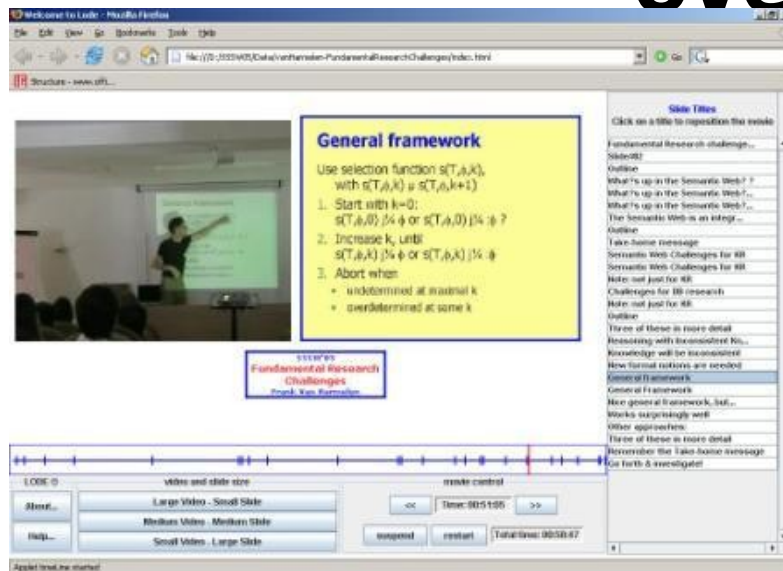


Research on Videolectures

Lectures On DEmand: a system for delivering traditional lectures over the Web.

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Dipartim. Informatica e
Telecomunicazioni
Università di Trento
Italy



What do we need e-learning for?

- Help traditional students
- Support remote students
- Make some activity faster
 - e.g. semi-automatically grading tests
- Change the way we teach
 - Make it more collaborative
- Create a business
 - Get new markets (e.g. Athabasca)
 - Sell content (e.g. SCORM lectures)

Traditional and remote students: how?

Traditional lecturing is dead.

- The lecture model is under attack by people proposing learner centered learning
- E-learning is an opportunity for a change
- However...

Traditional and remote students: how?

... what is going on in *your classroom*?

At our place, we sometimes use a blended approach,
much stuff is available through the net,

but the classroom is still there...

Can we make it any better, while the old paradigm
still survives?

Breaking the space-temporal unit

Can we **free** the student from
spatial and **temporal** constraints?

Classical solutions:

- Paper-based learning material
- VHS cassettes (and TV or satellite broadcasting)

Video distribution through the Internet was not feasible (at least in Europe)
until recently

Video is costly . Video is boring!

Videos for teaching?

- TV-based
 - VHS cassettes
 - TV broadcasting of frontal lectures
- Computer network based
 - 1998 Heyes (USA to France)

Our first experiment

We used e-presence on a whole first-year course (48 hours, Object Oriented Programming for Computer Science)

- through the Internet (webcasting)
- through the Internet (asynchronous)
- through the Internet (download)
- offline (through a set of 6 CDs or a single DVD).

Student feedback

Enthusiastic.

*We were “forced” to extend
the experiment to a second
course!*

75% anticipated using the
system often or very
often

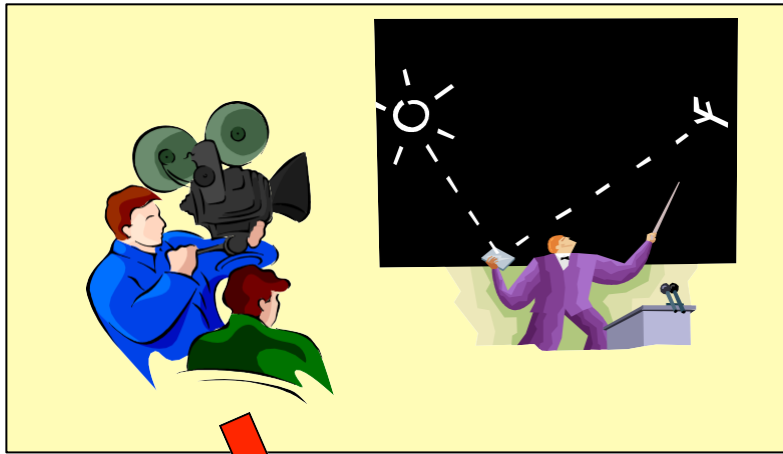
students who...	total	1 st exam (45 stud.)	2 nd exam (23 stud.)
...used the system to review at least one lecture	63%	51%	87%
...followed the course completely off-line	5%	6%	4%

Advantages from student' s perspective

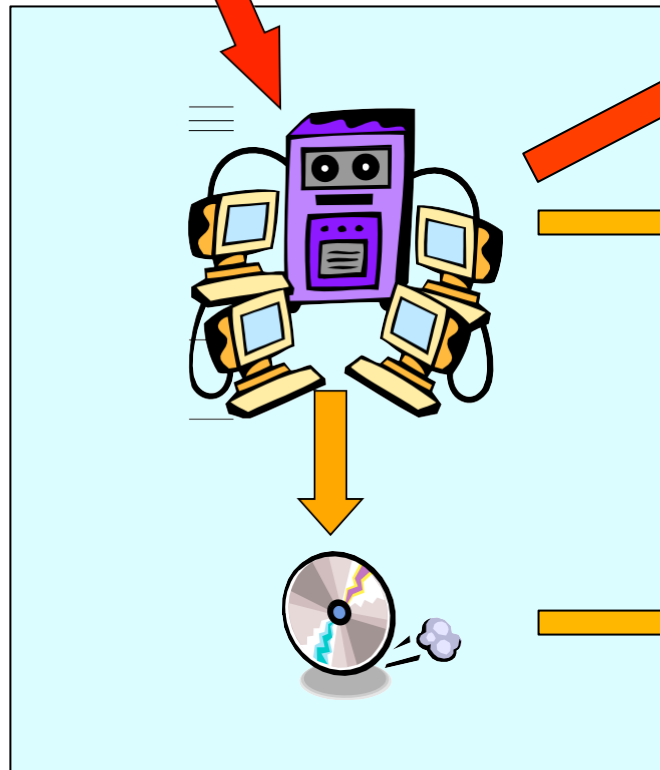
- Better time management:
 - ability to **recover lectures lost due to forced absence** (illness, work or other time-frame incompatibility);
 - ability to **better organize their time**, deciding not to be present at some lecture (elective absence);
- Better understanding
 - **review some critical point** (cases of poor understanding of a section due to concentration drop, excessive speed in an explanation or intrinsic difficulty);
 - ability to **check the correctness of notes** taken during a lecture;

Other advantages

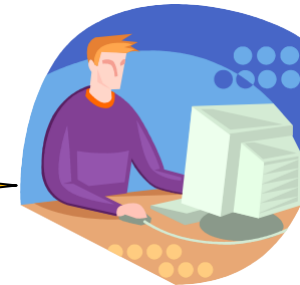
- Miscellaneous
 - perception by the student of a better service provided by the university;
 - support foreign (italian) students who might have difficulties with the Italian (English) language;
 - enrichment of the e-learning porxolio;
 - possibility for the teacher to view himself;
 - possibility to reuse lectures (across time, or in different contexts!)



