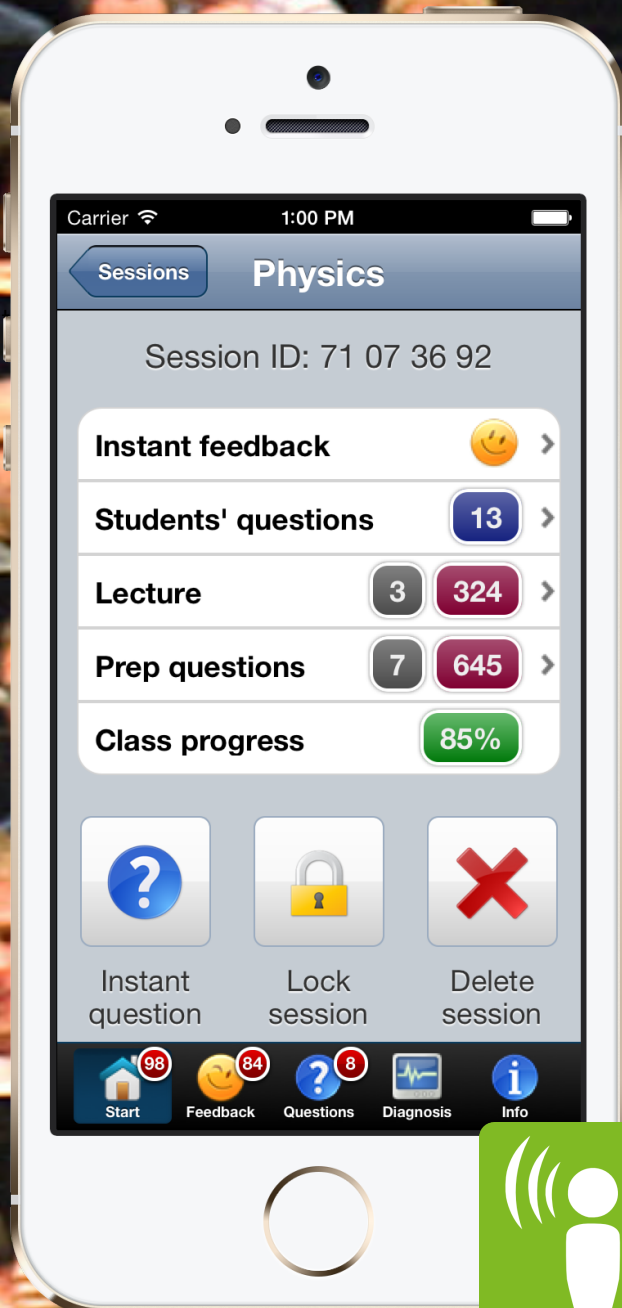


Agile Teaching





Questions for lecture

Answers



2/3

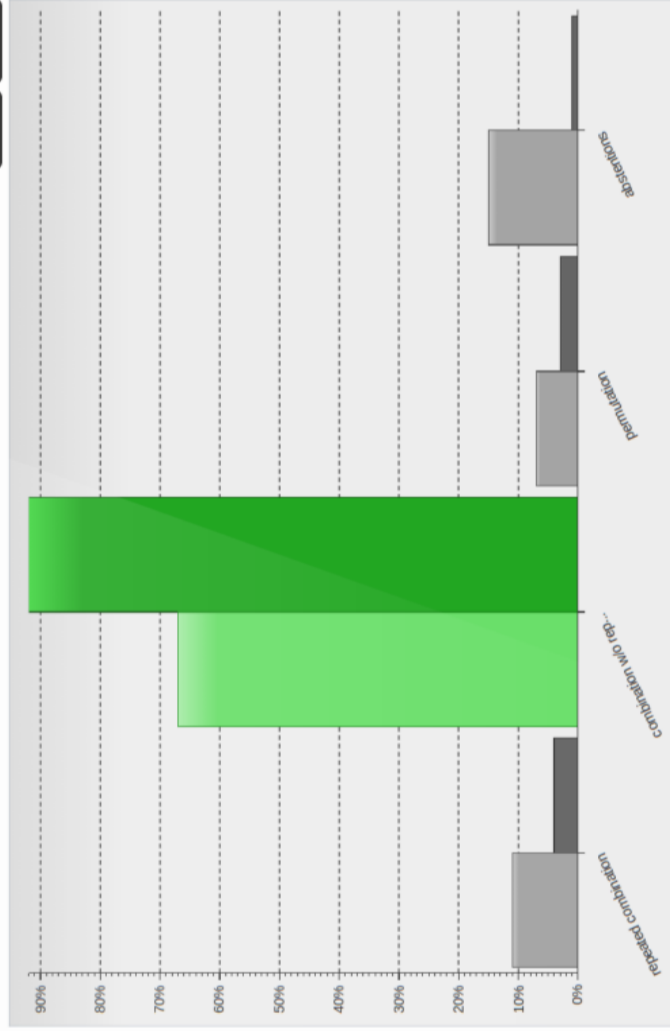
Show

Release

2nd

A standard deck of cards contains n cards divided into 4 suits ♠, ♥, ♦, ♣ ($4 \mid n$). Let $n = 4 \cdot 13 = 52$. Consider the probability of drawing a full house, i. e., three of a kind and a pair. This is a...

