



# TRANSFORMINGEXAMS.COM

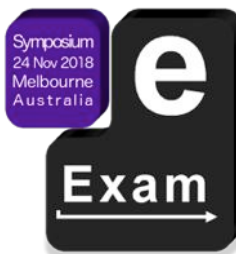
A Scalable Examination Platform for BYOD Invigilated Assessment

## A national roll out of e-exams for high stakes Matriculation

Thomas Vikberg

Finnish Matriculation Examination Board

e-Exam Symposium 24 Nov 2018  
Melbourne, Australia



# 47,000 e-Exam USB



Australian Government  
Department of Education and Training



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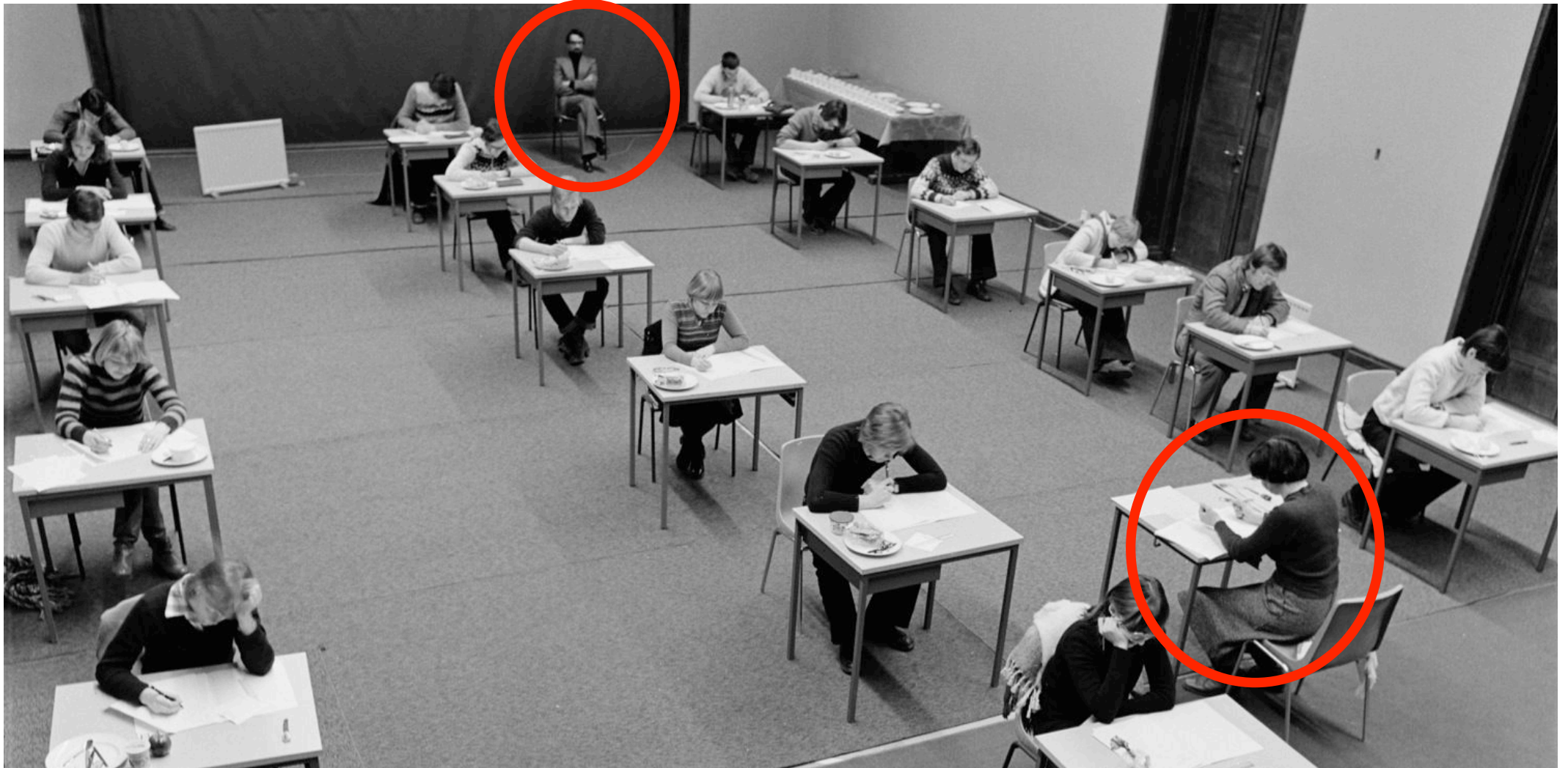
*e-Exam Symposium, 24 November 2018, Melbourne, Australia*



YLIOPPILASTUTKINTOLAUTAKUNTA  
STUDENTEXAMENSNÄMNDEN

[ylioppilastutkinto.fi](http://ylioppilastutkinto.fi)