Synchronous (**webcast**)



Asynchronous
(**On line**, or **download**)



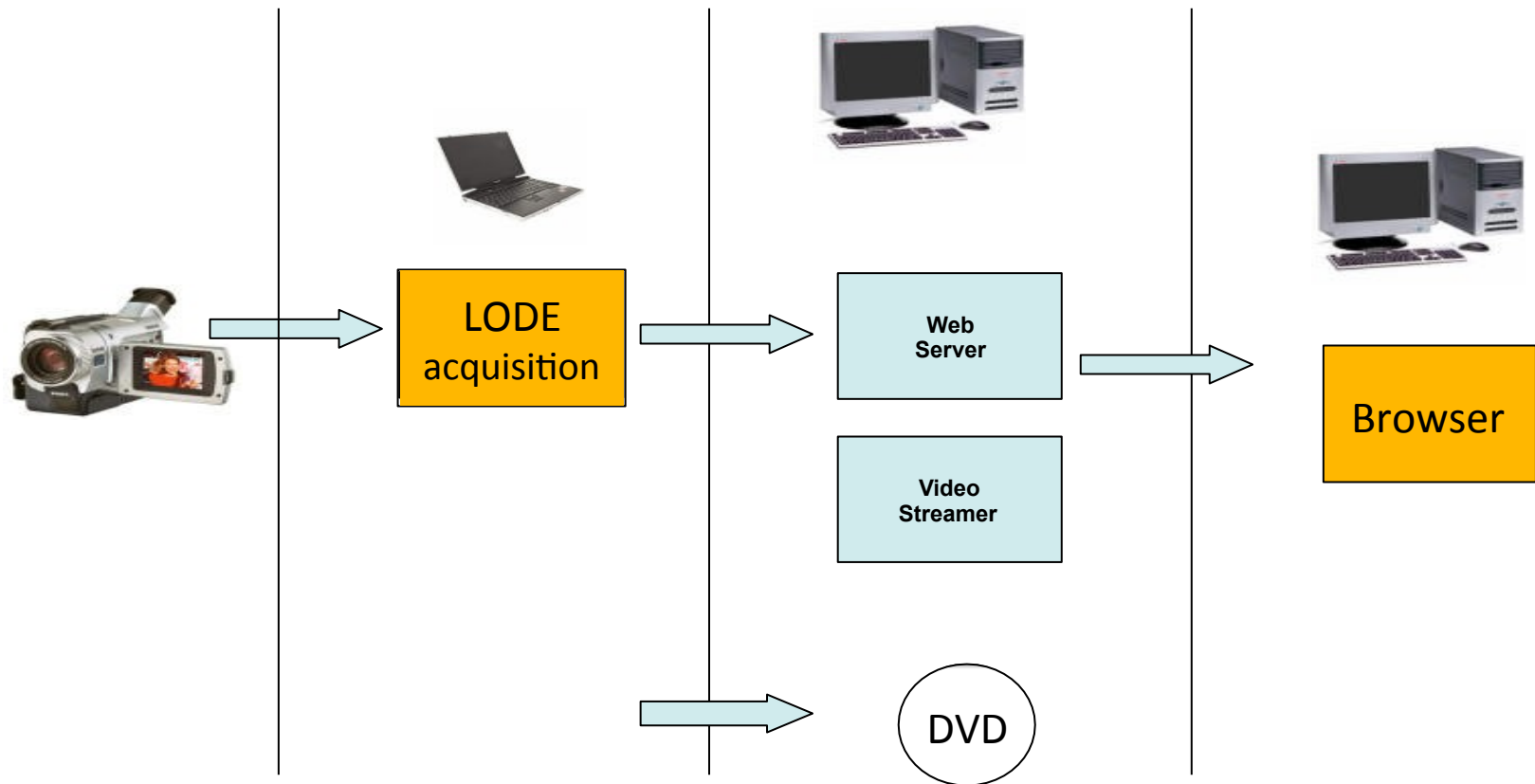
Asynchronous(**CD - DVD**)