1st 164 2nd 174



Live feedback

Questions by audience

Binomial distribution

July 25, 2014 10:31 AM

Exercise 3

Would you please explain the task again in more detail?

July 25, 2014 10:23 AM

Distinguishable permutations

July 25, 2014 10:06 AM

Lottery draw

July 18, 2014 10:39 AM

Feedback

July 11, 2014 11:16 AM

Conditional probability

July 11, 2014 10:19 AM

Question

July 11, 2014 9:58 AM

arsnova.eu/presenter

Agile Teaching

Based on Pedagogical Feedback Loops: JiTt, Peer Instruction, and Instant Feedback with the Audience Response System ARSnova

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This brochure outlines the pedagogical options of the open-source HTML5 audience-response system ARSnova.¹ The main focus lies on the feedback loops ARSnova establishes between students and teacher in class and at home. Students give feedback on a broad time scale: on the eve of next class (Just-in-Time Teaching, JiTT), at lecture time (Peer Instruction, PI), and in real-time while listening to the lecture (Instant Feedback). These options facilitate agile teaching, i.e., the ability of a teacher to adapt lecture pace and content to the current understanding of the audience. All Web services at arsnova.eu can be used free of charge and without registration.

1 TIME-SCALED INTERACTION AND FEEDBACK

It is common didactic knowledge that interaction between teacher and students is paramount for effective teaching and learning. Interaction in a discussion forum of a learning management system is difficult to initiate and keep going. To help solve this challenge, audience response systems (ARS) have been introduced and used in settings such as blended e-learning and flipped classroom scenarios. At THM University of Applied Sciences, the open source project ARSnova addresses student-teacher interaction and feedback on learning progress on a time scale from days to real-time. When monitoring feedback, the teacher can make adaptive instructional decisions for the course of the lecture.

¹ <https://arsnova.eu> – Code: <http://arsnova.github.io> – Info: <https://arsnova.eu/blog>

The feedback options ARSnova offers help to identify deficits in preparation, learning, or understanding. They indicate the need for re-adjustment of pace or content. There are three pedagogical feedback loops that ARSnova can establish and maintain between learners and educator, see Figure 1: JiTT *before class*, Peer Instruction and Instant Feedback *in class*. With the feedback loops in place, the educator is able to deliver well-balanced course contents that match the students' current level of knowledge. The anonymity guaranteed by ARSnova encourages individuals to fully participate without fear of embarrassment or loss of face. For a detailed workflow of JiTT and PI in concert with an audience response system, see Ives Araujo's illustration on the web.²

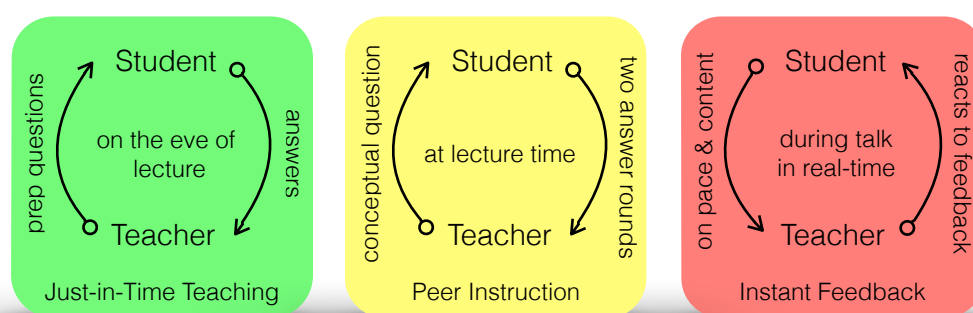


Fig. 1: ARSnova provides three feedback loops between student and teacher

2 JUST-IN-TIME TEACHING

Just-in-Time Teaching, JiTT [1], is a pedagogical strategy that uses feedback students give on their homework assignments, in preparation for the upcoming class session. The goals are to enhance student motivation and engagement, and to maximize the efficacy of the classroom session. The student feedback given on the eve of next class allows the teacher to tailor classroom activities to best meet students' needs. ARSnova implements the JiTT approach with the use of different question types, see the session panel for the lecturer on the front cover and for students on the inner back cover: Prep Questions for JiTT vs Lecture Questions for PI.