# Before

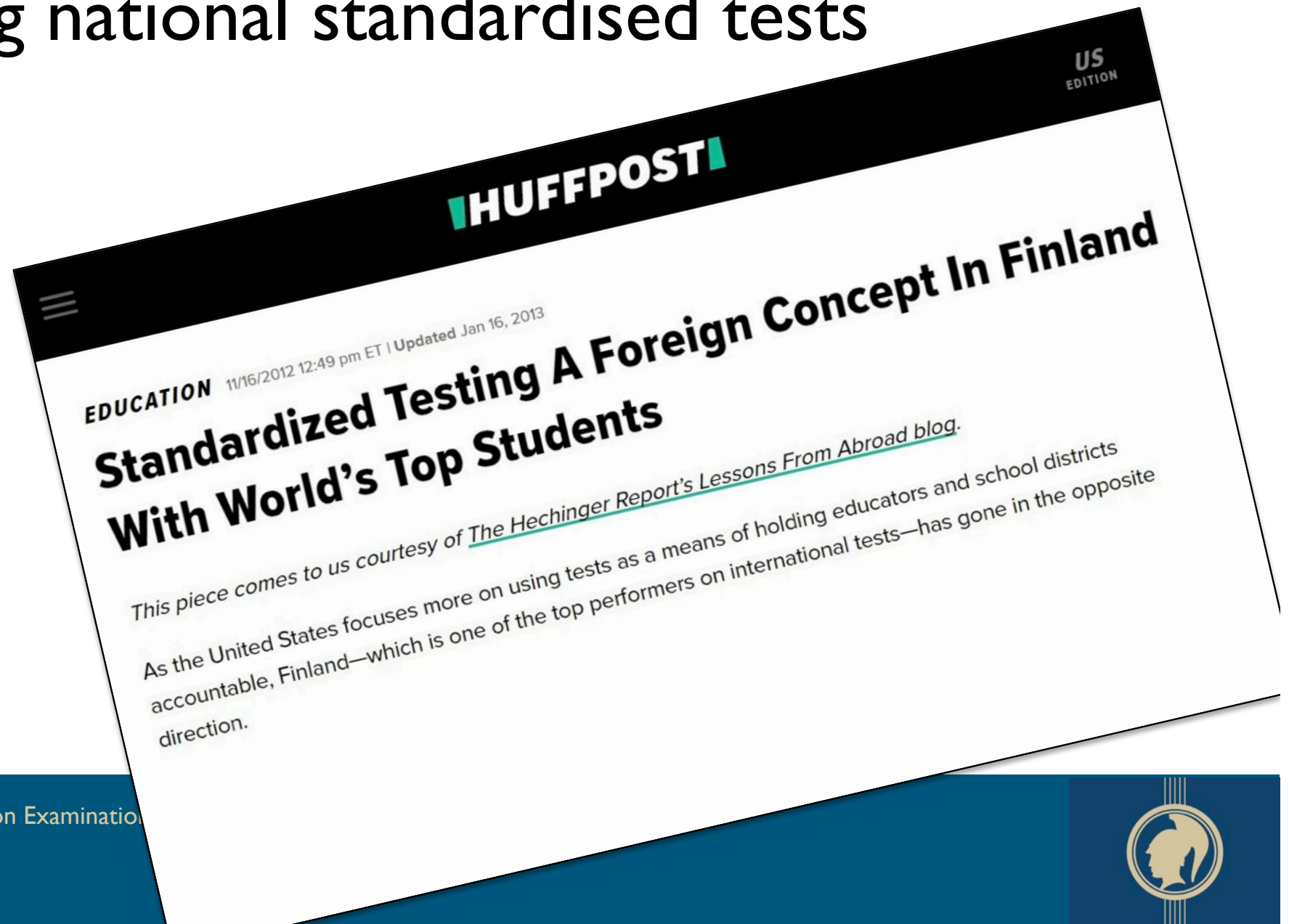




# After



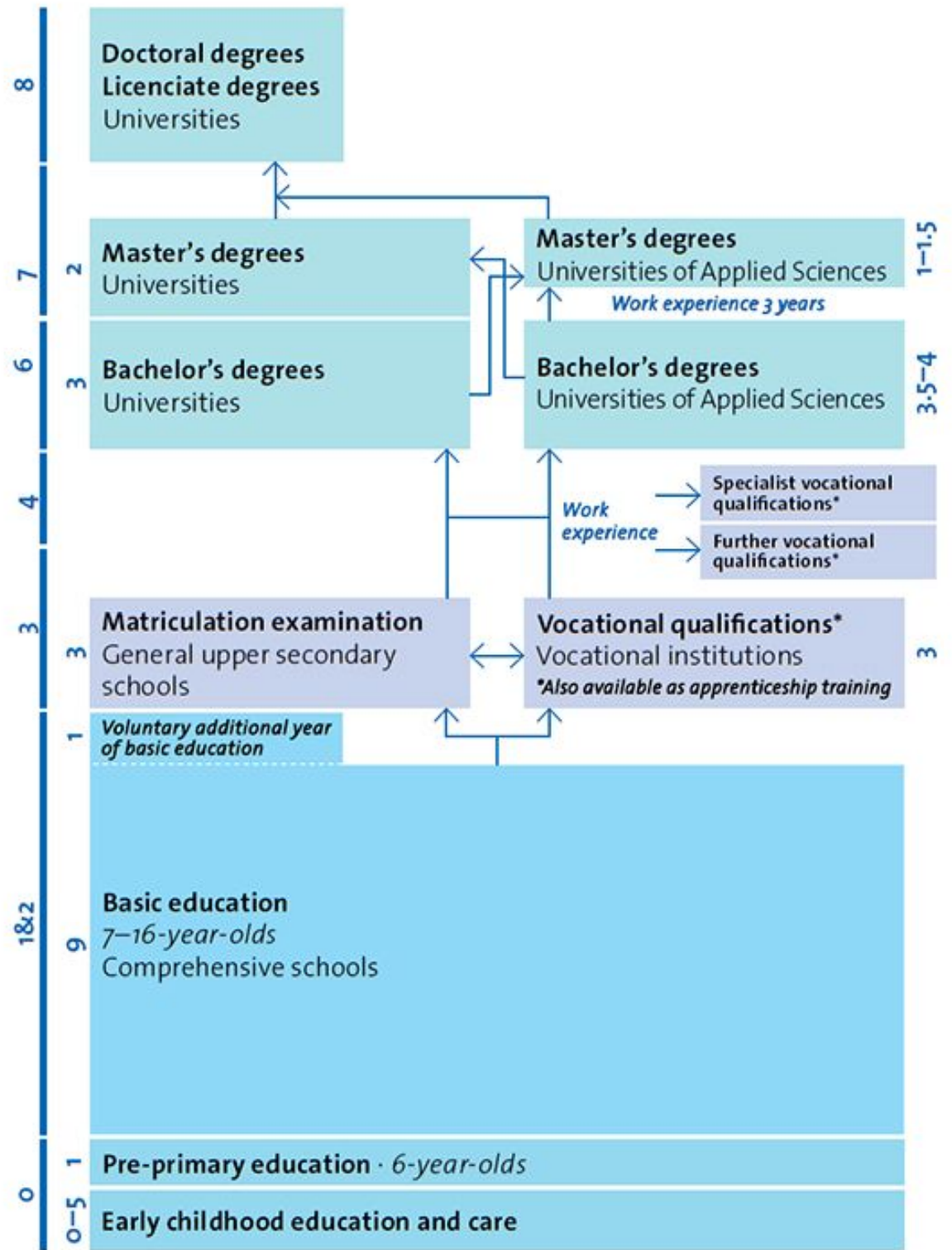
Finnish education system is famous for not having national standardised tests





