iCognitus
IT SOLUTIONS

medQuizz

José Miguel Pêgo

Universidade do Minho

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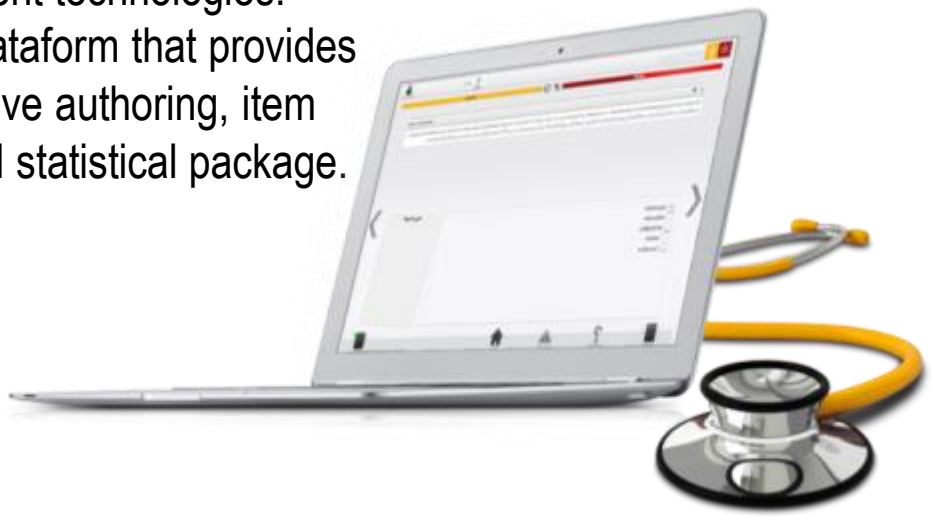
Who we are

iCognitus was founded by leading experts in online assessment in Portugal. iCognitus is a Spin-Off associated to the School of Health Sciences/University of Minho in Portugal, one of the 10 medical schools in the world that have been awarded the ASPIRE certificate.

ASPIRE
INTERNATIONAL
RECOGNITION OF EXCELLENCE
IN MEDICAL EDUCATION

What we do

Our mission is to provide the highest quality assessment technologies.
Our main product is **medQuizz** – an e-assessment plataform that provides a **secure** and **easy-to-use** environment for collaborative authoring, item bank management, online assessment and a powerful statistical package.
Take full control of your assessment process!



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Team

José Miguel Pêgo, MD, PhD, is a consultant in anesthesiology and a Professor in Pharmacology at School of Health Sciences. He is certified in FAME by the NBME and an active member of the EBMA. He is the Project Leader for medQuizz being responsible for its conception, design and scientific background.

Nuno Santos, BSc, is a computer enginner specialized in database managment, software design and programming. He has a long experience with the development of software packages for the health sciences. He is responsible for the programming of medQuizz databases and interfaces.

Paulo Cabral, BSc, is a computer enginneer specialized in systems administration and communication. He is the operational director of the IT Department at School of Health Sciences. He has previously worked in a major telecom company. He is responsibe for the conception of medQuizz fail-safe and security systems.

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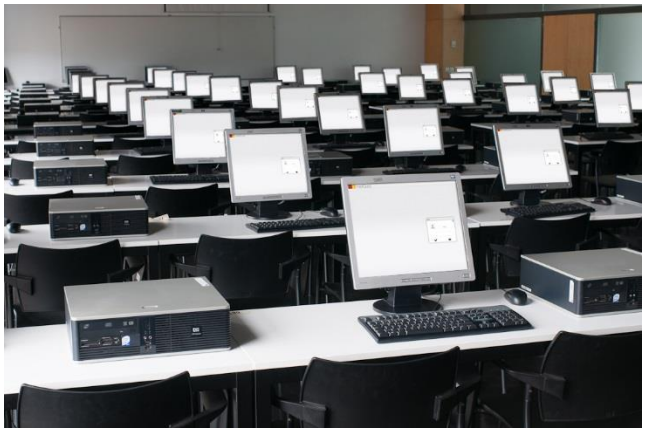
Case Study

School of Health Sciences, Braga, Portugal – founded 2001 - Bologna model

“Assessment drives learning” - Average – 1-2 tests/week

2001/09 – Paper based (optic reader) – 1 Full time employee
2009/12 – QuestionMark – 1 Full time employee (80 computers)
2012/15 – medQuizz – 1h/examination (150 computers)

Tests	73	Students/class	133
Items	5249	Test/class	14,6
Students	800	Pages/test	18
Print cost	0,03€	Items/test	72
Items per page	4	Total pages	174967



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Case Study

School of Health Sciences, Braga, Portugal – founded 2001 - Bologna model

“Assessment drives learning” - Average – 1-2 tests/week

- **Integrated collaborative environment**
- **Secure and Reliable**
- **Adaptable to your needs**
- **Intuitive and easy to use**
- **Provides control to the institution**

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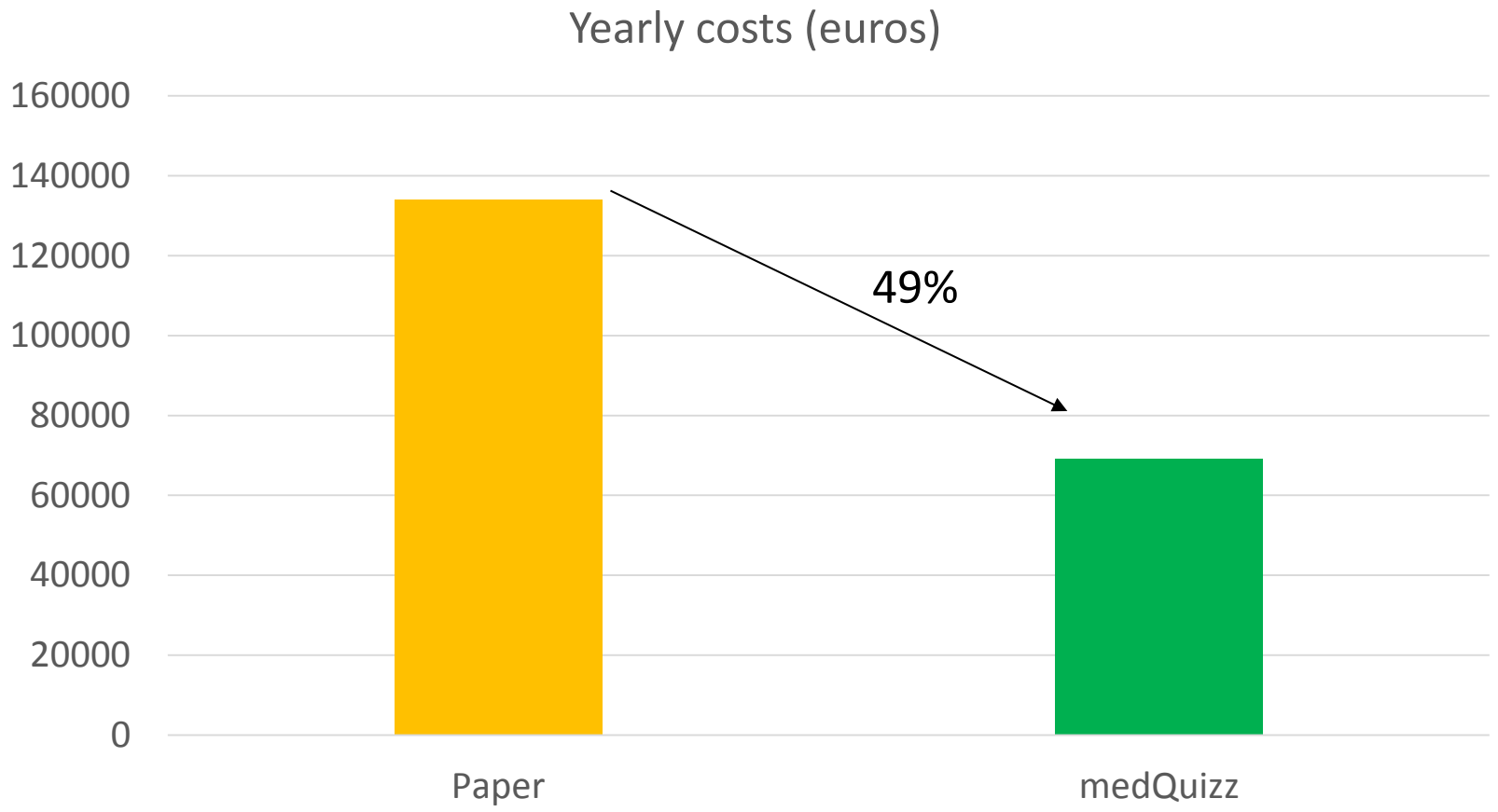
Case Study