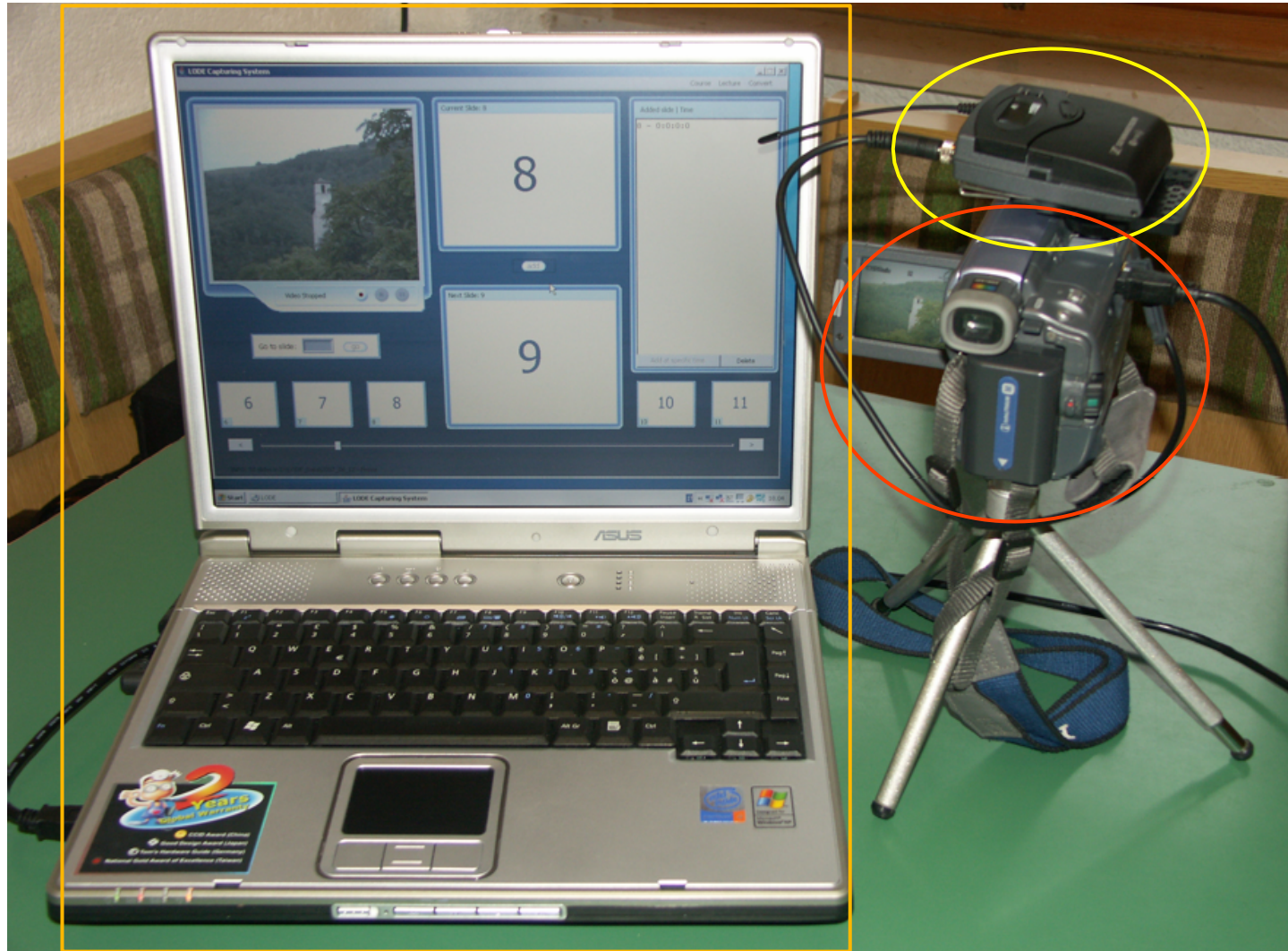
Our requirements

- **impact on lectures** should be minimal;
- **production costs should be minimal**, so as to allow scaling the approach to most courses.
 - Set-up must be lightweight!
 - Operations must be simple (low level skills!)
 - Post-processing operations must be light (i.e. almost automatic), and not require much work

System Architecture



Acquisition setup



Detail of camera and mic receiver



Assessing costs: initial costs:

- Software acquisition
 - (almost) 0 Euro (QuickTime, Java, Javascript, Darwin Streaming Server, open source components, our sw + one non-free component)
- Hardware acquisition:
 - SERVER 1000 Euro
 - ACQUISITION STATION 1400-2400 Euro
 - 1 Laptop (Euro 800-1500)
 - 1 Digital Camera (Euro 400)
 - 1 Radio Microphone (Euro 200-500)

Assessing costs: running costs

- setting up the system before lectures (10 min.)
- running the system during the lecture (2 hours)
- removing the system after lectures (5 minutes)
- starting the post-processing: 5 minutes. The post processing would then go by itself for approx. 1 hours for producing a streams of 1 hour.
- ending the post-processing (uploading the video on the web site, producing the master CD): 15 minutes.

=> 35 minutes extra work for a 2 hours lecture

Samples of the evolution

- http://latemar.science.unitn.it/Lode/Programmazione2_2005-06/15/content/start.html
- http://latemar.science.unitn.it/LODE/Programmazione2_2009/Programmazione2_2009_index.html
- <http://latemar.science.unitn.it/itunes/archive/ScienzeCognitive/AnalisiMatematica10-11/Defranceschi-13-101021.mp4>
- <http://latemar.science.unitn.it:3000/lecture.html?content=lectures/LinguaggiProgrammazione/Lezione17>
- <http://latemar.science.unitn.it/LODE/LinguaggiDiProgrammazione/02-7-Collections/>
- <http://latemar.science.unitn.it/cad/lecture.html?content=lectures/Analisi1/1219>



500 Euro totali



e idea, the system, the process

Once you have the videos...

- Flipped classroom. (2009)

- Scaffolding

Using analytics

Video publication

- Behind the scenes
- No emphasis
- No advertisement
- Just a small link on the course web site

Who are our "users"?
How do they behave?

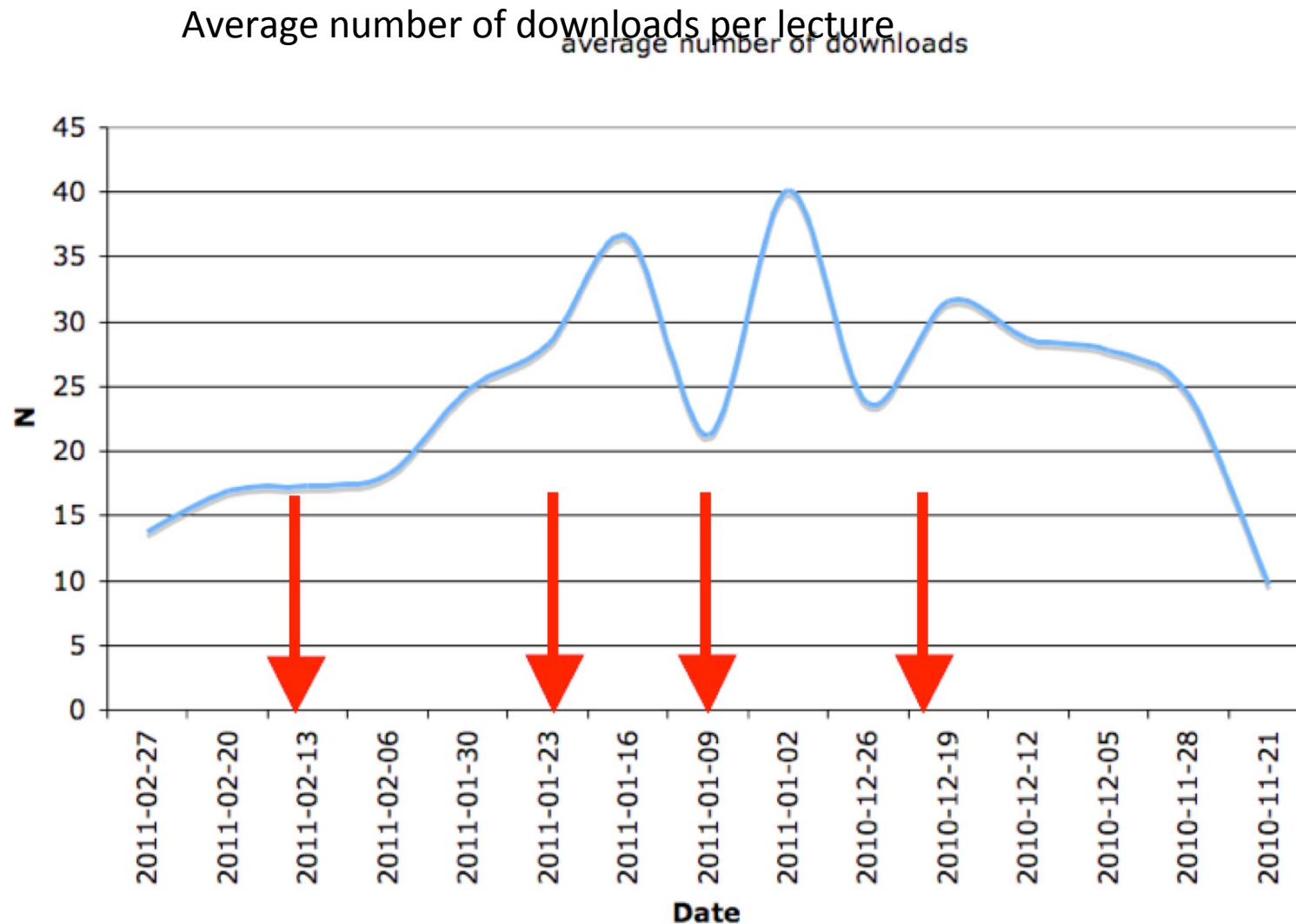
- Look at the download logs
 - No hints about provenance
- Ask "our" students