# Finnish education system in a nutshell

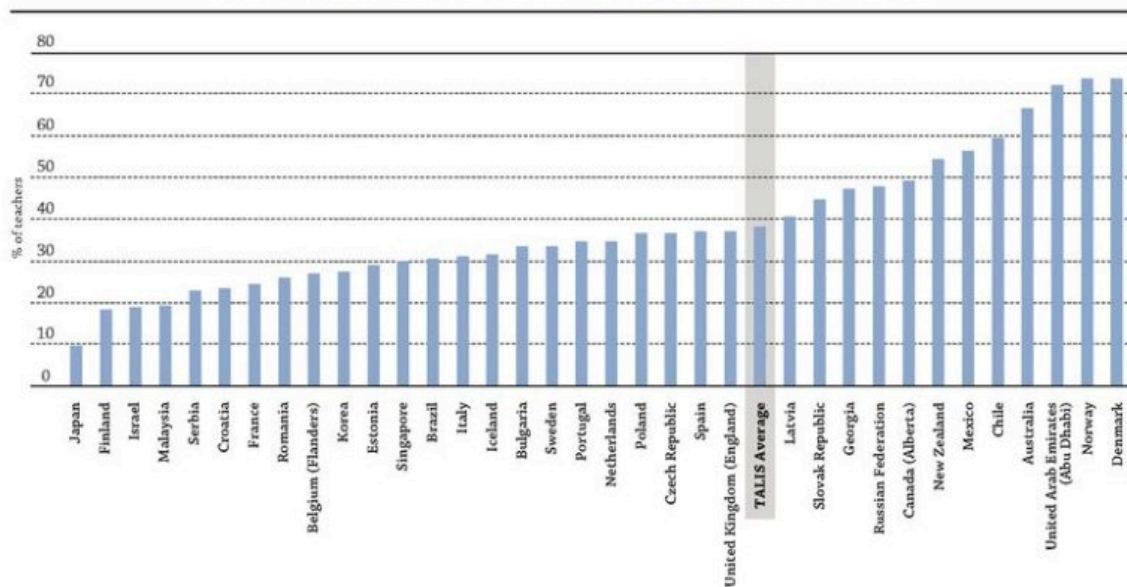
According to law, the purpose of the ME is to measure if students have acquired the knowledge and skills of upper secondary curriculum and objectives of maturity for upper secondary education



# Rationale for reform

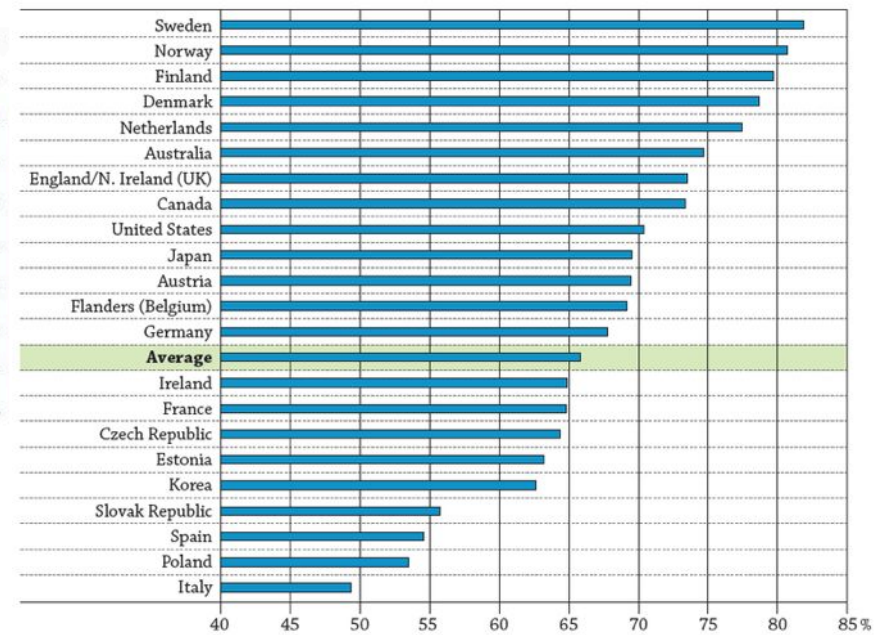
Rather than failing learning outcomes, the rationale for e-exams was to keep education relevant and inline with rest of society

Figure 1 • Teachers' use of ICT for students' projects or class work



Source: OECD, TALIS 2013 Database.

Percentage of workers who use a computer at work



Source: Survey of Adult Skills (PIAAC) (2012).



