



Stabilitätspakt für Südosteuropa
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2nd Delivery of the JCSE as an Intensive Course for Master's Students at Polytechnic University Tirana: Experience from 2008

Klaus Bothe
Zoran Putnik

8th Workshop "Software Engineering Education and Reverse Engineering"
Durrës, Albania, 8th – 13rd September 2008

Additional documents:
Tirana-Agenda.doc, Tirana-Handouts.doc, FeedbackTirana.doc

Main building of Polytechnic University Tirana





Agenda

- Short history
- New aspects in 2008
- Delivery of the course: lectures
- Assignments and Exams Organized at a Distance
- Students feedback: 2007 - 2008
- What really would be useful to be improved

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History

- April 2006, DAAD conference at Ohrid lake:
B. Cico and K. Bothe: first ideas
- 19 – 24 March 2007: 1st intensive course SE (JCSE),
17 students from 4th semester of the master studies
- 21 – 26 April 2008: 2nd intensive course SE (JCSE),
32 students from 1st and 3rd semester of the master studies

Each time:

- followed by assignments and examinations
- cooperation between Klaus Bothe and Zoran Putnik
(selected lectures, assignments, exams)

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New aspects in 2008

- Broader audience: 32 students from 1st and 3rd semester (2007: 17 students from 4rd semester)
- Lecturers: Klaus Bothe, Zoran Putnik, Mihal Brumbulli, Fisnik Kraja (2007: Zoran P., K. Bothe)
- Questionnaire 2008: different results compared with 2007
- Assignments and exams: higher workload for staff and results
- TV life discussion: B. Cico + K. Bothe

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Master in "Computer Engineering": Curriculum

We could not take it into account ...

... and it seemed to be without any matter



I YEAR	Moduls	Done 3rd	Done 1st	Credits
	Statistic and Stochastic Processes	YES	NO	each 6
	Digital Design	YES	in progress	
	Operating Systems II	YES	in progress	
	Data Base II	YES	in progress	
	Networking	YES	NO	
	Electronic for Computer Engin.	YES	YES	
	Languages and Compilers	YES	NO	
	Foreign Language II	YES	YES	
	Security of Information Systems	YES	YES	
	Architecture of Control automatic Systems	YES	in progress	
II YEAR Moduls				
	Advanced Computer Architecture	YES	NO	
	JAVA II in Eclipse Platform	YES	NO	
	Project Management	YES	NO	
	Distributed Systems II	NO	NO	
	Software Engineering II	NO	NO	
	WEB Application	NO	NO	
	Artificial Intelligence	NO	NO	
	Diploma	NO	NO	20



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Photo from the course: students



Delivery of the course: lectures, assignments, examinations

- Lectures: 21 – 26 April 2008, 6 days, 5 – 7 hours per day
- Schedule (agenda) delivered before → next slide
- Handouts before lectures: 48 important key slides
- Printouts: All slides published: after the lectures, as 1sided, 4sided pdf files
- Assignments: 1st before the course (Review of SemOrg); 2nd, 3rd, 4th each two weeks
- Examinations: 23 June 2008

Selected 19 topics for Tirana: Lecturers

in minutes	Z.B. (W 02)	K.B. (S 03)		
Part I: Introduction			Part III: Software Design	
• 1 What is software engineering	80	120	• 15 Overview of design activities	-- 90
• 2 Quality criteria ...	40	45 Z	• 16 Structured design	-- 15
• 3 Software process models	120	90 F	• 17 Object-oriented design	-- 45 Z
• 4 Basic concepts ...	60	40	Part IV: Implementation and testing	
Part II: Requirements engineering			• 18. Implementation	-- 90
• 5 Results of the ... phase	(70)	100	• 19. Systematic testing	-- 180
• 6 Cost estimation	60	100 Z	• 20. Functional testing	-- 150 Z
• 7 Function-oriented view	60	50 M	Part V: Advanced problems	
• 8. Data-oriented view	50	35	• 21 Software metrics	-- 180 Z
• 9. Rule-oriented view	50	40	• 22. Maintenance	-- -
• 10 Structured analysis	80	65	• 23 Reverse engineering	-- 90
• 11 State-oriented view	(45)	80	• 24. Quality of software development ...	-- 90
• 12 Scenario-oriented view	30	25 Z	• 25. Software ergonomics	-- 180
• 13 Object-oriented analysis	(60)	210	• 26. User manuals	- -
• 14 Formal software specification ...	--	190	• 27. Project management	? 90
			• 28. Configuration ... management	- 45
Z Zoran Putnik F Fisnik Kraja			Sum:	33 lecture hours
M Mihal Brumbulli			Selected topics	11