Download statistics

- row numbers -

- Total 11.385 downloads (in the 15 weeks observation period)
- Over 15 weeks: 345 download per lecture
- Average of 23 download per lecture per week

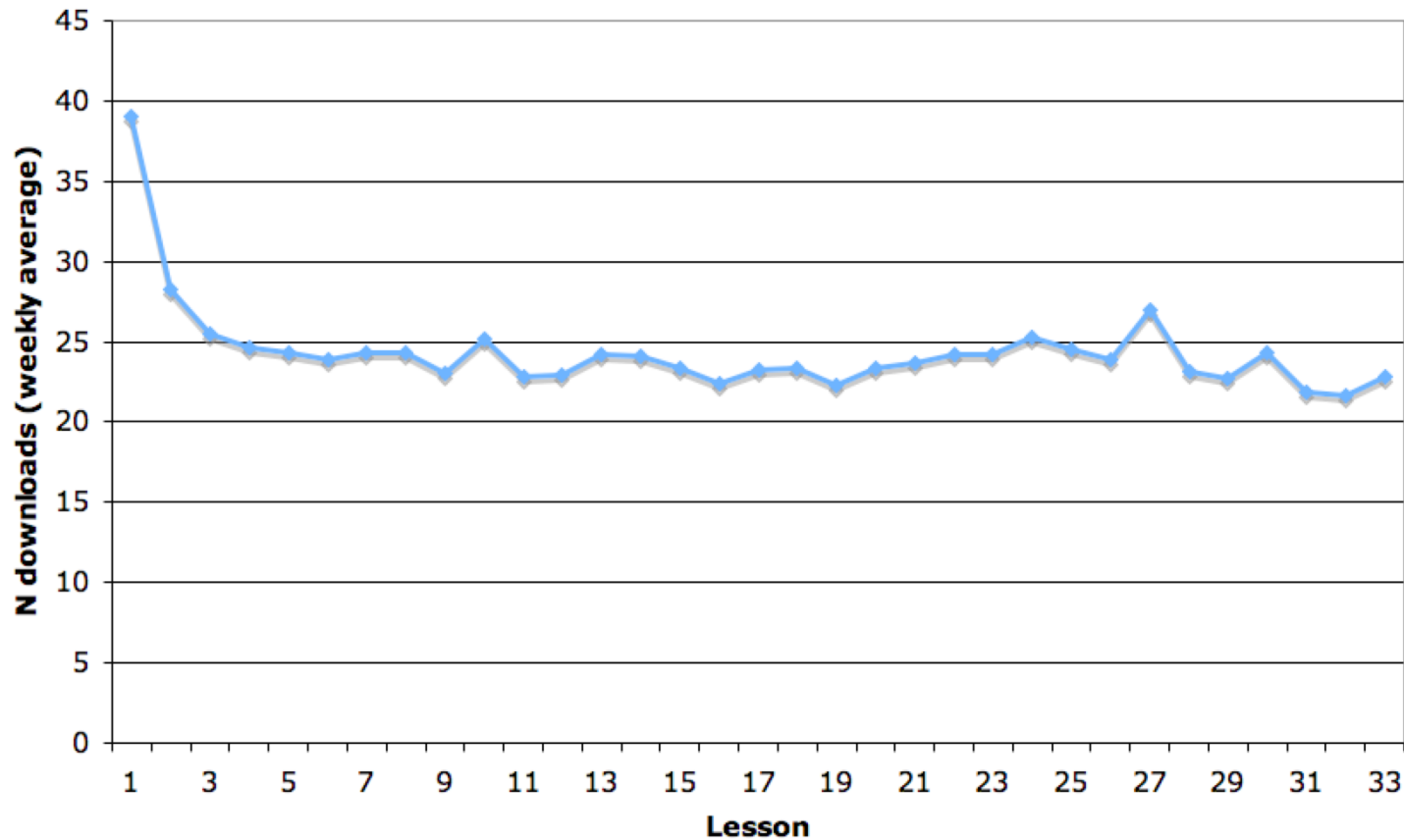
Time distribution of downloads



Do "students" take the entire course?

Stats over 15 weeks

Lesson Download distribution



Students survey

- Sample: 91 students passing the exam between January and June (65 responded, 71%)



Anonymous, free,
web data collection
by invitation

- Used the video: 25%
- Did not know the video were available: 38%
- Decided not to use the videos: 37%

Students survey

- Are videos useful? Yes 84%
- Would you like other courses to use them? Yes 79%
- The format allows following well the lecture? Yes 53%, No 11%

How much did the videos help you passing the exam?

