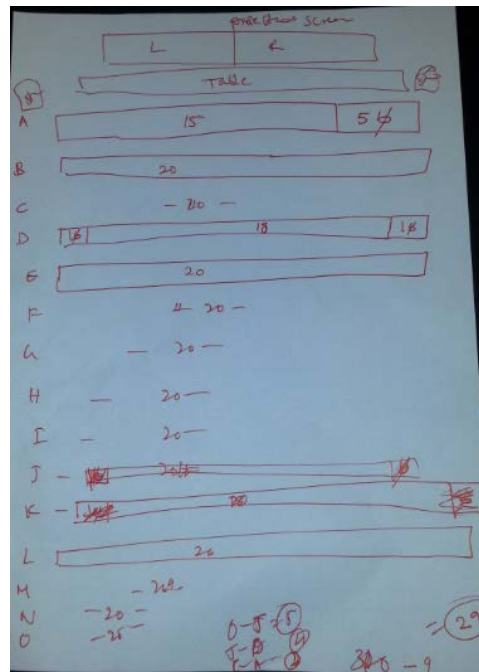
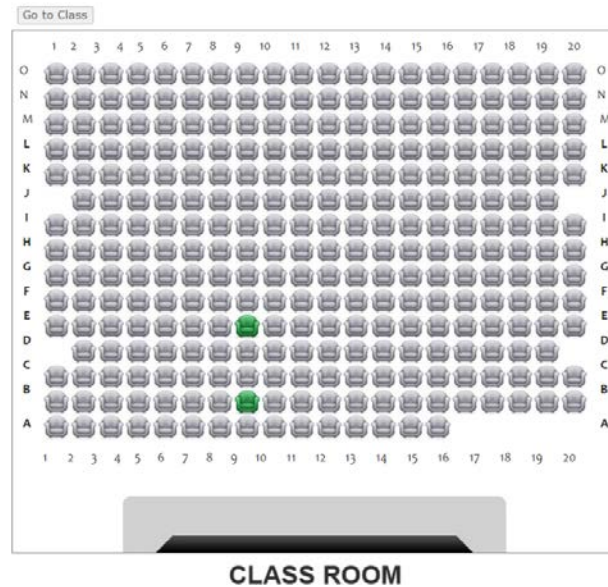


Figure 3: Conceptual Sketch of a Physically Addressable Classroom



**Figure 4: iKlassroom Layout for Auditorium1, ITU**

### 2.3 Usage Scenario: Teachers

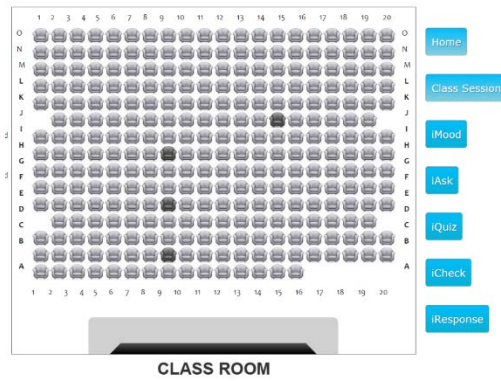
Teachers create accounts on iKlassroom and setup their courses by providing information about the course (code, title, description) and its schedule (time and room location). Teachers have the option of using the default classroom configurations already available in iKlassroom or create a new classroom configuration (that is, seating arrangement). Before each class, the teachers open an iKlassroom session for student to check-in (each seat in the classroom is assigned a unique identity).

Functionality implemented in the first prototype of iKlassroom allows teachers to do the following:

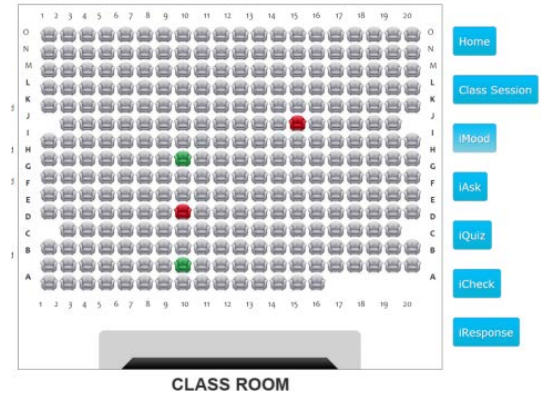
- Elicit emotional state of the students (iMood)
- Check conceptual understanding (iCheck)
- Answer students' questions (iAsk)
- Make accessible learning objects and resources to students (iStore)
- Conduct quizzes (iQuiz)

Teachers (alone or together with co-teachers and/or teaching assistants) can monitor and manage their classroom activities through the iKlassroom Dashboard which

provides a simple colour-coded overview with details on demand. Screenshots from the prototype are presented below.



**Figure 5: iKlassroom Screenshot: Occupied Seats**



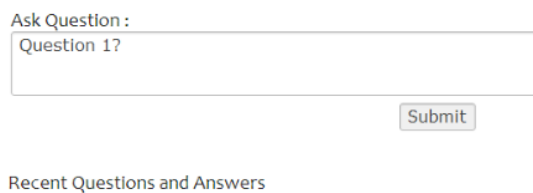
**Figure 6: iKlassroom Screenshot: Responses**

### 2.3 Usage Scenario: Students

Students create accounts with iKlassroom and are automatically added to eligible courses. Students sign-in to iKlassroom class session by checking in to the particular seat that they are currently sitting in the physical classroom. Students have the ability to convey their emotional state whenever they want to apart from responding to teacher elicited iMood responses. Similarly, students can ask questions whenever they want to (iAsk) as well as respond to teachers' questions (iCheck) and quizzes (iQuiz). Learning objects and resources for the current class session are readily available from iStore. Screenshots from the prototype are presented below.



**Figure 5: iKlassroom Screenshot of iMood**



**Figure 6: iKlassroom Screenshot of iAsk**

### 3 Discussion

iKlassroom follows the triadic model of teaching analytics and involves teachers, students, visual analysts, and design-based researchers [2]. Triadic dialogue of teacher initiated question, student response and teacher's evaluation of it is ubiquitous classrooms [3]. iKlassroom seeks to facilitate this process by aligning the computational representation of the student responses to the actual physical classroom configuration. At the individual level of analysis, it would be interesting to investigate

if iKlassroom results in the generation of an increased number of self-explanations [4] amongst students during the classroom sessions. At the social level of analysis, there might be opportunities for exploring dynamic zones of proximal development [5].

How iKlassroom influences teachers' professional vision is a central concern for us in terms of different levels of cognitive load as well as different configurations of instructional practice (individual vs. team teaching with assistants and/or co-teachers).

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