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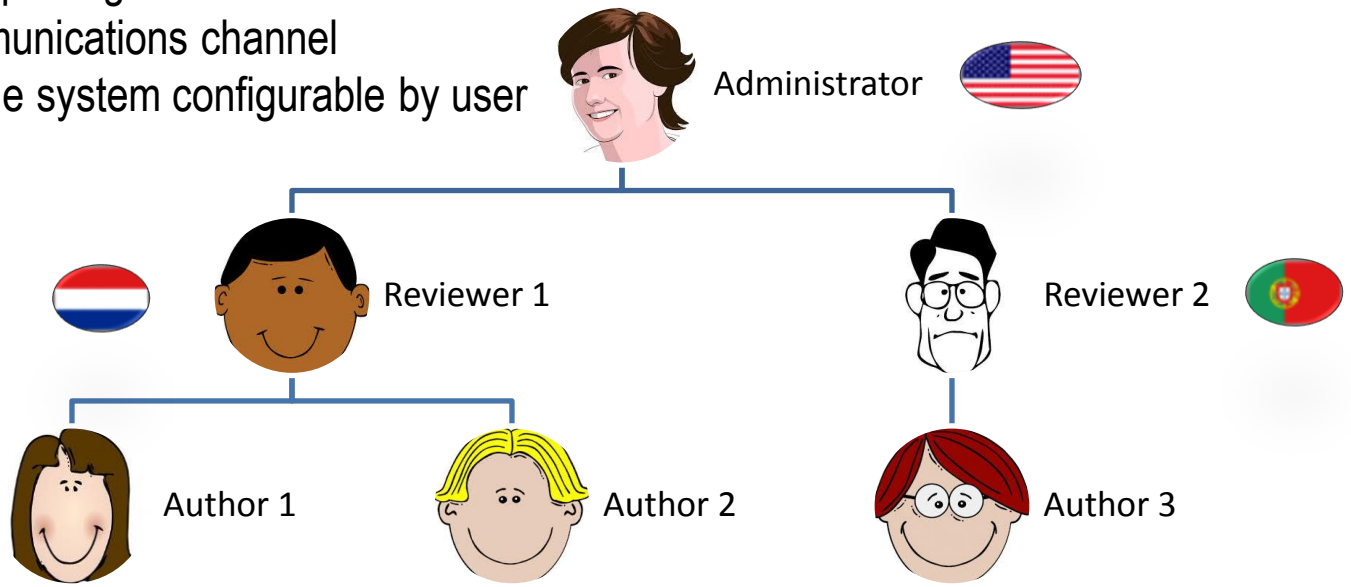
Collaborative secure authoring system

- medQuizz provides a secure but easy-to-use authoring environment
- Embedded **workflows** allow for multiple users to work on items and communicate decisions
- User profiles privileges are costumizable
- Secure communications channel
- Multi language system configurable by user



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Collaborative secure authoring system

Permission Management

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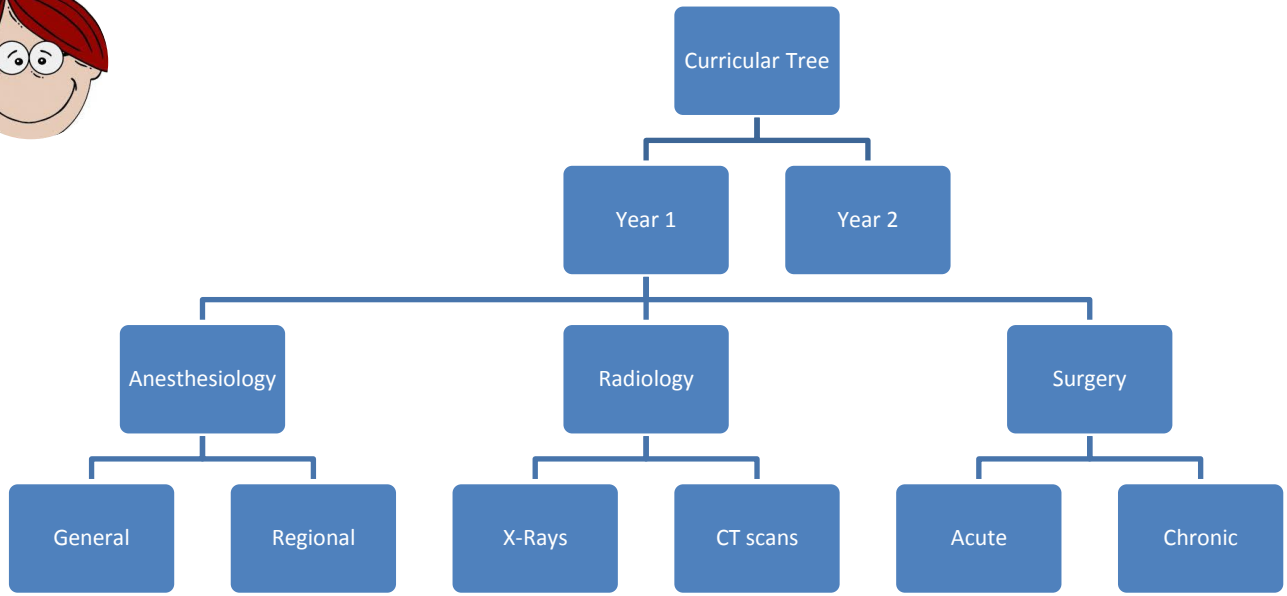
Collaborative secure authoring system

Roles distribution

Reviewers

Authors



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Collaborative secure authoring system

Profile Management

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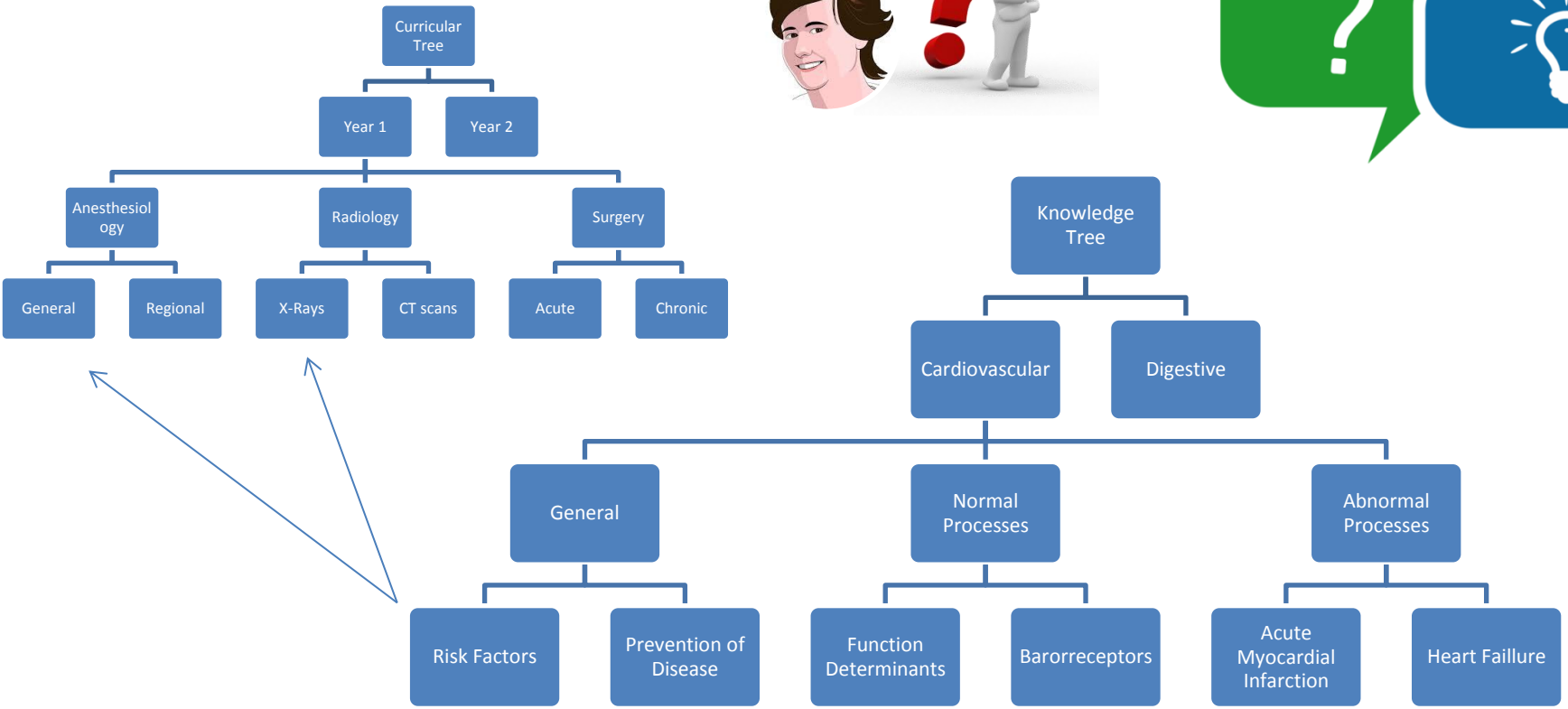
Collaborative secure authoring system

Graph node items relations



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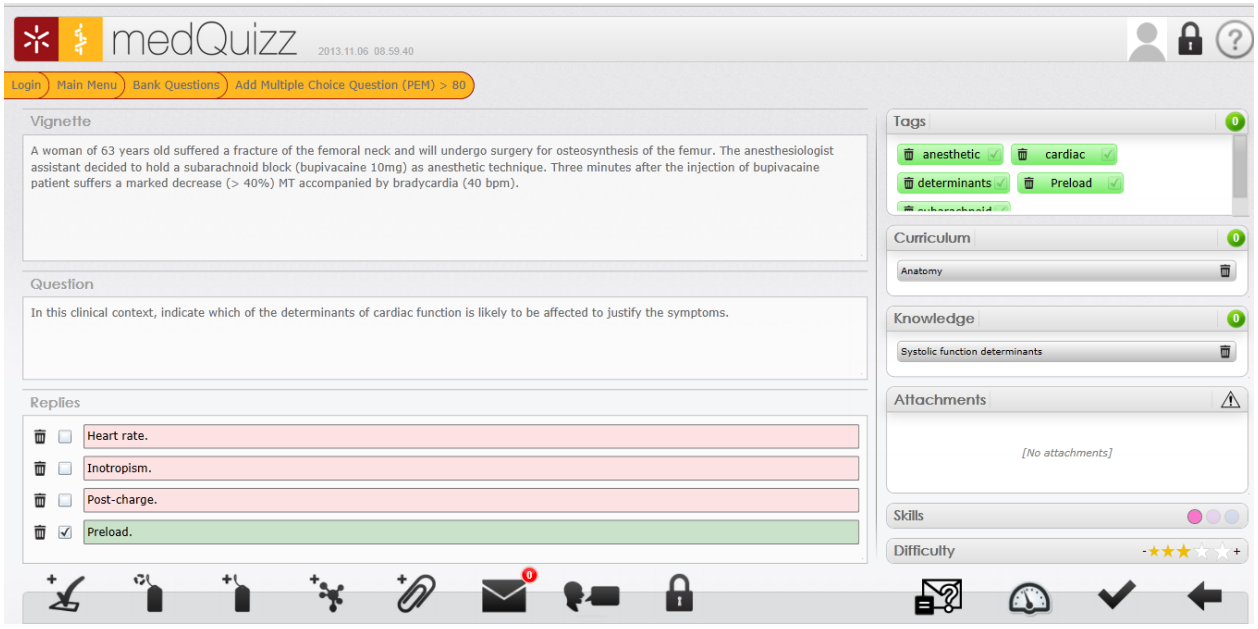
Item Management lifecycle