- Little/very little 38%
- Much/very much 38%

Survey - type of usage

- Did you watch most of the lectures? Yes 50%
- Did you watch some lecture more than once? Yes 50%
- Did you use Desktop-laptop? 100%
- Did you use iPhone-iPad? 0%

Survey - type of usage

- Did you watch some lecture from beginning to end? Yes 38%
- Did you make breaks for resting? Yes 19%
- Did you make breaks for doing exercises? Yes 31%
- Did you watch only some important part of some lecture? Yes 31%
- Did you watch more than once some lecture? Yes 53%

Students survey

- In general, would you stop going to class if you had the videos?
- No 47%
- Yes 12%
- Depends on the type and quality of the lectures 33%
- Depends on the quality of the videos 8%

Where did the other students come from?

- Almost 350 downloads (per lecture) over the first 15 weeks, and going...
- Anecdotal evidence

Gentile Professoressa...

Gentile Professoressa,
Dopo mesi di incubi, ci tenevamo a dirLe che anche grazie alle sue preziosissime lezioni su itunes siamo finalmente riusciti a superare l'esame di matematica generale.
La ringraziamo del materiale messo a nostra disposizione e le alleghiamo la foto dei nostri due statini a testimonianza.

The image shows two pages of handwritten student records from the University of Rome Tre. The left page is titled 'UNIVERSITÀ DEGLI STUDI ROMA TRE' and 'In Regimen Istruzione'. It lists students and their exam results for various subjects. The right page is also titled 'UNIVERSITÀ DEGLI STUDI ROMA TRE' and 'In Regimen Istruzione'. It lists students and their exam results for various subjects.

Nome del Discente	CFU	Voto	Data	Prova del Discente
G. PIRELLI	3	27	11/01/10	Matematica
SEVERINO	3	24	01/01/10	Matematica
F. RATTI	6	28	24/06/10	Matematica
B. W. PIRELLI	9	30	23/01/10	Matematica
DEBATTINI	8	29	11/01/11	Matematica
FRONZONI	8	27	25/01/11	Matematica
P. LIBERATI	3	24	26/01/11	Matematica
L. ROSSI CARLO	9	28	15/01/11	Matematica
P. LIBERATI	10	27	08/01/11	Matematica
P. LIBERATI	1	26	06/01/11	Matematica
S. LIBERATI	9	27	16/01/11	Matematica
F. RATTI	9	28	22/01/11	Matematica
V. RATTI	10	29	11/01/11	Matematica
L. RATTI	10	29	11/01/11	Matematica

Nome del Discente	CFU	Voto	Data	Prova del Discente
DEBATTINI	8	27	01/01/10	Matematica
FRONZONI	8	27	01/01/10	Matematica
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FRONZONI	8	27	01/01/10	Matematica
FRONZONI	8	27	01/01/10	Matematica
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FRONZONI	8	27	01/01/10	Matematica

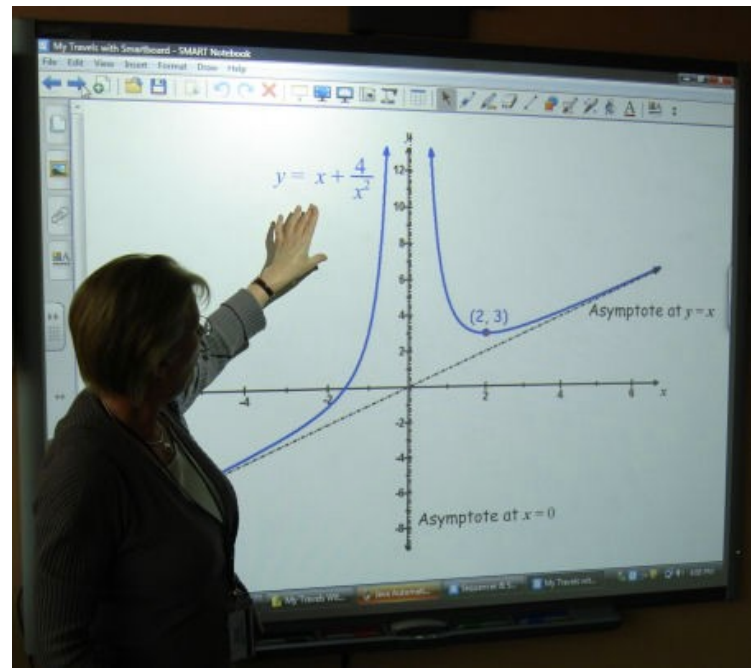
The next step:
Videolecture Annotation

A question

Is giving out lecture material a good thing?



Or...



IWB

A question

Is giving out lecture material a good thing?

Or should we encourage students to take notes?



A question

Is giving out lecture material a good thing?

Should we encourage students to take notes?

Or should we attempt a mixed approach?



Taking notes...

Helps

Or

Hinders

Understanding?

An extreme: giving out the lecture itself...

13 JavaFX5-Animation

About Lode Help LinguaggiDiProgrammazioneMod1 - <http://latemar.science.unitn.it/LODE->

LODE

Layout: Video Only Video+Slide Slide Only Fullscreen



KeyFrame

Defines target values at a specified point in time for a set of variables that are interpolated along a Timeline.

The developer controls the interpolation of a set of variables for the interval between successive key frames by providing a **target value** and an **Interpolator** associated with each variable. The variables are interpolated such that they will reach their target value at the specified time.

An **onFinished** function is invoked on each KeyFrame if one is provided.

Play 1.0 x 1.3 x 2.0 x Mute < >

Show Previous Current Next slide

28:55/66:15

KeyFrame

Defines target values at a specified point in time for a set of variables that are interpolated along a Timeline.

The developer controls the interpolation of a set of variables for the interval between successive key frames by providing a **target value** and an **Interpolator** associated with each variable. The variables are interpolated such that they will reach their target value at the specified time.

An **onFinished** function is invoked on each KeyFrame if one is provided.