Schedule (agenda) of the lectures

DAY 1 7 lecture hours a 45 minutes			DAY 4 5 1/2 h		
Introduction: DAAD, JCSE, Tempus, concept of the course 45			14th Formal software specifications and program verification 130 130 <i>Z, Algebraic, Hoare</i>		
PART I Introduction to Software engineering 6 h			PART III Design		
	<i>Duration normal planned</i>		• 15 th Overview of design activities Software architecture, specification of components, Quality assurance, Overview of some software architectures		
1 st What is Software engineering?	100 90 90		• 16 th Structured design Structure charts		
2 nd Quality criteria for software products	45 45 45 Z		• 17 th Object-oriented design Architecture design, user-interface, performances, implementation design		
3 rd Software process models - introduction	90 120 90 F		DAY 5 5 h		
4 th Basic concepts and software development documents	40 60 45		PART IV Implementation and Testing		
DAY 2 6 h			18. Implementation Principles, methods, guidelines		
PART II Requirements engineering (analysis and definition)			19 th Systematic testing Classification, review/audit, control-flow, data-flow oriented		
	<i>Duration normal planned</i>		20 th Functional testing Incl. testing tools		
5 th Results of the "Analysis and Definition" phase	90 70 60		DAY 6 5 h		
6 th Cost estimation	90 60 60 Z		PART V Advanced problems		
7 th Basic concepts of the function-oriented view	60 60 60 M		21 st Software metrics McCabe, Halstead, LOC, OO, CASE-Tools, Demo of MC-Tools		
8 th Basic concepts of data-oriented view	35 45 -		22. Maintenance Types, requests, costs, planning		
9 th Basic concepts of rule-oriented view	45 50 -		23 rd Reverse engineering Software repair, Reengineering, Restructuring, CASE-Tools		
10 th Structured analysis	90 90 90		24 Quality of software development process and its standardization ISO 9000, Capability assessment models		
DAY 3 4 h			25 Introduction to software ergonomics Graphical user interfaces, Standards, Guidelines		
11 th Basic concepts of state-oriented view	90 60		26 User manuals Principles and guidelines for writing user-manuals		
12 th Basic concepts of scenario-based view	30 30 Z		27 Project management Planning, organization, people management, control		
13 th Object-Oriented analysis	90		28 Configuration management Motivation, activities, CVS		
Class-diagrams, use-cases, UML, demonstration of a CASE Tool	+120 90				



New lecturers from UPT Tirana

- Plan: Tirana's own staff will take over the lectures
- Fisnik Kraja and Mihal Brumbulli: new lecturers in 2008 were students in 2007
- Took over topic 3 (Process models) and topic 7 (function-oriented view: use case, data flow ...)
- Assessment of their lectures → did it very well:
 - their first lectures
 - use of slides produced by others
 - English slides, English as presentation language
- Faster than usual:
 - Topic 3 usually 90-120 minutes, now: 55 minutes
- Proves: material convenient for reuse by lecturers which are not the developers

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Development of teaching materials since 2007

- Slides: only minor extensions and some elimination of misspellings
 - 2 examples of new slides from topic 1: below
- Same assignments: not such a big problem since the solutions are rather individual and students need them as a repetition of lectures and preparation of exams
- New examination questions necessary.