- Item categorization is essential for reliable databank management and use
- medQuizz provides intuitive tools that easy a thorough categorization of items
  - Customizable Curricular structure
  - Knowledge
  - Tags (content)
  - Skills (Bloom)
  - Difficulty (Angoff)
- Artificial intelligence
- Automatic tagging
- Automatic translation of items
- Error checking heuristic
  - Duplicate choices
  - Duplicate items



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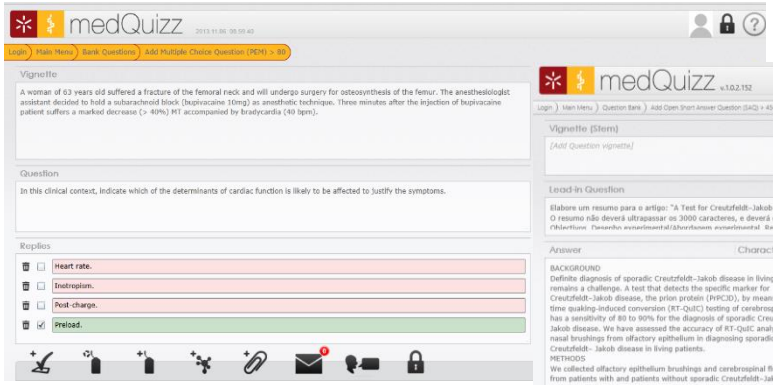
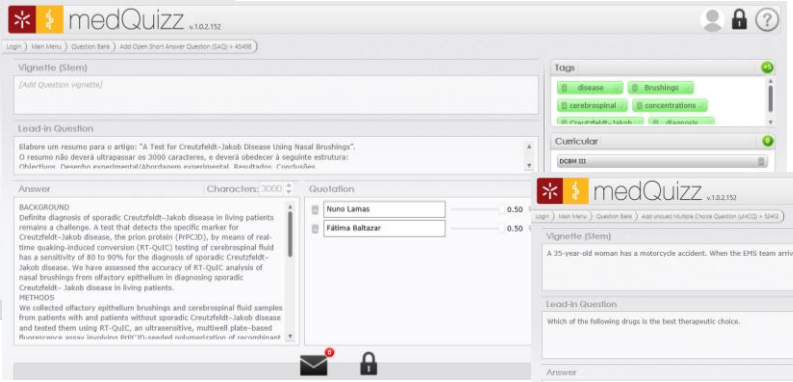
Item types

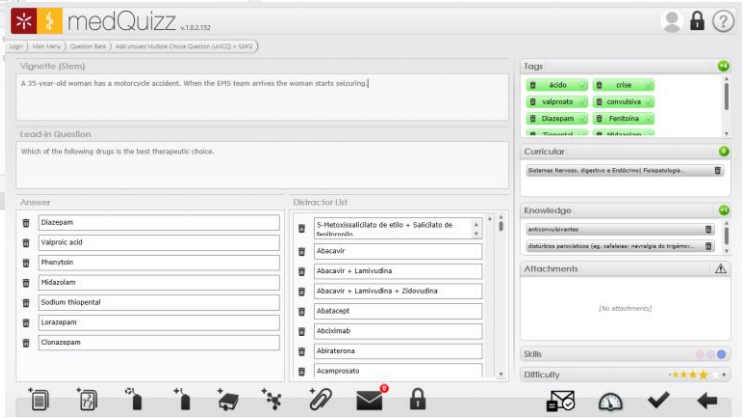
MCQ (type-A)

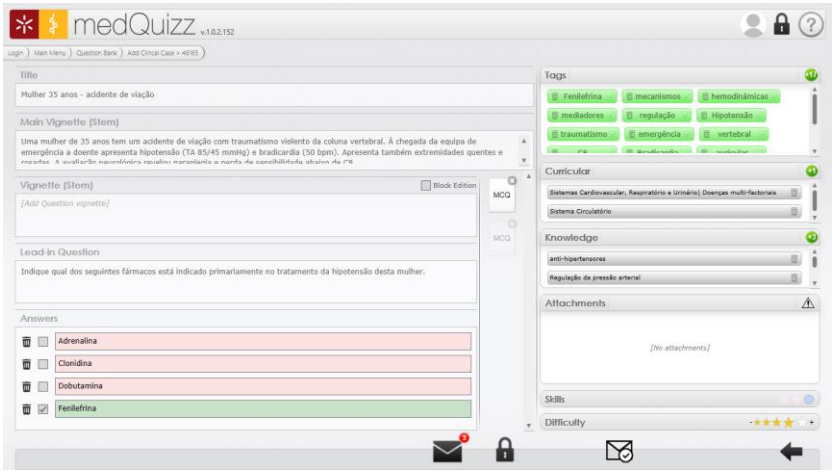


SAQ



uMCQ (modified EMQ)





Clinical Cases (MCQ, SAQ)

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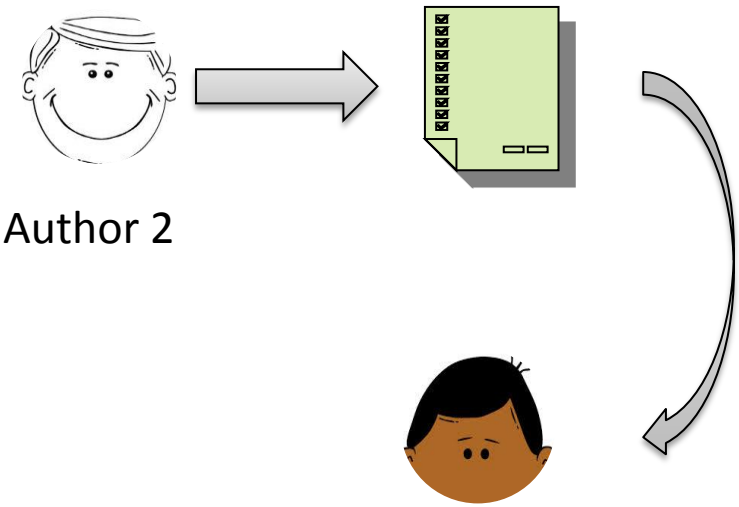
Collaborative secure authoring system

Normal item workflows

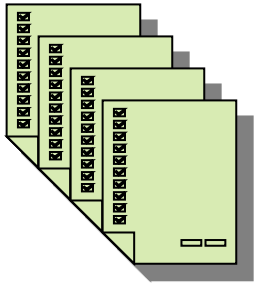


Author 2

Version 1

Item Bank

Reviewer 2



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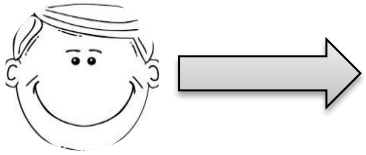
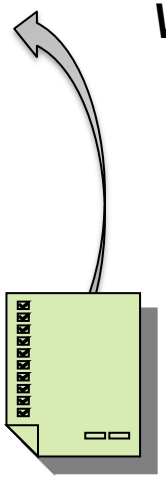


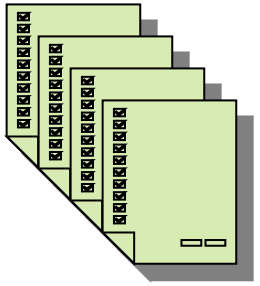
Author 2

Reviewer 2



Version 2

Item Bank



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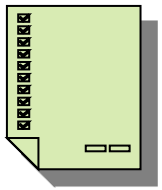
Collaborative secure authoring system

Item workflow broadcast

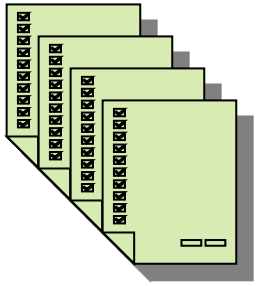
Author 2



Version 3

Item Bank

Reviewer 2



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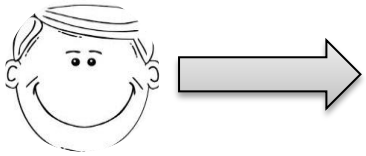
Collaborative secure authoring system