Esempio di animazione 1.1

```
public class Animazione1_1 {
    public static void main(String[] args) {
        Timeline tl = new Timeline();
        tl.play();
    }
}
```

Esempio di animazione 1.2 v-1

```
public class Animazione1_2_v1 {
    public static void main(String[] args) {
        Timeline tl = new Timeline();
        tl.play();
    }
}
```

Esempio di animazione 1.2 v-2

```
public class Animazione1_2_v2 {
    public static void main(String[] args) {
        Timeline tl = new Timeline();
        tl.play();
    }
}
```

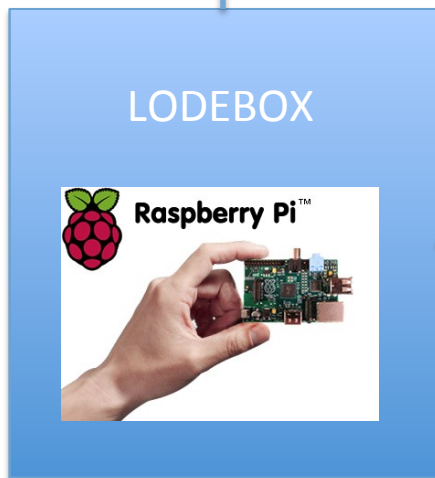
Esempio di animazione - v-3

```
public class Animazione1_3 {
    public static void main(String[] args) {
        Timeline tl = new Timeline();
        tl.play();
    }
}
```

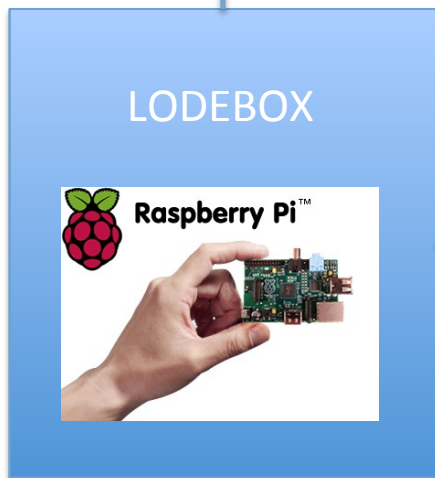
14. Esempio di 15. Esempio di 16. Esempio di 17. Esempio di

And YES, we do believe in the usefulness of videos!

LodeBox



LodeBox



... also if it is not PPT based

1118



C1 - -- latemar.science.unitn.it/LODE-

▶ 1.0x 1.3x 2.0x ◀▶ 🔊 - +



Movie Recording

$$f(x) = e^{4x} \cdot e^{-1}$$
$$= e^{-1} \left(1 + (4x) + \frac{(4x)^2}{2} + \frac{(4x)^3}{3!} \right) + o(x^3)$$
$$\begin{matrix} \uparrow \\ e^t = 1 + t + \frac{t^2}{2} + \frac{t^3}{6} + o(t^3) \\ t \rightarrow 0 \end{matrix}$$
$$t = 4x \quad \text{per } x \rightarrow 0 \quad t \rightarrow 0$$
$$=$$

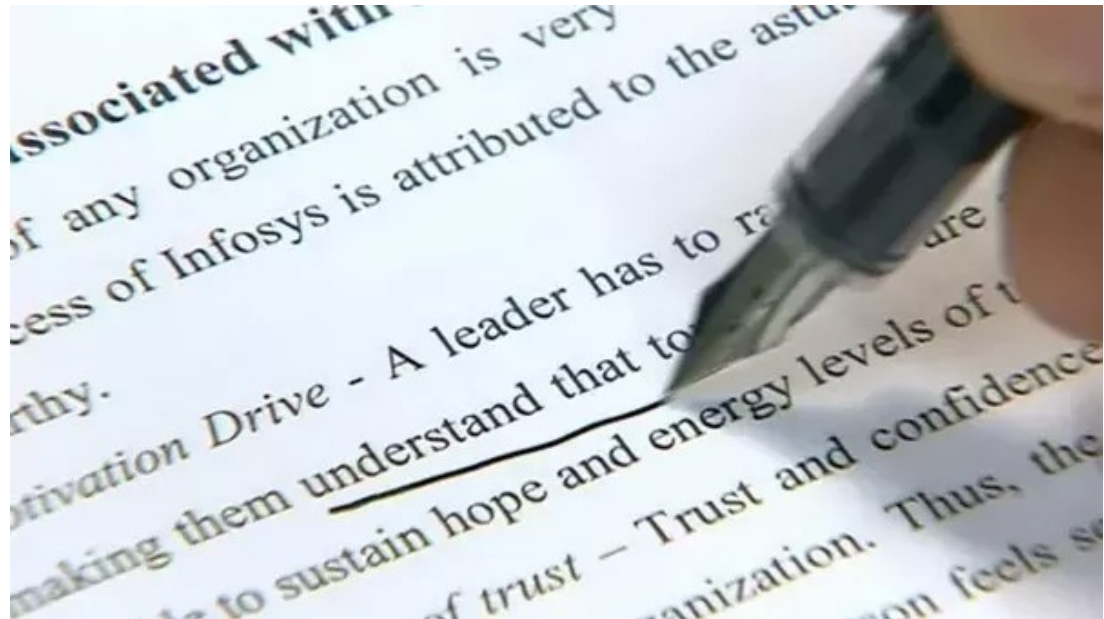
But...

If you have videos, what is the point of taking notes?

But...

If you have videos, what is the point of taking notes?

Well, why do we underline books? (or take notes in margin)



But...

If you have videos, what is the point of taking notes?

Well, why do we underline books? (or take notes in margin)