3 PEER INSTRUCTION

Peer Instruction, developed by Eric Mazur [1], is a research-based pedagogical approach to creating more interactive engagement – even in large lecture classes. It replaces lectures with small-group discussions on a conceptual question, followed

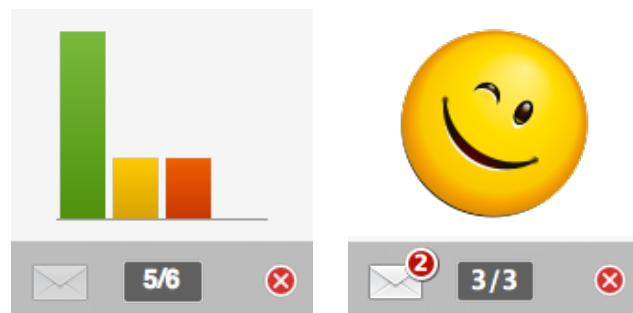
² <http://blog.peerinstruction.net/2012/09/04/how-one-professor-motivated-students-to-read-before-a-flipped-class-and-measured-their-effort>

by whole-class discussions, with short lectures between conceptual questions. Students first think about the questions and answer them individually, then discuss the rationale for their answers with their neighbors and try to reach an agreement. The teacher, wandering around the room, listens in to students' use of concepts and terminology and intervenes when necessary. After discussing their answers with their neighbors, they poll for a second time. The polling rounds are implemented by a dedicated teacher front-end: ARSnova Presenter, see the PI votes with highlighted correct answer (1st and 2nd round) on the inner front cover.

4 INSTANT FEEDBACK

Anonymous feedback on the students' understanding of an ongoing lecture helps both the lecturer and the students in a large lecture hall. The lecturer can spontaneously adapt pace and content of his or her talk to the current understanding of the audience. The students can see whether their peers also have difficulties with the pace and course of the lecture. Besides watching audience feedback on one's own smartphone or tablet, see screenshot on the back cover, the lecturer can display it publicly on his or her slides, Figure 2.

Fig. 2: ARSnova Overlay:³ Monitoring instant feedback on presentation slides. Emoticons or bar charts visualize audience response to the current lecture pace. The badge counter on the envelope icon indicates the number of questions brought up by students during the lecture or discussions. The feedback monitor (200 x 200 pixel) can be placed in any corner of the projection.



5 UNIQUE CHARACTERISTICS OF ARSNOVA

Besides pedagogical feedback loops that most proprietary clickers and open-source prototypes offer, though, not in concert with JiTT and PI, there are also a couple of unique features of the ARSnova project, which are listed on the next page. These features were obtained through the use of rapid prototyping and continuous deployment of ARSnova during several lectures over the last two academic years.

³ <https://arsnova.eu/overlay>

- Learning Analytics: Students can see their “Personal Learning Progress” vs “Class Progress” measured by scores achieved for JiTT and PI questions, see the percentage badges in the student session panel on the right side.
- Grid-based picture questions to spot errors in circuit diagrams, mechanical and architectural drawings, etc.; or to locate some areas of interest, see an example on the right side.
- Flashcards that can be integrated with the THMcards Gamification Project.⁴ This sister project of ARSnova is an open-source flashcard platform that uses Spaced Repetition Learning Algorithms (Leitner, SuperMemo) and issues Mozilla OpenBadges, see Figure 3.