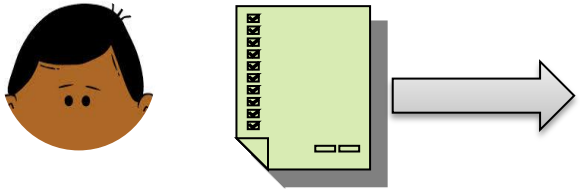
Item workflow broadcast



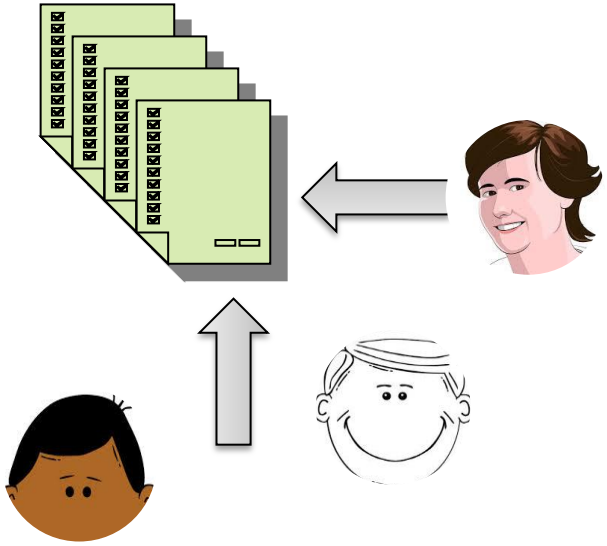
Author 2

Version 4

Item Bank



Reviewer 2



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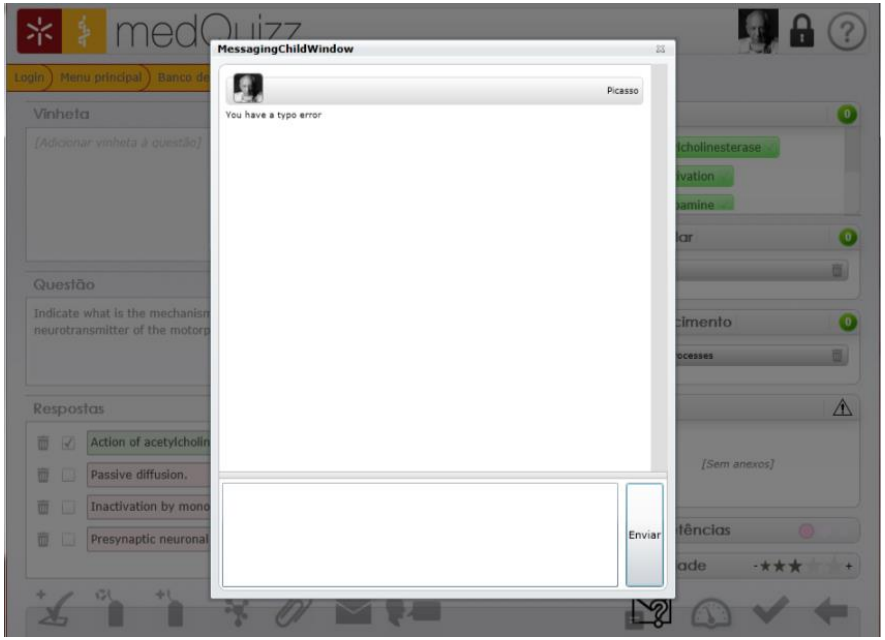
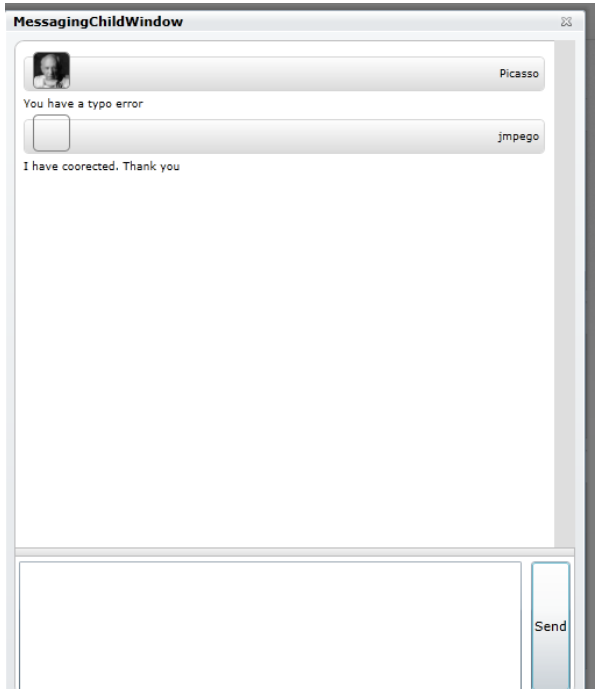
Collaborative secure authoring system
Internal communication messaging system

Chat-like system





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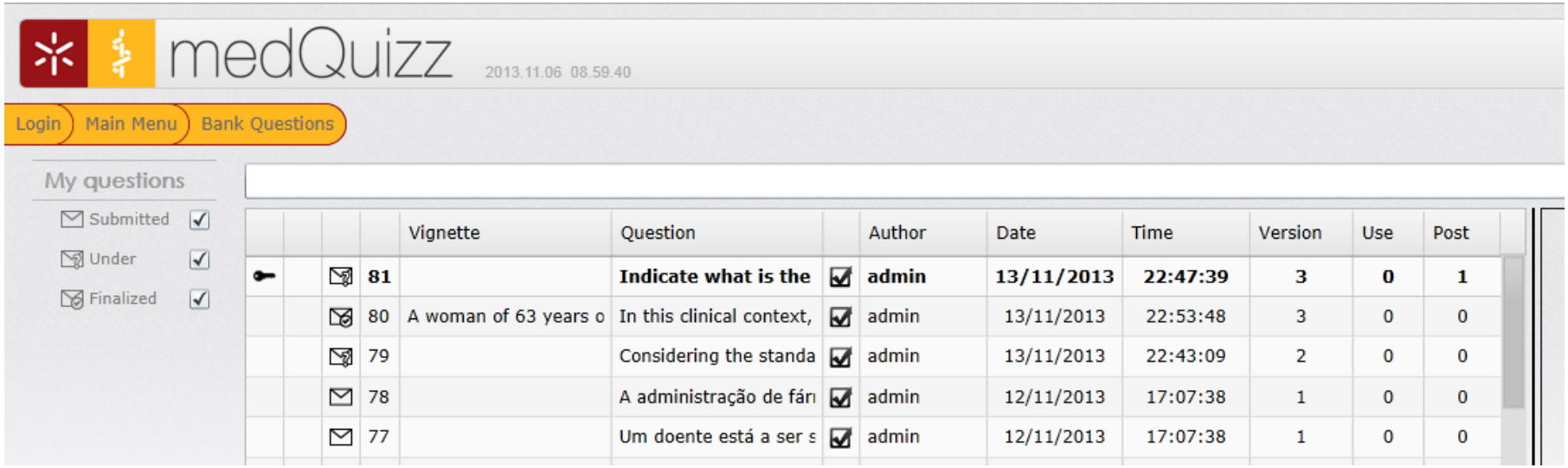
Collaborative secure authoring system
Embedded feedback features

- Multiple sources of feedback
  - Messages on the main screen
  - Email
  - Visual



		Vignette	Question		Author	Date	Time	Version	Use	Post
81			**Indicate what is the**	☑	**admin**	**13/11/2013**	**22:47:39**	**3**	**0**	**1**
80		A woman of 63 years o	In this clinical context,	☑	admin	13/11/2013	22:53:48	3	0	0
79			Considering the standa	☑	admin	13/11/2013	22:43:09	2	0	0
78			A administração de fár	☑	admin	12/11/2013	17:07:38	1	0	0
77			Um doente está a ser s	☑	admin	12/11/2013	17:07:38	1	0	0

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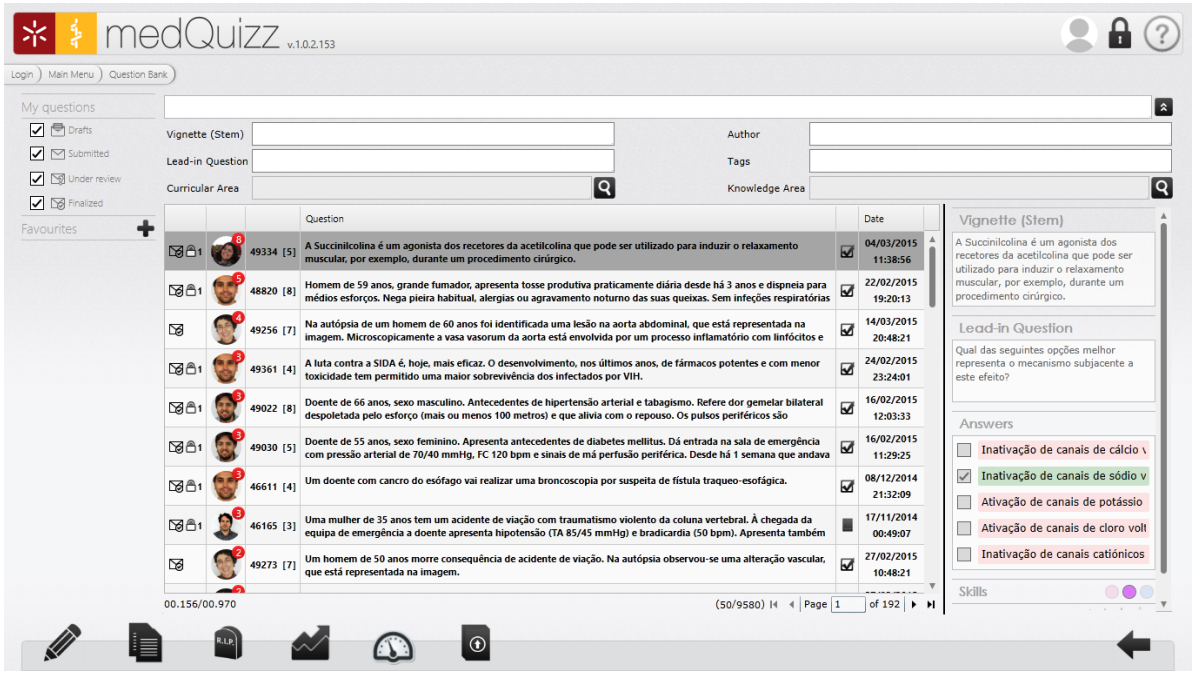
Item Management made easy

- Item bank is easy to navigate – comprehensive search
- Automatic creation of tests (Blueprint)
- Schedule tests for different groups
- Easy to read statistics