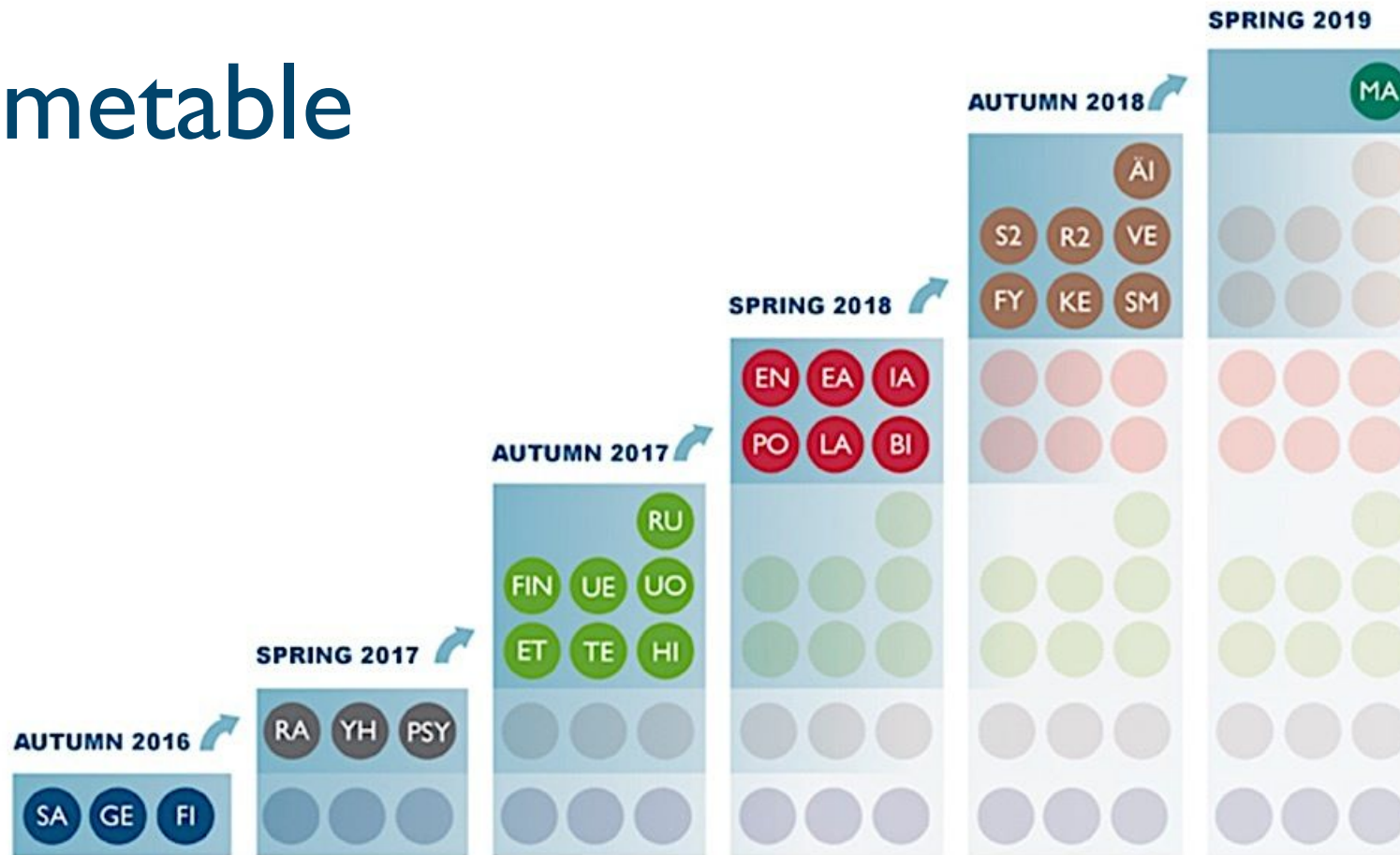
# The decisions

- Using ICT in the matriculation examination became an initiative in the government program of 2011
  - Strong backing from *The Union of Upper Secondary School Students*
  - *The Trade Union of Education in Finland* supported, provided teachers get in-service training and proper tools
  - *The Matriculation Examination Board* didn't oppose
- Following the program, the Matriculation Examination Board decided in 2013 the timetable for the project and outlined main specifications





# Timetable



- |                             |                            |  |                         |
|-----------------------------|----------------------------|--|-------------------------|
| <b>BI</b> Biology           | <b>HI</b> History          | <b>RU</b> Swedish language                             | <b>AI</b> Mother tongue |
| <b>EA</b> Spanish language  | <b>IA</b> Italian language | <b>S2</b> <b>R2</b> Finnish/Swedish as second language |                         |
| <b>EN</b> English language  | <b>KE</b> Chemistry        | <b>SA</b> German language                              |                         |
| <b>ET</b> Ethics            | <b>LA</b> Latin language   | <b>SM</b> Sami languages                               |                         |
| <b>FI</b> Philosophy        | <b>MA</b> Mathematics      | <b>TE</b> Health education                             |                         |
| <b>FIN</b> Finnish language | <b>PO</b> Portuguese lang. | <b>UE</b> <b>UO</b> Religion (ev. luth./orth.)         |                         |
| <b>FY</b> Physics           | <b>PSY</b> Psychology      | <b>VE</b> Russian language                             |                         |
| <b>GE</b> Geography         | <b>RA</b> French language  | <b>YH</b> Social studies                               |                         |



# Three main specifications of the exam environment

## I. Computers must be equipped with various similar programmes

- All students must have access to the same programmes
- Teachers must have pedagogical freedom to choose their tools for learning
- As little as possible ME specific features should be in the environment, rather use real programmes



# Three main specifications of the exam environment

## 2. All schools can handle untypical and emergency situations without lots of ICT expertise

- Special environments such as prisons
- There will always be power shortages somewhere
- Computers break, networks fail etc.





# Three main specifications of the exam environment

## 3. Exam answers cannot get lost

- During the exam
- After the exam
- 99% is not enough



# After the decisions

1. Roadshow where teachers were convinced that
  1. You can change a laptop to a different computer with a USB stick
  2. It is easy to set up an ethernet network
2. New type of communication approach without the burden of MEB's ivory tower image
  1. Active on social media
  2. New website for the reform
3. A team of developers were contracted
  - Not to deliver a ready product, but to work alongside the MEB
  - The team quickly pointed out the need for a testing and feedback environment, thus the course exam system Abitti was released



# Launch of Abitti changed the game

- Now, teachers and students had direct access to the exam environment
- New features and programmes of the environment could be communicated through Abitti
- Feedback and support request started to pour in and teachers set up their own discussion channels
- MEB had to set up a help desk, which meant practise for MEB as well
- By autumn 2016, when the first exams took place, Abitti had been used 15 000 times
- To date, 2.5 million course answers have been submitted through it