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Some huge software systems

	Mio SLOC	PersonMonth	Mio EUR
GIMP	0,65	1.400	19
Windows 3.1	6	13.000	177
Windows XP	40	86.000	1.200
Mac OS X	86	290.000	4.000

GIMP = GNU Image Manipulation Program

e.g. Windows XP: 86.000 PM = 7166 Person Years

Source: H. Mühleisen: Software-Kostenschätzung, 2008

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Windows

Computerworld, April 10, 2008

Windows is 'collapsing,' Gartner analysts warn

"Windows' rapidly-expanding code base, which makes it virtually impossible to quickly craft a new version with meaningful changes.

That was proved by Vista.

Most users do not understand the benefits of Windows Vista or do not see Vista as being better enough than Windows XP.

The monolithic nature of Windows not only makes it tough to deliver a worthwhile upgrade.

Users want a smaller Windows that can run on low-priced -- and low-powered -- hardware."

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Reminder of assignments

- **Berlin: 8 assignments**
- **Novi Sad: 7 assignments**
- **Tirana: 4 assignments**

Assignments	HU	NS	TIR
1. Review requirements specification "SemOrg"	x	x	x
2. Function points (Tool)	x	x	x
3. Review structured analysis model	x	x	-
4. Develop an OOA model Tool	x	x	-
5. Formal specifications (Tool)	x	x	x
6. Metrics Tool	x	x	x
7. Select test cases functionally by the CTE Tool	x	-	-
8. Select regression test cases by ATOS Tool	x	-	-
9. Review of a assgn solution of another team	-	x	-

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Reasons for selecting just these four assignments for Tirana

- Importance and actuality.
- (Non)-Availability of tools
- No local assistant available
- Ease of correcting at a distance
- Only four:
 - available time of students at the end of the semester,
 - available time of the reviewers: Bothe, Putnik

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Assignments

- The first assignment was given to students *before* the course started.
- The most important reason was acquaintance with the main case-study, that is used throughout the whole course.

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Assignments

- 33 Students were divided into 9 teams for assignment solving – same as in Berlin and Novi Sad.
- One of the teams drop-out, and didn't submit the rest of the assignments.
- Team members were self-chosen.

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Assignments 2 to 4

- Given to students *after* all of the lectures.
- For each assignment, teams had 2 weeks.
- Also, for each assignment, promised (and achieved) feedback was within 10 days.
- It was agreed, that the final mark will be decided based on points won at assignments – 40%, and on a written exam – 60%.

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Complete results for assignments

- Results for each team, for each assignment, are given in a table.

Team	Assignment				Total
	I	II	III	IV	
	10	10	10	10	40
1	7	6	9	10	32
2	0	9	9	9	27
3	5	6	7	9	27
4	9	9	10	9	37
5	10	8	9	10	37
6	4	8	6	10	28
7	8	8	9	9	34
8	9	7	4	9	29

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Exam

- In Berlin, exam consists of assignments and questions answered *orally*.
- In Novi Sad, exam consists of assignments and 4 *written* tests during the year.
- We used experiences and questions from Novi Sad, translating and adjusting them to material presented in Tirana, using *only* open questions.

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Exam

- Having experiences from the last year, final results are quite satisfactory. Complete results are as follows:
- As can be noticed, 4 students didn't approach the exam, so there is some more work these days for lecturers!
- Adjustment of final grades because of harder conditions: all in English (lectures, exams), no local assistant available in the period of exam preparation (bonus points)