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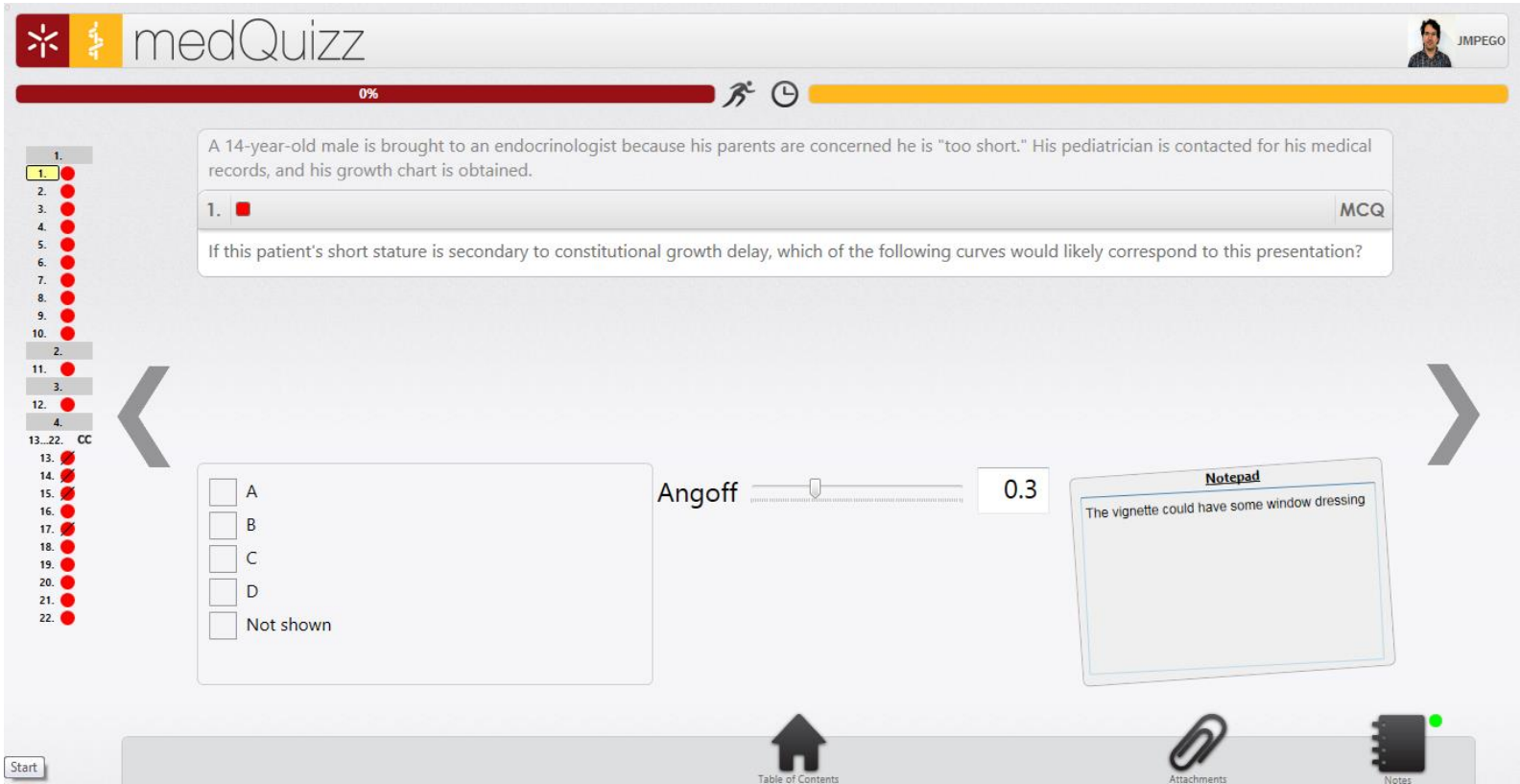
Angoff room

- Collaborative online Angoff procedure.
- Allows scheduling, partner selection, look-and-feel similar to the student's exam client
- Export data



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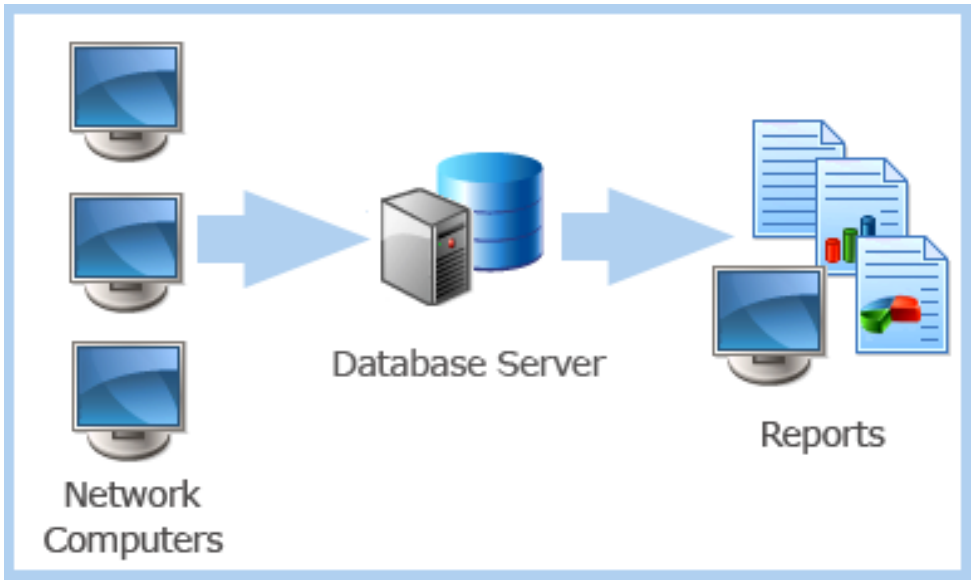
Secure and seamless test administration

- Native applications that provide secure connection to server
- Fail-safe systems that provide seamless experience to the user
- Anti-cheating measures avoid security breach
- Real Time Monitoring of students activity
  - Action logs



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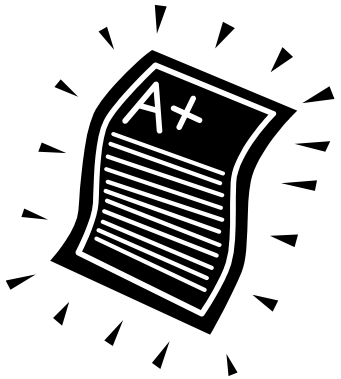
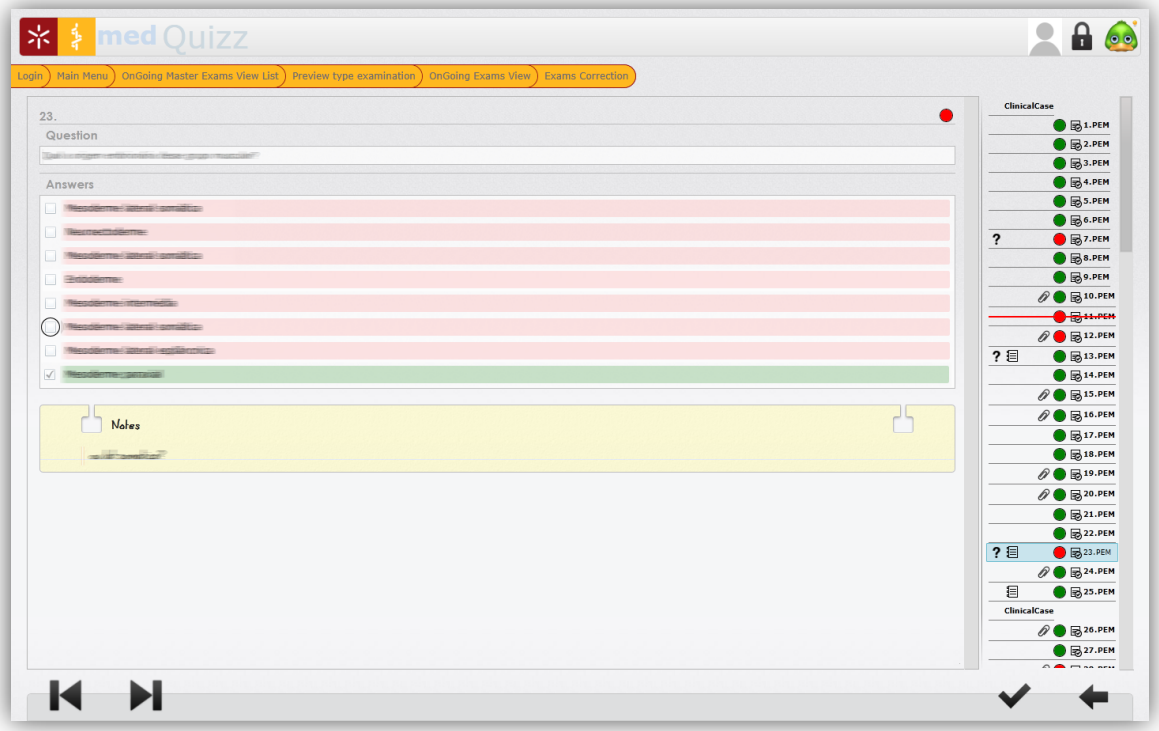


Fast post- test processing and management

- Automated and semi-automated scoring system
- Online discussion and decision on flagged items
- Automated reports
  - PDF, Excel



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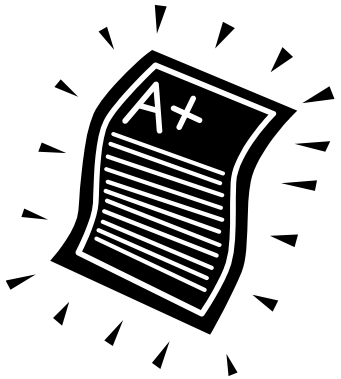