# The exam environment consist of three parts

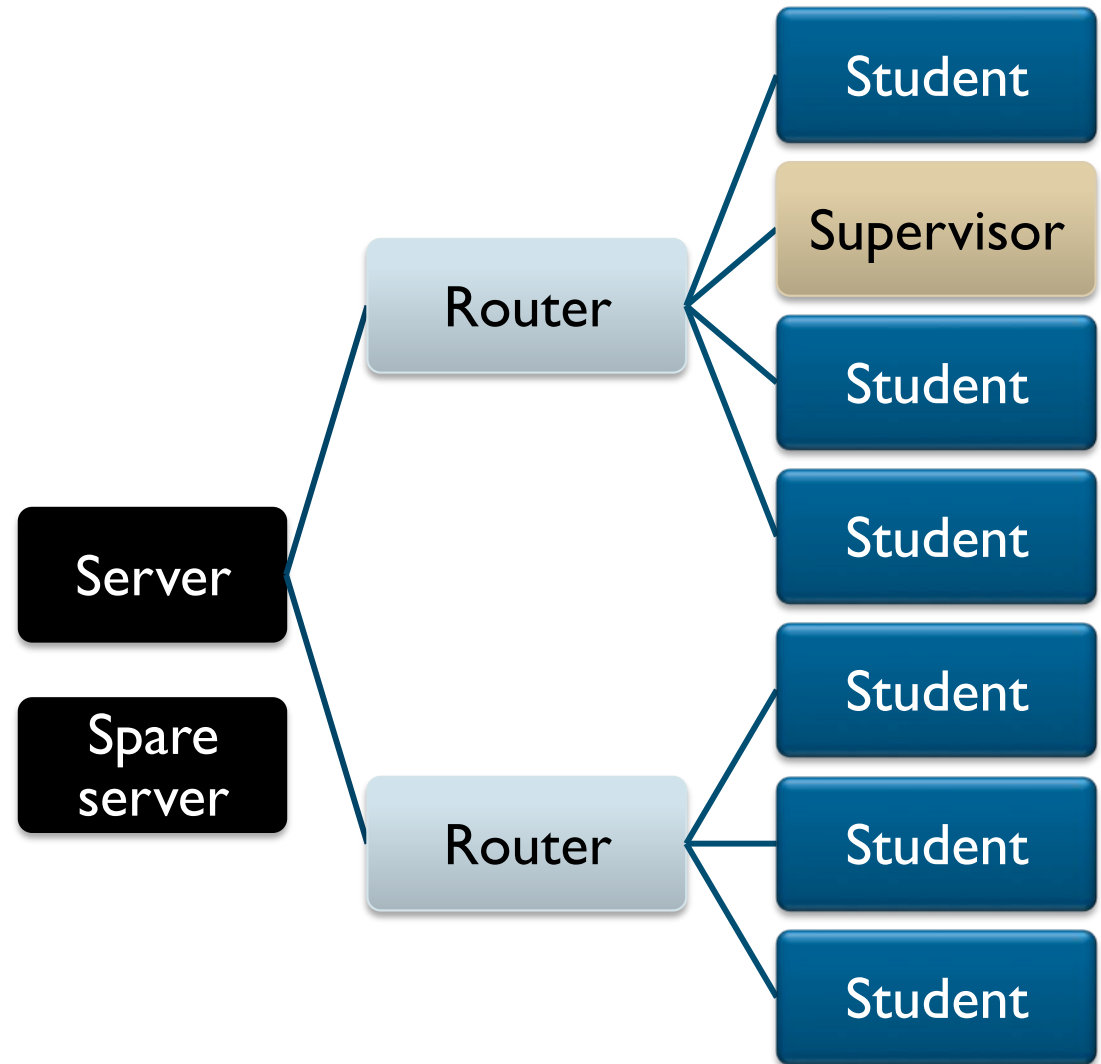
## 1. Student laptops

## 2. Two servers

- USB stick or virtual machine

## 3. Local network

- Can be wireless, but not common



# USB sticks

- USB sticks are prepared by the MEB and shipped to school
- In Abitti, anybody can prepare the sticks
- Students boot their laptops from USB sticks into a live Linux environment with the exam and various programmes



# Exam – Open question

digabi@digabi-os: /var/lib/di...

3. Geografi i Mumindalen (20 p.)

Bilderna (material 3.A och 3.B) föreställer kartor ur muminböckerna. Studera kartorna och nämn tre geografiska processer eller fenomen som har kunnat forma landskapet i Mumindalen och dess omnejd. Hur kan man urskilja processerna eller fenomenen i landskapen på kartorna? Beskriv varje process eller fenomen och ge ett regionalt exempel ur den verkliga världen på varje process eller fenomen.

Material:

3.A Karta: Mumindalen på sommaren

3.B Karta: Mumindalen på vintern

Anvisning för bifogande av bilder och formler ▾

4. Förenta nationernas mål för en hållbar utveckling (20 p.)

3.A Karta: Mumindalen på sommaren

3.B Karta: Mumindalen på vintern

Förstora





# Exam – Multiple choice

digabi@digabi-os: /var/lib/di...

19.9.2018




This is a video of Leon Botstein discussing art. You can play the video as many times as you want to, and stop, fast forward, and rewind it. Read the questions carefully and then watch the video.

Öppna materialet


3.1. Which of the following best illustrates Botstein's views on art? (2 p.)

- Art puts the reality we perceive in a different light
- Art is something that shifts through time and space
- Art serves as a certain type of mirror for humanity

3.2. In Botstein's view, which of the following portraits would most likely be considered a piece of art? (2 p.)

3. What Is Art?



(Bearbetning: SEN)  
Källa: Big Think. Leon Botstein: Art Now (Aesthetics Across Music, Painting, Architecture, Movies, and More.). Videotjänsten Youtube. www.youtube.com. Publicerad 10.10.2012. Hämtad 14.7.2017.