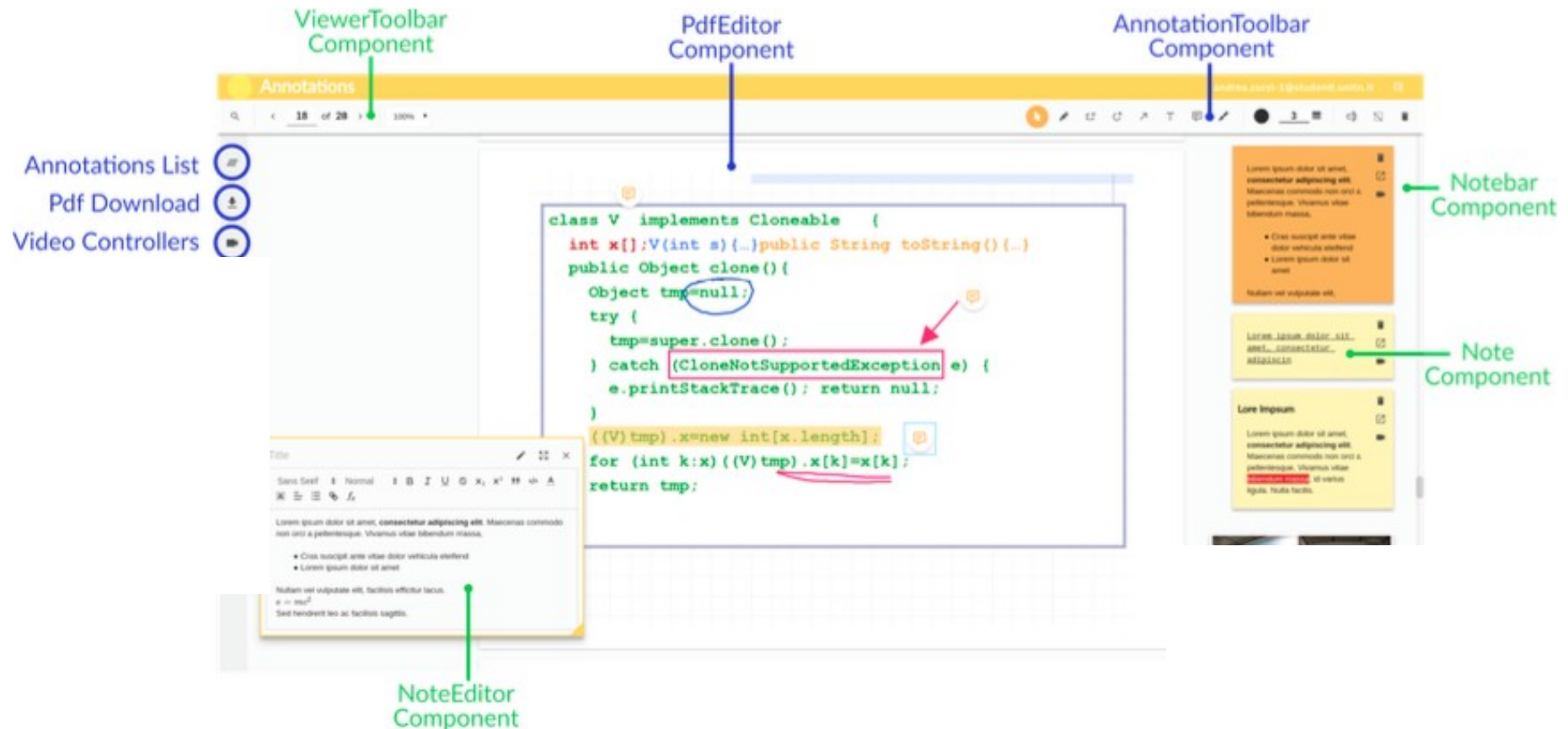
- Give relevance
- refind

Can we annotate videolectures?

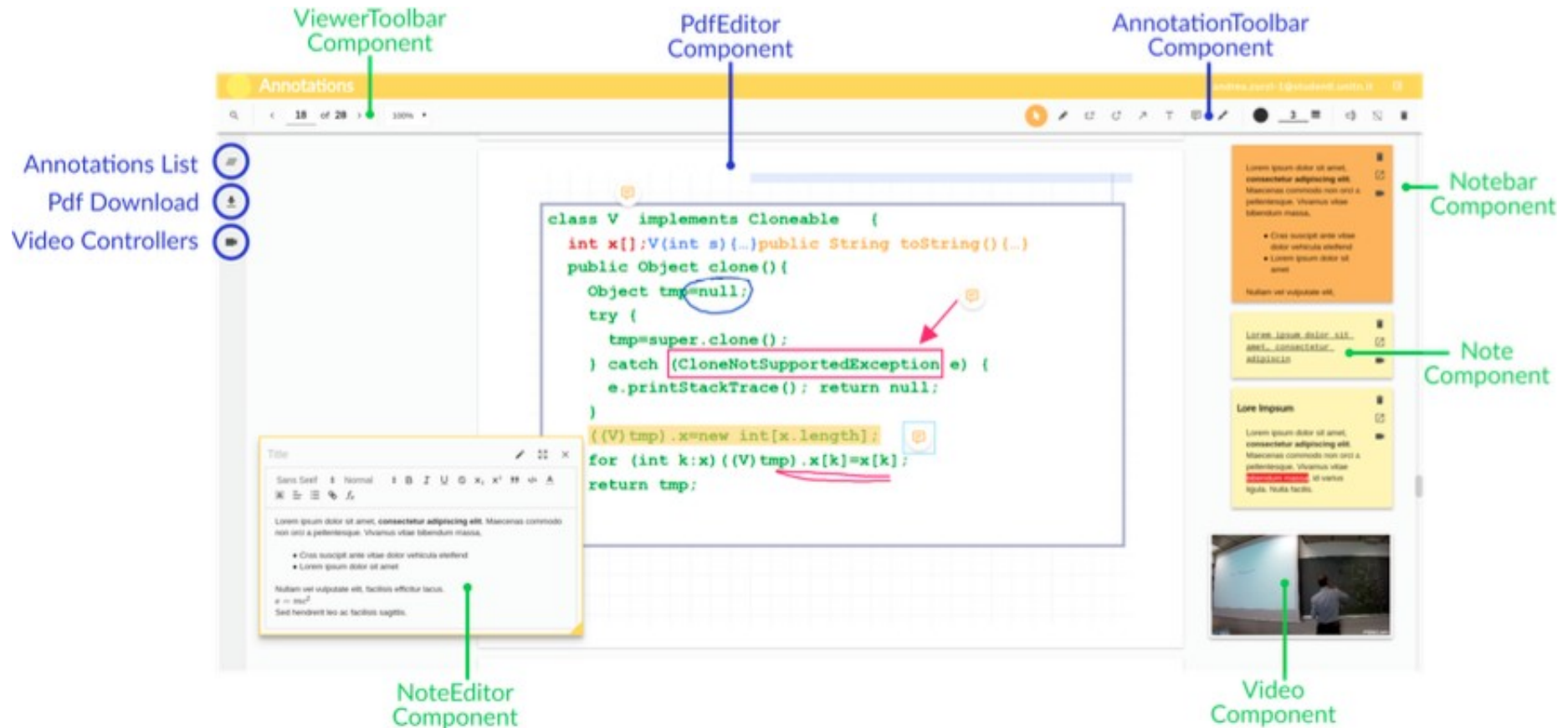
How?



Our prototype: in class



Our prototype: at home



Reviewing annotation

The image shows a screenshot of a presentation software interface with several components labeled:

- Annotations**: A yellow header bar at the top.
- Video Component**: A green label pointing to a video player showing a person at a chalkboard.
- Lecture Component**: A blue label pointing to a code editor window displaying Java code.
- VideoToolbar Component**: A green label pointing to a toolbar below the video player.
- ViewerToolbar Component**: A green label pointing to a toolbar below the code editor.
- Timeline Component**: A blue label pointing to a horizontal timeline bar with markers.
- SlideNoteBar Component**: A blue label pointing to a bar at the bottom containing several note cards.
- Note Component**: A green label pointing to one of the note cards in the SlideNoteBar.