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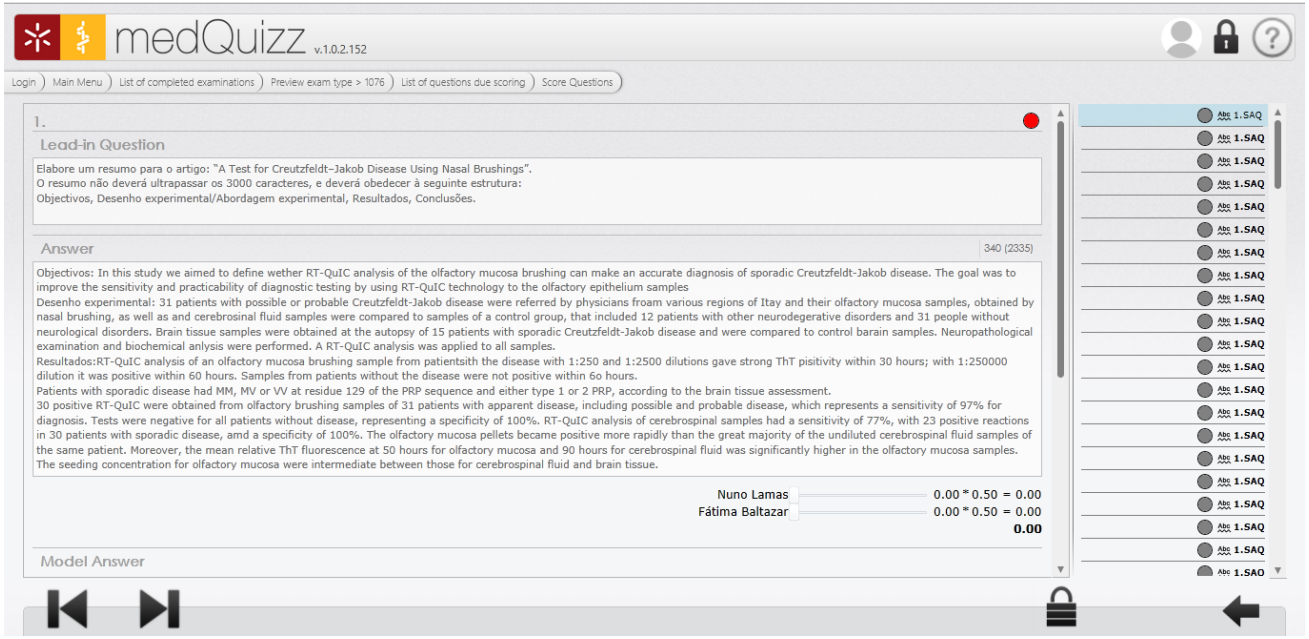

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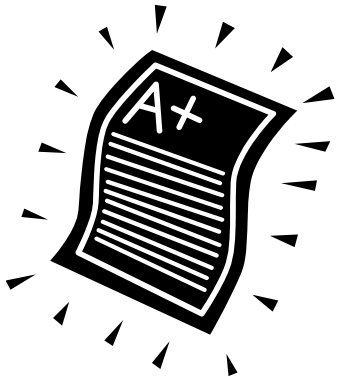

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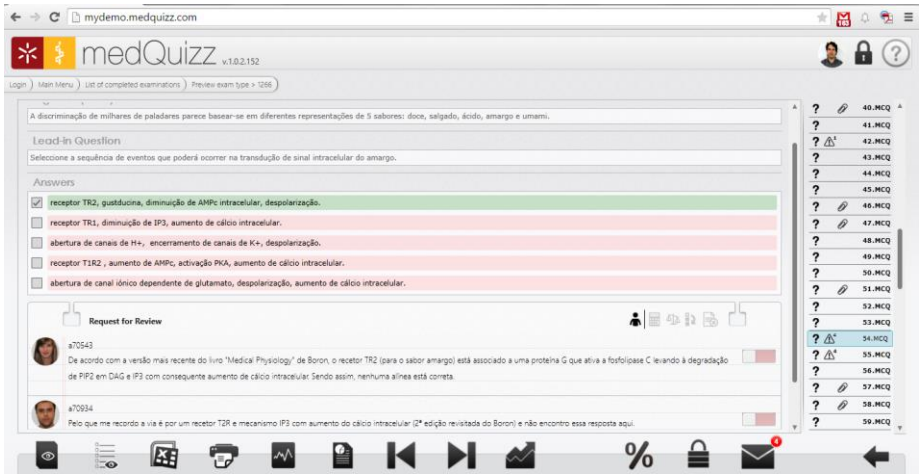

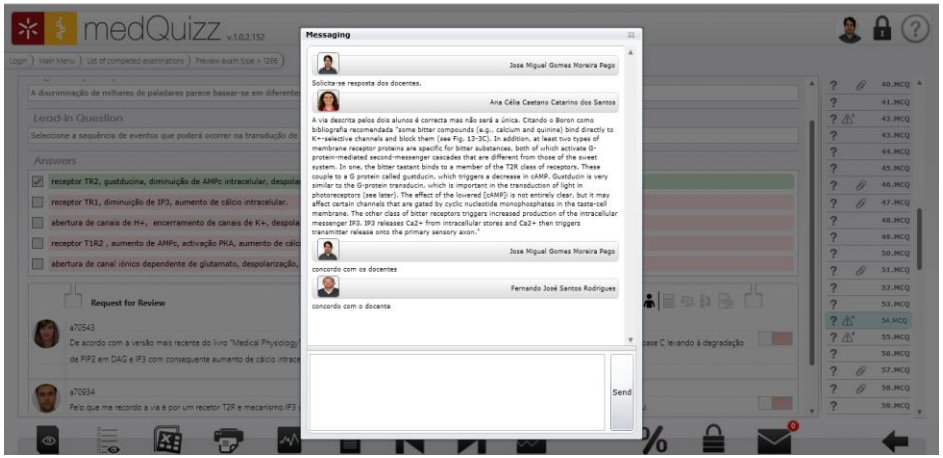

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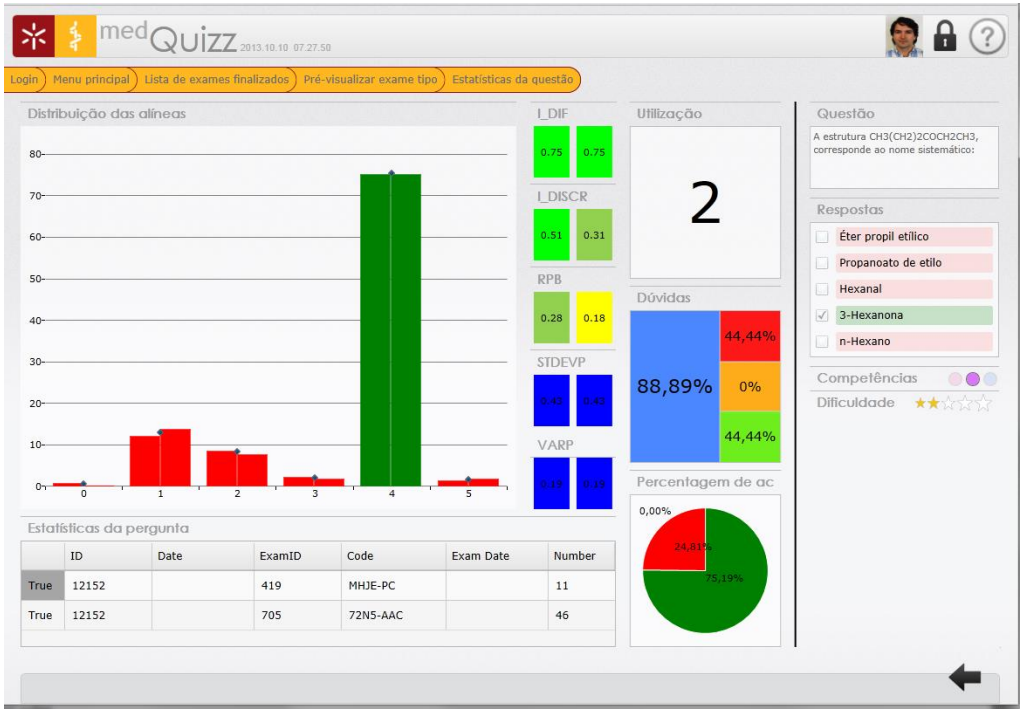
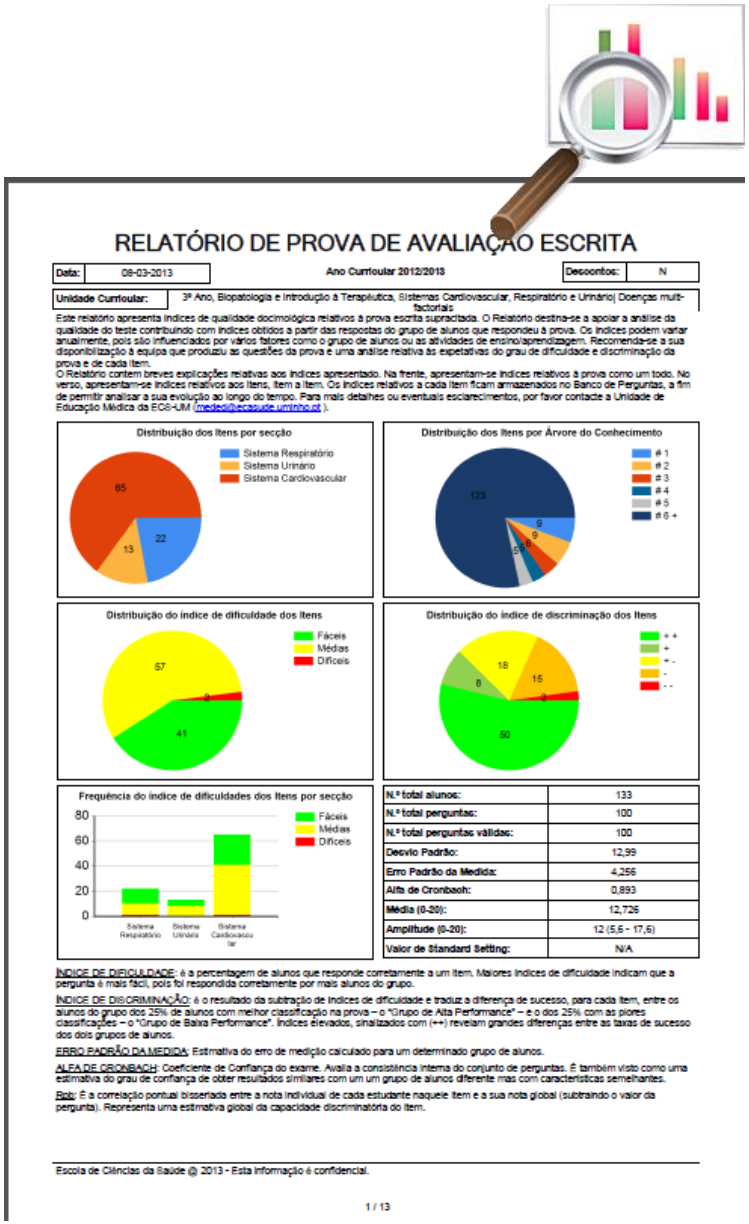
Powerful statistical package