# Schools provide

- Electricity and network for students
- Servers and supervisors
- Uninterruptible power source (backup electricity)
- Encrypted exams downloaded by principal from web service



# After the exam

1. Answers are uploaded to an assessment service
2. First round of assessment by schools own teachers
3. Second round of assessment by MEB assessors

The screenshot displays a web interface for the Finnish Matriculation Examination Board (MEB) assessment service. At the top, there is a navigation bar with a back arrow, the text 'Pistetaulukko', and buttons for 'Avaa koe' and 'Avsa liitteet'. Below this is a table with columns for 'Opiskelija' (Student) and 'Pisteet' (Points). The table lists three students with their IDs and scores for various questions. The questions are displayed below the table, each with a description, a maximum score, and a 'Lisää muistio' (Add memo) link.

| Opiskelija    | Pisteet | 1 | 2a | 2b | 2c | 2d | 2e | 3a | 3b | 3c | 4 | 5a | 5b | 6a | 6b | 6c | 7a | 7b | 7c | 8a | 8b | 8c | 8d | 9a | 9b | 9c | 9d | 9e | Σ |
|---------------|---------|---|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 1. [Redacted] | 10069   | 5 |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 0 |
| 2. [Redacted] | 10077   | 4 |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 0 |
| 3. [Redacted] | 10085   | 3 |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 0 |

**2a** Alku syksy. Sillä lämpötilat olivat tähän vuodenaikaan sopivat. Ja varsinkin Euroopassa oli paljon sateita ja tuulista. 4 p max  
Vastauksen pituus: 16 sanaa, 105 merkkiä  
Valmistavan arvostelun merkinnät  
[Lisää muistio](#)

**2b** Reunoille merivirtojen ja lämmön takia. 4 p max  
Vastauksen pituus: 5 sanaa, 35 merkkiä  
Valmistavan arvostelun merkinnät  
[Lisää muistio](#)



# General response

- Lots of bad press in all major medias
- Lots of frustrated teachers and students, especially in mathematics
- Also, lots of support for the reform and the chosen approach
- Still backed by *The Union of Upper Secondary School Students* and *The Trade Union of Education in Finland*



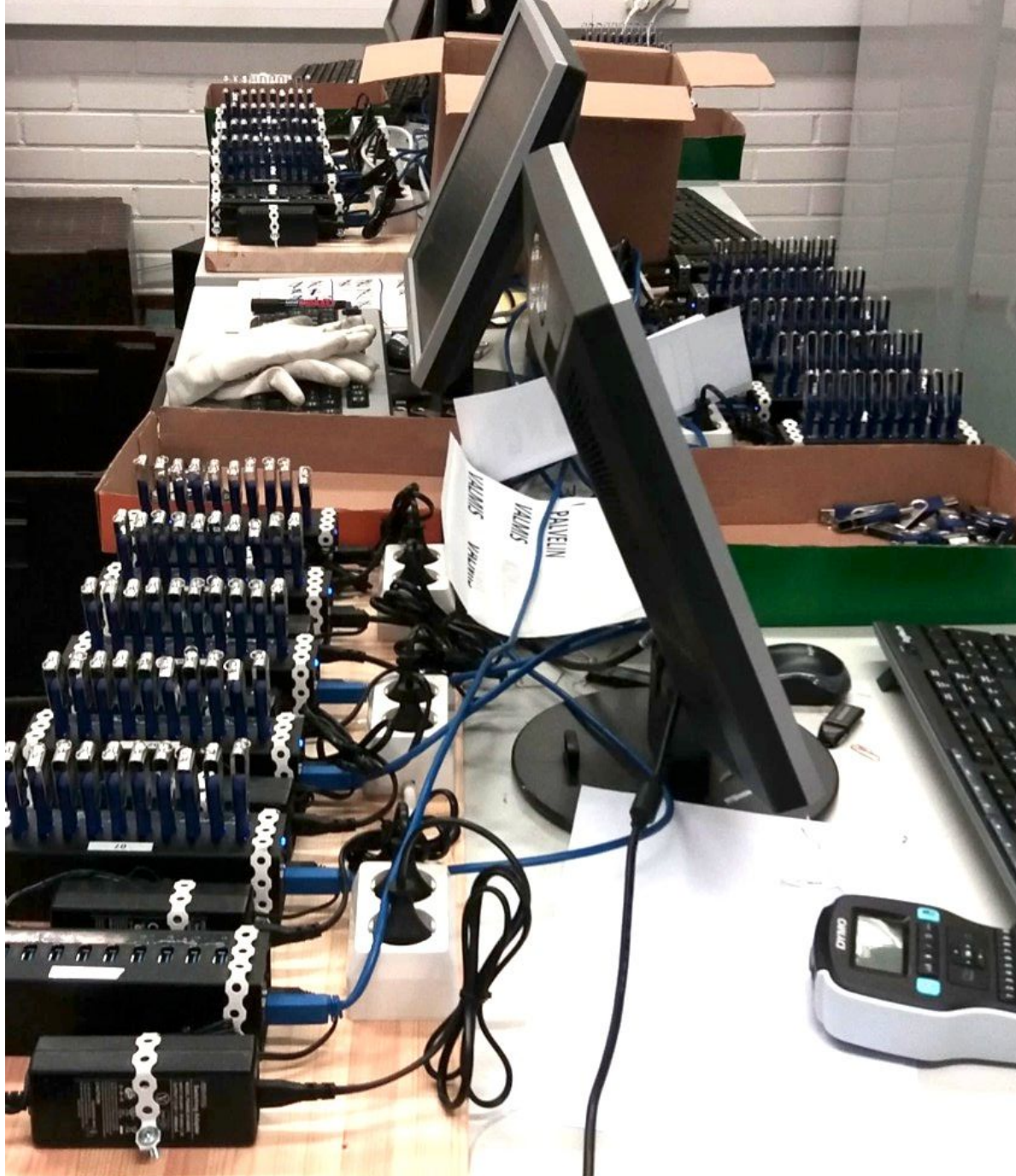


**This reform wouldn't been possible  
without the outstanding support,  
flexibility and patience of teachers and  
education providers**

Now, universities need to think what to do with  
the new generations of students, who aren't  
longer used to pen and paper exams  
(*provocation*)