The interface includes a video player, a code editor, a timeline, and a slide note bar, all with associated toolbars and annotations.

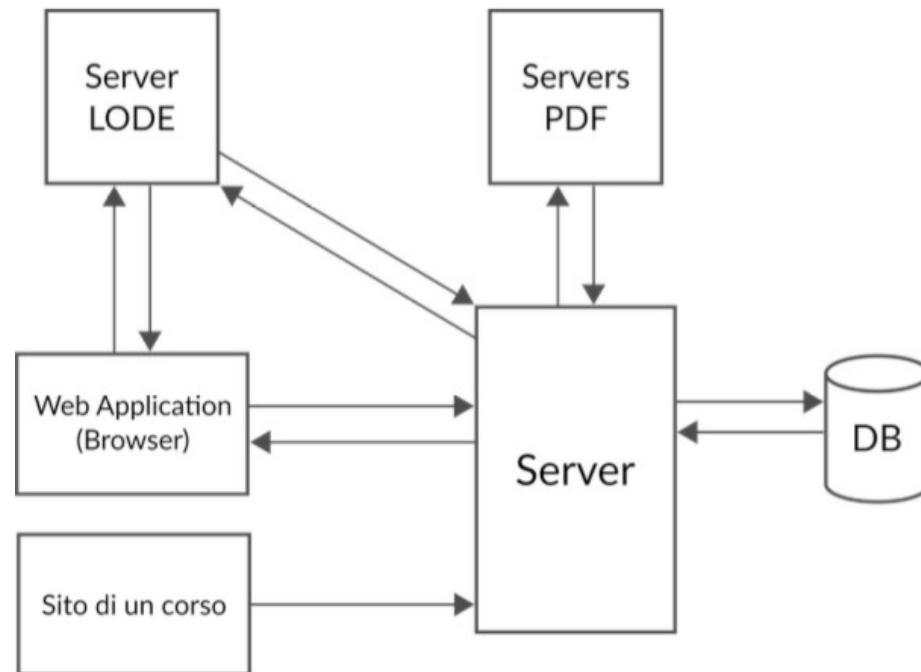
Advantages

- Combining “passive” and “active” approach
- “Delta” annotations
- Quick jump to a point in the lecture (“refind”)
- Gather statistics (analytics)
- Share annotations with friends (possibly)

Validation

- Very little yet, but promising...
- Extended validation planned since next semester

SW architecture



Variants

- Pre-uploaded slides
- On the flight generated screenshots

1118

C1 --- latemar.science.unitn.it/LODE-

ODE

1.0x 1.3x 2.0x

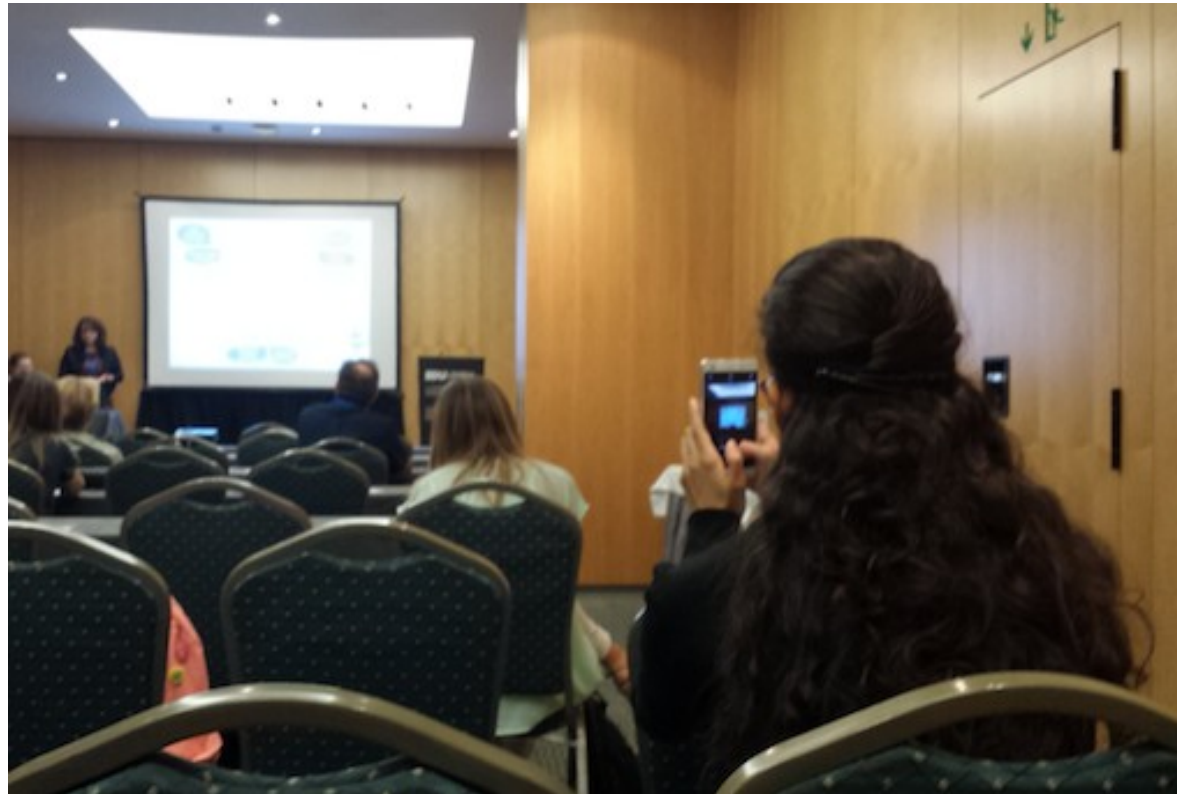
Movie Recording

$$f(x) = e^{4x} \cdot e^{-1}$$
$$= e^{-1} \left(1 + (4x) + \frac{(4x)^2}{2} + \frac{(4x)^3}{3!} \right) + o(x^3)$$
$$e^t = 1 + t + \frac{t^2}{2} + \frac{t^3}{6} + o(t^3) \quad t \rightarrow 0$$
$$t = 4x \quad \text{per } x \rightarrow 0 \quad t \rightarrow 0$$
$$=$$

28:32/01:40

Scenarios

- What if you could capture the projected screen you're looking at?



Scenarios

- What if you could capture the projected screen you're looking at?
- Avoid giving out the material!
- Students must (and will) create their own.
- Then they can share, if they want to