RBr	Name	Team	Practice Total	Exams Total	Total	Mark
1	...	7*	34	39,0	73,00	8
2	...	4*	37	41,0	78,00	8
3	...	6*	28	40,0	68,00	7
4	...	4*	37	55,5	92,50	10
5	...	8	29	22,0	51,00	6
6	...	2	27	38,0	65,00	7
7	...	3*	27	0,0	27,00	-
8	...	7*	34	30,0	64,00	7
9	...	1	32	21,0	53,00	6
10	...	5	37	40,0	77,00	8
11	...	4*	37	19,0	56,00	6
12	...	3*	27	0,0	27,00	-
13	...	6*	28	44,0	72,00	8
14	...	6*	28	28,0	56,00	6
15	...	7*	34	18,0	52,00	6
16	...	8	29	0,0	29,00	-
17	...	8	29	28,0	57,00	6
18	...	7*	34	39,0	73,00	8
19	...	6*	28	28,5	56,50	6
20	...	4*	37	28,5	65,50	7
21	...	3*	27	41,5	68,50	7
22	...	5	37	27,5	64,50	7
23	...	1	32	47,0	79,00	8
24	...	1	32	50,5	82,50	9
25	...	1	32	38,0	70,00	7
26	...	5	37	41,5	78,50	8
27	...	2	27	43,0	70,00	7
28	...	5	37	43,5	80,50	8
29	...	8	29	34,5	63,50	7
30	...	2	27	0,0	27,00	-



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Feedback from students ("Questionnaire")

Our *standard feedback form with additional questions*:

- Was it a big problem that the slides and presentations were in English?
- Have the handout materials been sufficient to follow the lecture?
- Was it a big problem to get the slides only after the lectures?

+ Some *additional questions with open (free) answers*:

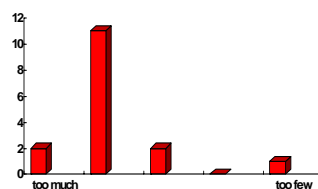
- What should be remained next time?
- What should be changed next time?

Assignments not included (after that week)

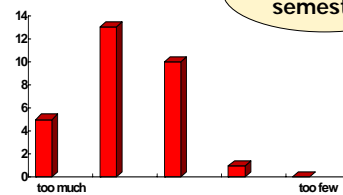
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Questionnaire results (1)

- Do you consider the amount of knowledge offered in the lectures?



2007

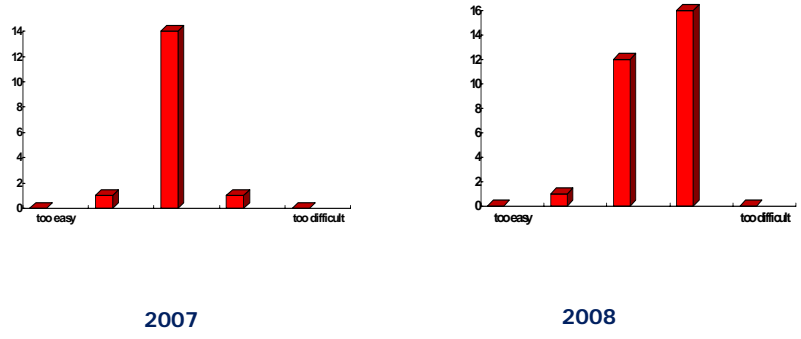


2008

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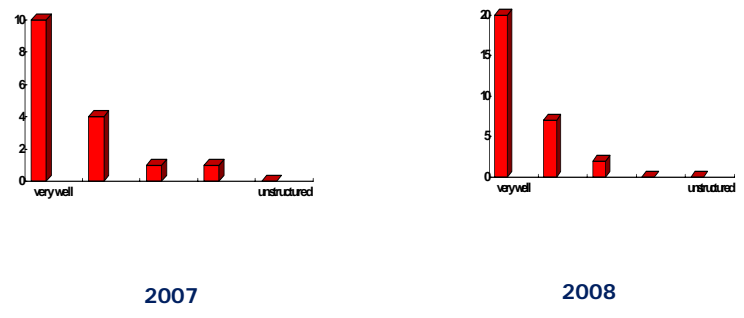
Questionnaire results (2)

- How do you consider the contents of the lecture?



Questionnaire results (3)

- Is the course well-structured?