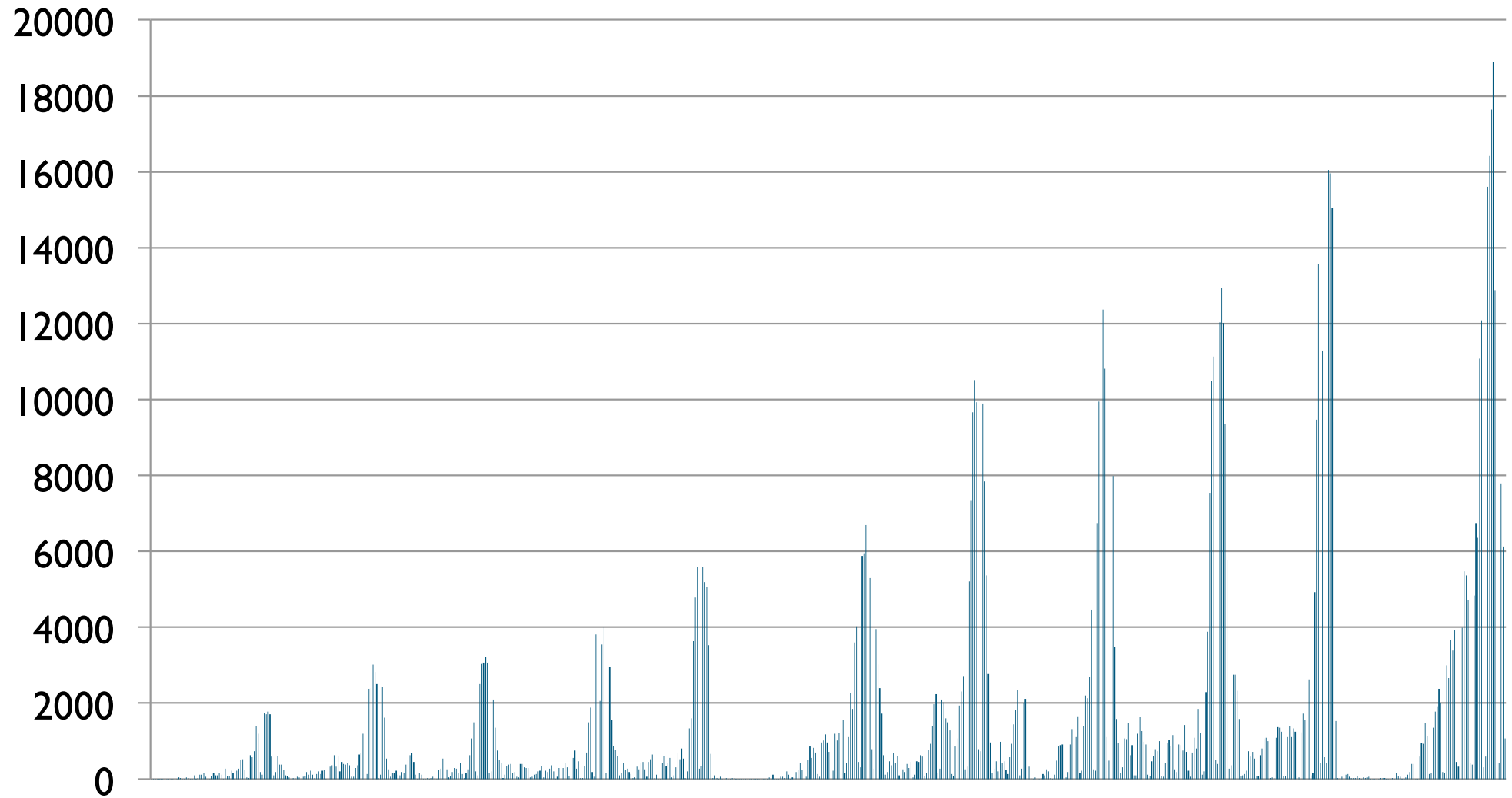


# Thank You!

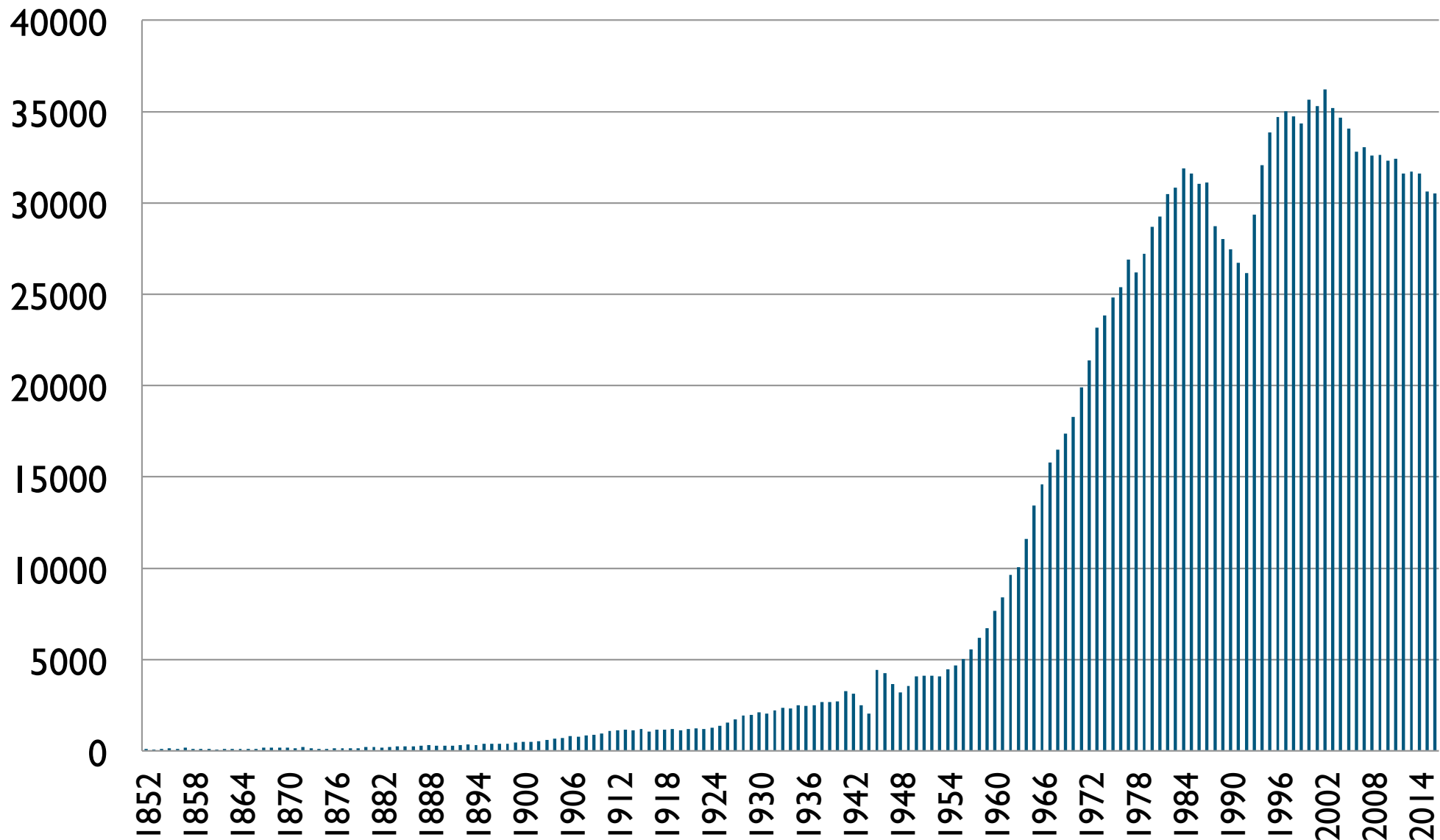


# Abitti usage

## Course exam answers



# Completed matriculation examinations



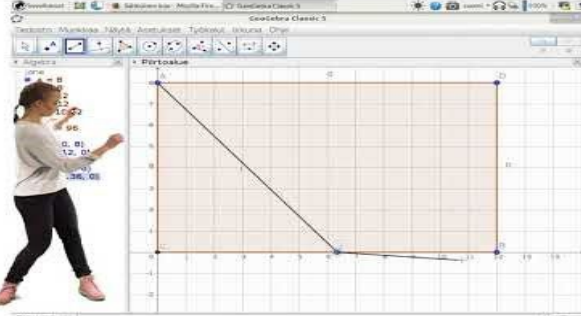
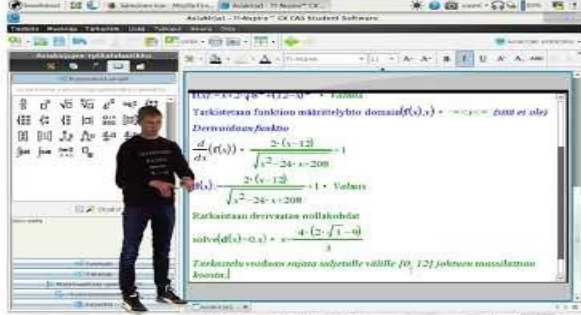


# Matriculation Examination Board

- The MEB is selected by the Ministry of Education for three years at a time
  - Now, 25 members
- The MEB selects adjunct members who form sections that are responsible for creating test items and assessment
  - Approx 400 members
- The MEB has a office, which is run by public officers
  - Now, 25 persons



# Mathematics

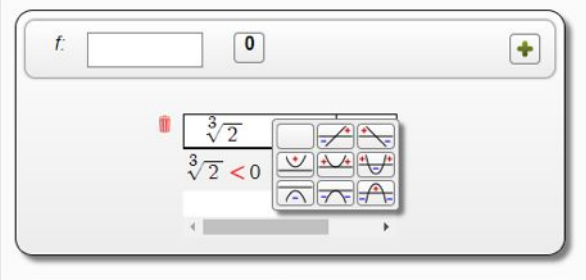


- Kaavoja voi harjoitella nimeämällä vaihto-merkitsejä jatkamalla kirjoittamalla LaTeXia.
- Editorin vastauskenttään voi kirjoittaa tekstiä ja kaavoja sekä lisätä kuvia.

Lisää kaava seuraavalle riville Enter

## Vastaus 1

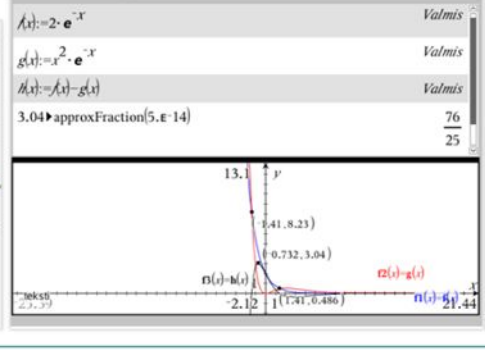
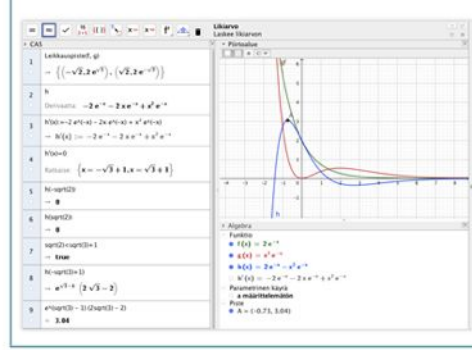
Matematiikan vastaamista voi harjoitella sivulla [math-demo.abitti.fi](http://math-demo.abitti.fi)



$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$256 = \int_0^{\infty} \sin x \, dx$$

$$256 = \int_0^{\infty} \sin x \, dx$$



# History of the Matriculation examination

- In 1852, the entry exam to Imperial Alexander University in Finland (now University of Helsinki) is tied to the syllabus of gymnasium
- In 1919, completing the exam does not automatically yield entry to university, which changes the of the exam to a final exam of secondary education
- In 1874 the exam is moved for most parts into the gymnasiums and in 1921 it is completely held in upper secondary high-schools





# After





# e-Exam Symposium

24 Nov 2018

Monash University Caulfield Campus  
Melbourne, Australia

Speaker: Thomas Vikberg

[thomas.vikberg@ylioppilastutkinto.fi](mailto:thomas.vikberg@ylioppilastutkinto.fi)

**TransformingExams.com**

**TransformingExams@gmail.com**