- Automated reports – Summary, historical,
  - difficulty level heuristic's





RELATÓRIO DE PROVA DE AVALIAÇÃO ESCRITA

Data:	08-03-2013	Ano Curricular 2012/2013	Desconfec:	N

Unidade Curricular: 3º Ano, Biopatologia e Introdução à Terapêutica, Sistemas Cardiovascular, Respiratório e Urinário| Doenças multi-factoriais

Este relatório apresenta índices de qualidade docimológica relativos à prova escrita supracitada. O Relatório destina-se a apoiar a análise da qualidade do teste contribuindo com índices obtidos a partir das respostas do grupo de alunos que respondeu à prova. Os índices podem variar anualmente, pois são influenciados por vários fatores como o grupo de alunos ou as atividades de ensino/aprendizagem. Recomenda-se a sua disponibilização à equipa que produziu as questões da prova e uma análise relativa às expetativas do grau de dificuldade e discriminação da prova e de cada item.
O Relatório contem breves explicações relativas aos índices apresentado. Na frente, apresentam-se índices relativos à prova como um todo. No verso, apresentam-se índices relativos aos itens, item a item. Os índices relativos a cada item ficam armazenados no Banco de Perguntas, a fim de permitir analisar a sua evolução ao longo do tempo. Para mais detalhes ou eventuais esclarecimentos, por favor contacte a Unidade de Educação Médica da EC6-UM (medec@ecsaude.uminho.pt).

Distribuição dos itens por secção — Sistema Respiratório, Sistema Urinário, Sistema Cardiovascular

Distribuição dos itens por Árvore do Conhecimento — # 1, # 2, # 3, # 4, # 5, # 6 +

Distribuição do índice de dificuldade dos itens — Fáceis, Médias, Difíceis

Distribuição do índice de discriminação dos itens — + +, +, + -, -, - -

Frequência do índice de dificuldades dos itens por secção — Fáceis, Médias, Difíceis; Sistema Respiratório, Sistema Urinário, Sistema Cardiovascular

N.º total alunos:	133
N.º total perguntas:	100
N.º total perguntas válidas:	100
Desvio Padrão:	12,99
Erro Padrão da Medida:	4,256
Alfa de Cronbaoh:	0,893
Média (0-20):	12,726
Amplitude (0-20):	12 (5,6 - 17,6)
Valor de Standard Setting:	N/A

INDICE DE DIFICULDADE: é a percentagem de alunos que responde corretamente a um item. Maiores índices de dificuldade indicam que a pergunta é mais fácil, pois foi respondida corretamente por mais alunos do grupo.

INDICE DE DISCRIMINAÇÃO: é o resultado da subtração de índices de dificuldade e traduz a diferença de sucesso, para cada item, entre os alunos do grupo dos 25% de alunos com melhor classificação na prova – o "Grupo de Alta Performance" – e o dos 25% com as piores classificações – o "Grupo de Baixa Performance". Índices elevados, sinalizados com (++) revelam grandes diferenças entre as taxas de sucesso dos dois grupos de alunos.

ERRO PADRÃO DA MEDIDA: Estimativa do erro de medição calculado para um determinado grupo de alunos.

ALFA DE CRONBACH: Coeficiente de Confiança do exame. Avalia a consistência interna do conjunto de perguntas. É também visto como uma estimativa do grau de confiança de obter resultados similares com um um grupo de alunos diferente mas com características semelhantes.

Rpb: É a correlação pontual bisserlada entre a nota individual de cada estudante naquele item e a sua nota global (subtraindo o valor da pergunta). Representa uma estimativa global da capacidade discriminatória do item.

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RELATÓRIO DE PROVA DE AVALIAÇÃO ESCRITA

Data:	28-06-2013	Ano Curricular 2012/2013	Descontos:	N
Unidade Curricular:	1º Ano, Socorrismo		Módulo/Sub-módulo:	N/A

#	KEY	Secção	G_0	G_1	G_2	G_3	G_4	G_5	I_0	I_1	I_2	I_3	I_4	I_5	S_0	S_1	S_2	S_3	S_4	S_5	i_dif	i_disc	varp	stdev	rpb
1	2	Suporte Básico de Vida	0	0	0,966	0,017	0	0,017	0	0	0,254	0	0	0	0	0	0,254	0	0	0	0,97	0	0,033	0,181	-0,098
2	1	Suporte Básico de Vida	0	0,949	0,017	0	0,034	0	0	0,22	0,017	0	0,017	0	0	0,237	0	0	0,017	0	0,95	0,13	0,048	0,22	0,246
3	1	Suporte Básico de Vida	0	0,78	0,169	0	0	0,051	0	0,186	0,051	0	0	0,017	0	0,22	0,034	0	0	0	0,78	0,13	0,172	0,414	-0,121
4	4	Suporte Básico de Vida	0	0,068	0,051	0	0,881	0	0	0,017	0	0	0,237	0	0	0,017	0	0	0,237	0	0,88	0	0,105	0,323	-0,211
5	3	Suporte Básico de Vida	0	0	0	0,983	0	0,017	0	0	0	0,237	0	0,017	0	0	0	0,254	0	0	0,98	0,07	0,017	0,129	0,091
6	4	Suporte Básico de Vida	0	0	0	0,136	0,864	0	0	0	0	0,102	0,153	0	0	0	0	0	0,254	0	0,86	0,4	0,117	0,342	0,288
7	5	Suporte Básico de Vida	0	0,017	0,017	0	0	0,966	0	0,017	0,017	0	0	0,22	0	0	0	0	0	0,254	0,97	0,13	0,033	0,181	0,275
8	2	Suporte Básico de Vida	0	0	0,983	0,017	0	0	0	0	0,237	0,017	0	0	0	0	0,254	0	0	0	0,98	0,07	0,017	0,129	0,091
9	3	Suporte Básico de Vida	0	0,017	0,153	0,153	0,068	0,61	0	0	0,017	0,051	0,034	0,153	0	0	0,034	0,017	0	0,203	0,15	-0,2	0,129	0,36	-0,291
10	4	Suporte Básico de Vida	0	0	0,017	0	0,983	0	0	0	0	0	0,254	0	0	0	0	0	0,254	0	0,98	0	0,017	0,129	-0,038
11	4	Suturas	0	0	0,119	0,051	0,814	0,017	0	0	0,068	0	0,186	0	0	0	0,017	0	0,22	0,017	0,81	0,13	0,152	0,389	-0,036
12	3	Suturas	0	0,186	0,034	0,542	0	0,237	0	0,102	0,017	0,068	0	0,068	0	0,017	0	0,22	0	0,017	0,54	0,53	0,248	0,498	0,214
13	4	Suturas	0	0,068	0,051	0,169	0,627	0,085	0	0,017	0,034	0,034	0,119	0,051	0	0,017	0	0,051	0,186	0	0,63	0,33	0,234	0,484	0,014
14	5	Suturas	0	0,542	0,085	0,254	0	0,119	0	0,119	0,034	0,085	0	0,017	0	0,153	0,034	0,017	0	0,051	0,12	0,13	0,105	0,323	-0,124
15	3	Suturas	0	0,254	0	0,695	0,051	0	0	0,102	0	0,136	0,017	0	0	0,017	0	0,22	0,017	0	0,69	0,4	0,212	0,46	0,085
16	1	Suturas	0	0,61	0,119	0	0,102	0,169	0	0,169	0,034	0	0	0,051	0	0,186	0,034	0	0,017	0,017	0,61	0,07	0,238	0,488	-0,12
17	3	Suturas	0	0	0,017	0,983	0	0	0	0	0,017	0,237	0	0	0	0	0	0,254	0	0	0,98	0,07	0,017	0,129	0,026
18	1	Suturas	0	0,966	0,017	0	0,017	0	0	0,22	0,017	0	0,017	0	0	0,254	0	0	0	0	0,97	0,13	0,033	0,181	0,085
19	2	Suturas	0	0,271	0,475	0,051	0,203	0	0	0,068	0,068	0,034	0,085	0	0	0,034	0,169	0,017	0,034	0	0,47	0,4	0,249	0,499	0,006
0	5	Suturas	0	0	0,119	0,102	0,136	0,644	0	0	0,068	0,017	0,085	0,085	0	0	0,017	0	0	0,237	0,64	0,67	0,229	0,479	0,319
22	4	Fraturas	0	0	0	0,017	0,983	0	0	0	0	0,017	0,237	0	0	0	0	0	0,254	0	0,98	0,07	0,017	0,129	0,091
23	2	Fraturas	0	0,102	0,847	0	0,034	0,017	0	0,085	0,153	0	0,017	0	0	0	0,254	0	0	0	0,85	0,4	0,129	0,36	0,166
24	2	Fraturas	0	0	0,847	0	0	0,153	0	0	0,203	0	0	0,051	0	0	0,22	0	0	0,034	0,85	0	0,129	0,36	-0,072