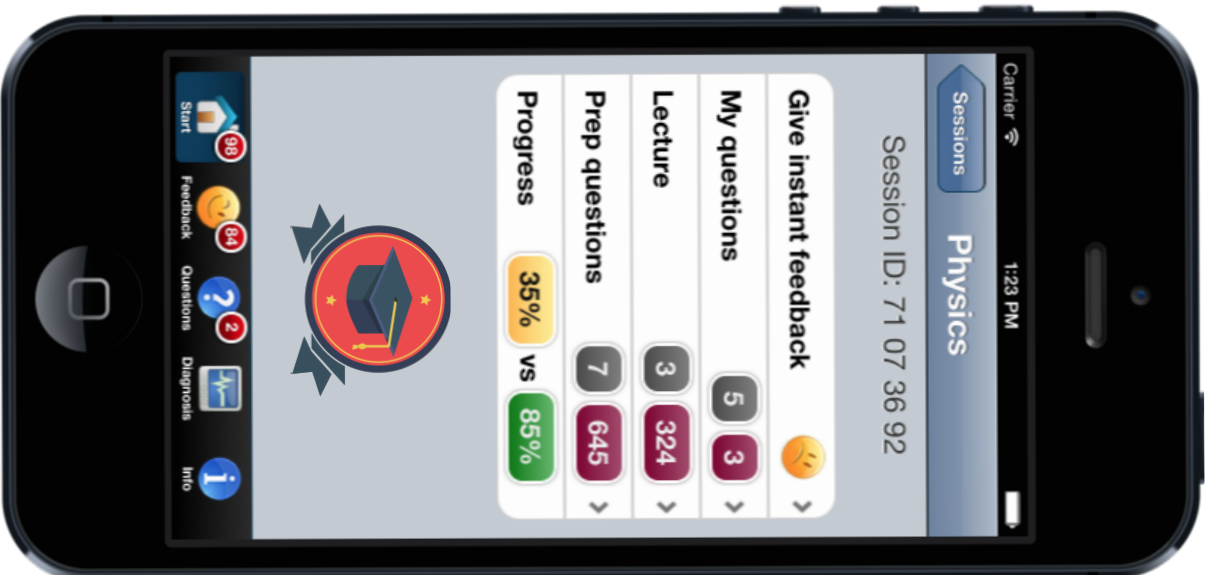
Fig. 3: Badges for THMcards and ARSnova PI questions

- (a) Striver: person who is leading the scoreboard
 - (b) Critics’ Darling: person whose flashcard sets are well accepted by peers
 - (c) Critic: person who evaluates the quality of a flashcard set
 - (d) Frequenter: person who is learning according to a Spaced Repetition algorithm
 - (e) Meteor: person who participated in the Meteor flashcard game
 - (f) Benefactor: person who offers his or her flashcard sets to peers
- LMS connector for the open-source learning management platform Moodle: With a single click, an ARSnova session is created restricting access to members of the LMS course.
 - MOOC proven: more than 30,000 students used ARSnova on a regular basis in a MOOC series of Web Engineering at iversity.org.

REFERENCES

1. Mazur, E., Watkins, J.: Just-in-Time Teaching and Peer Instruction. In: Simkins, S., Maier, M. (eds.) Just-in-Time Teaching Across the Disciplines. pp. 39-62. Stylus Publishing, Sterling, VA (2009)

⁴ <https://cards.thm.de>



Student Panel



Picture Question

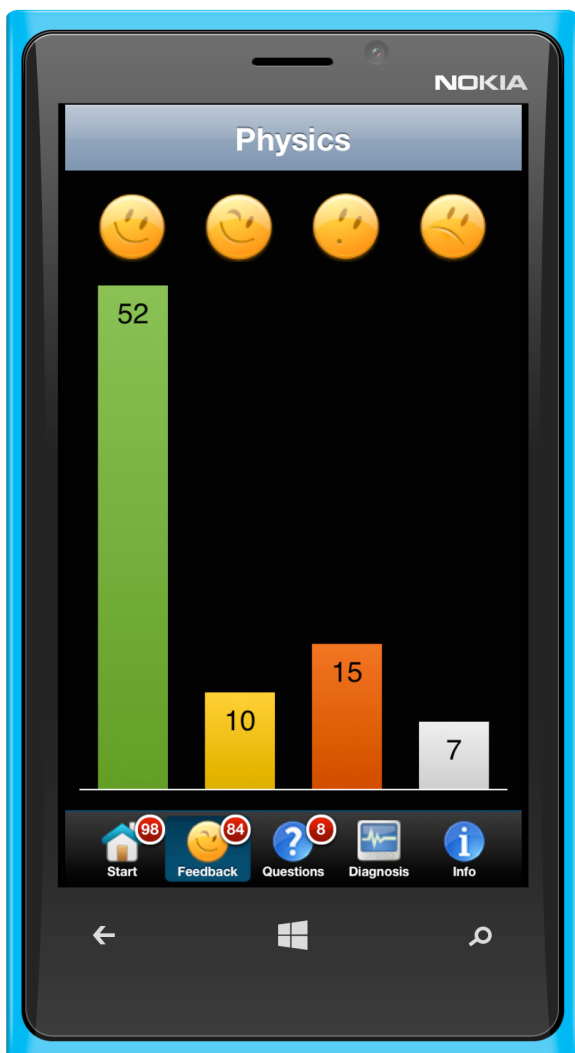


TeX Formula



THM

TECHNISCHE HOCHSCHULE MITTELHESSEN



Audience Response



- Instant Feedback
- Peer Instruction
- Just-in-Time Teaching
- Open Source Project
- Service free of Charge and w/o Registration



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