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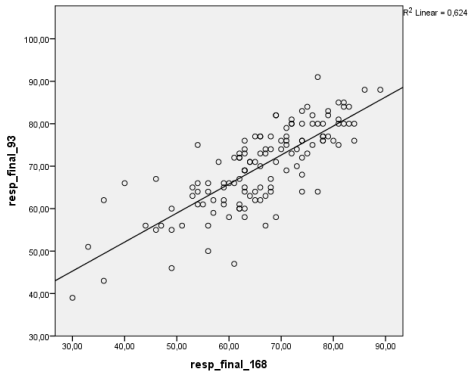
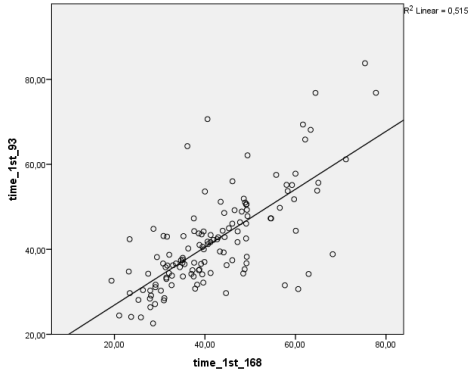
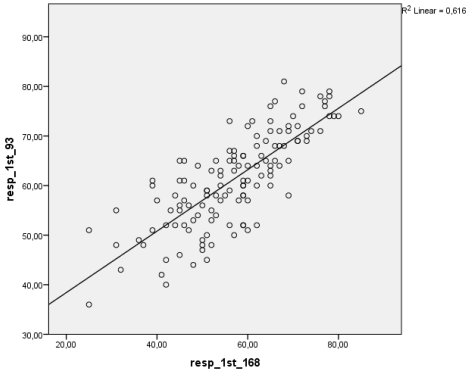
Final Score



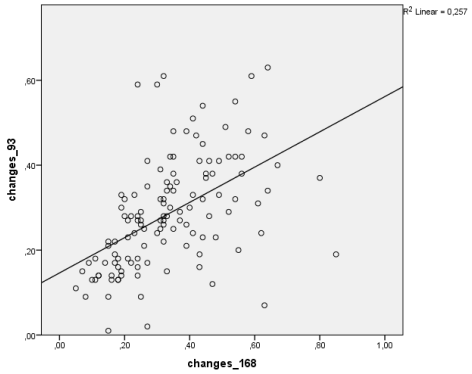
Initial Score



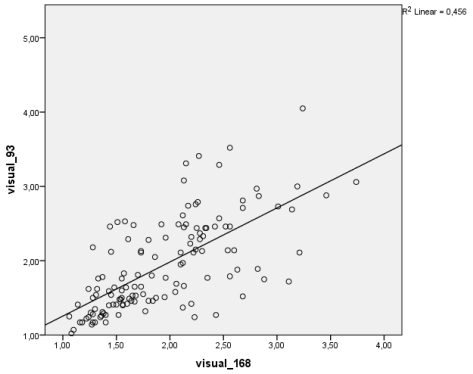
Latency to action



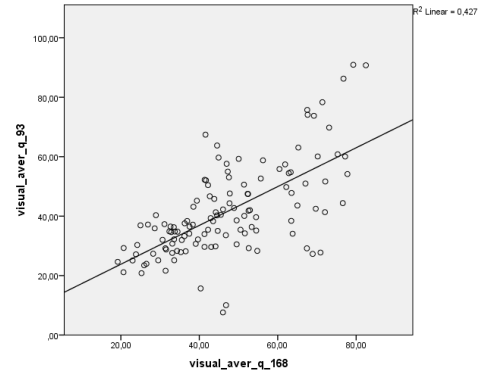
Changes



Visual



Avg Visual Time



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Using Mouse Dynamics to Assess Stress During Online Exams

Davide Carneiro[1](✉), Paulo Novais[1], José Miguel Pêgo[2,3], Nuno Sousa[2,3], and José Neves[1]

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[2] School of Health Sciences, Life and Health Sciences Research Institute (ICVS), University of Minho, Braga, Portugal
{jmpego,njcsousa}@ecsaude.uminho.pt
[3] ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal

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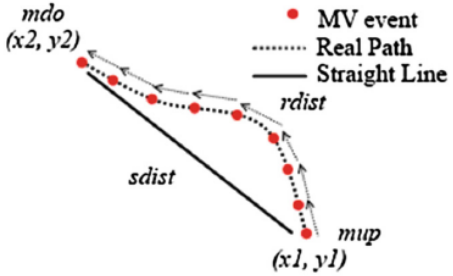

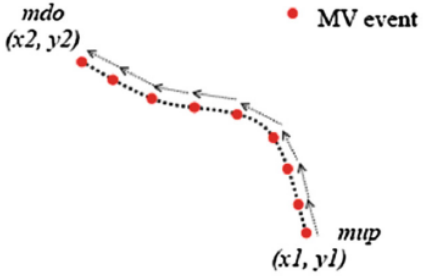

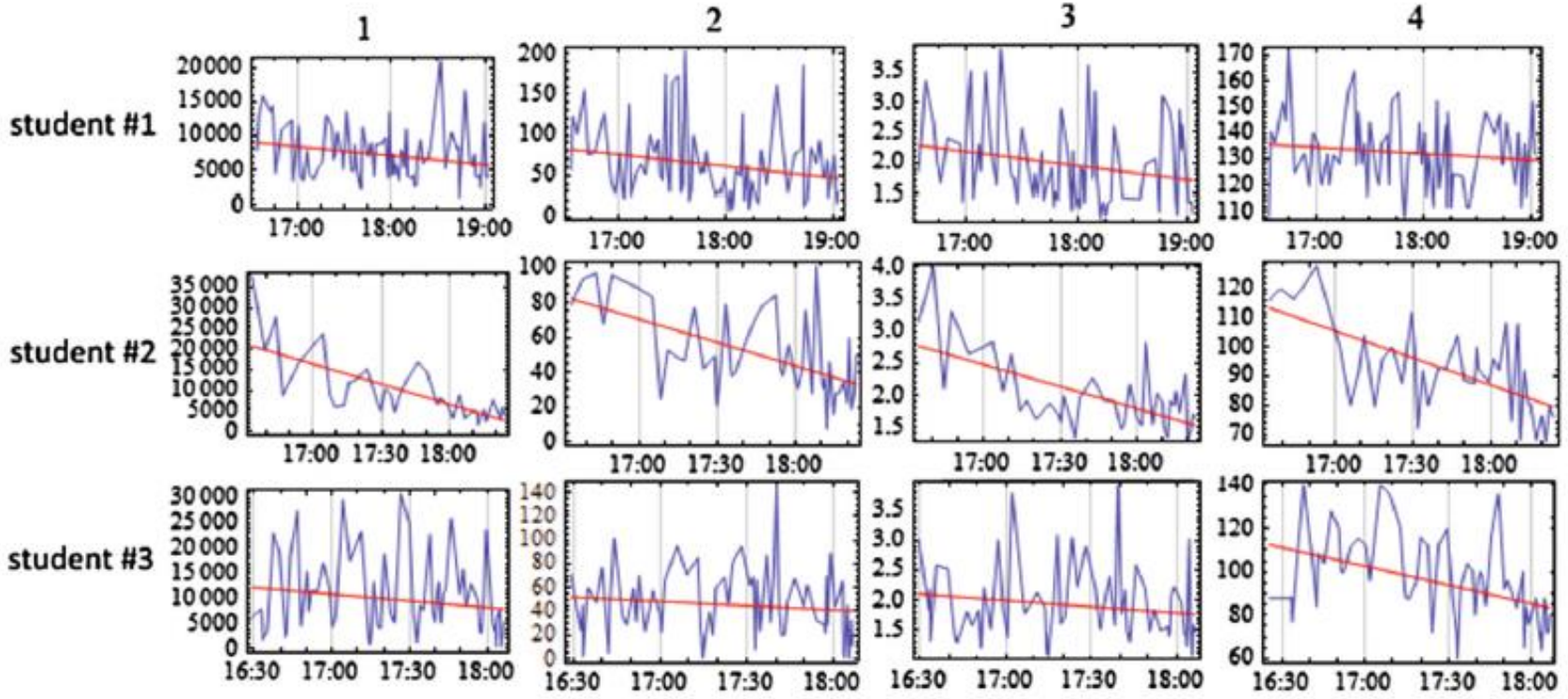

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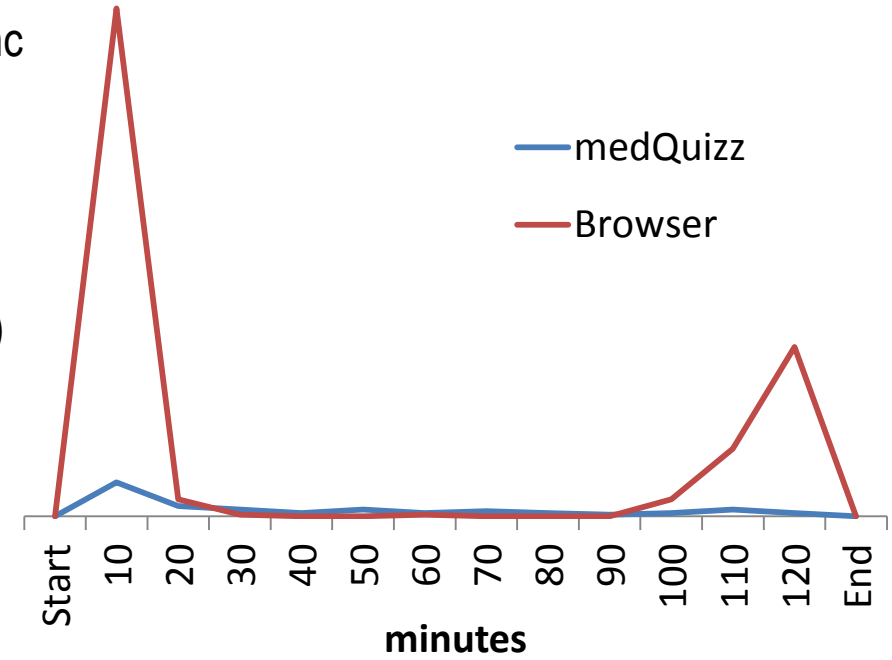

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