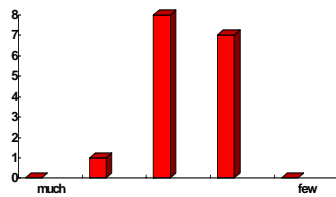




Questionnaire results (4)

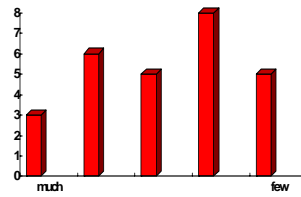
- Are there any special requirements (pre-knowledge) to be able to understand the course?

1st and 3rd semester



2007

Preknowledge:
programming languages,
Algebra, logics, UML



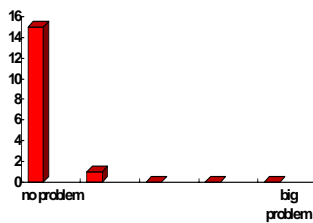
2008

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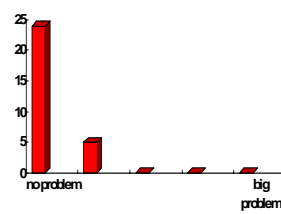


Questionnaire results (5)

- Was it a problem that slides and presentation were in English language?



2007



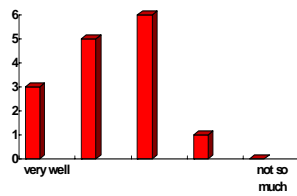
2008

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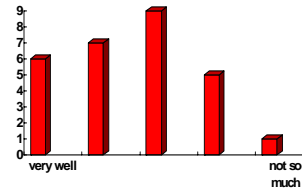


Questionnaire results (6)

- Have the handouts materials been sufficient to follow the lecture?



2007



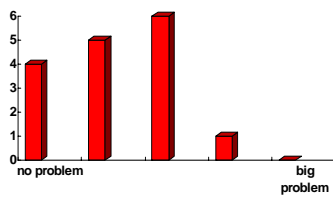
2008

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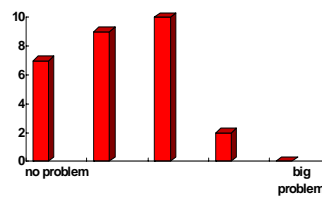


Questionnaire results (7)

- Was it a big problem to get the slides only after the lectures?



2007



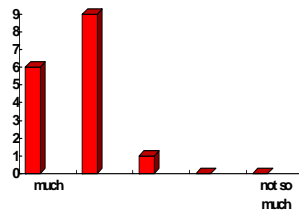
2008

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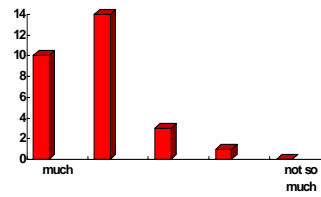


Questionnaire results (8)

- Did you learn a lot of new things?



2007



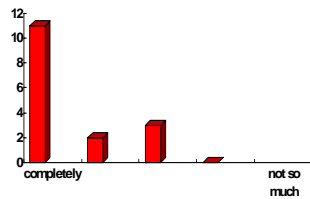
2008

35

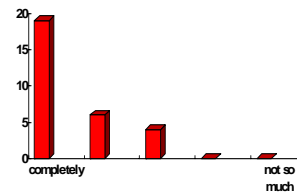


Questionnaire results (9)

- Do you think the contents of the lecture is useful?



2007



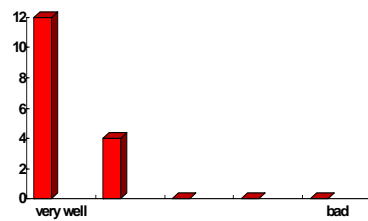
2008

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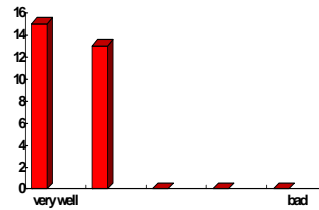


Questionnaire results (10)

- What is your overall ranking of the lecture?



2007



2008

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Some students' comments 2008 (1)

- The English of Zoran Putnik was more familiar for us Albanians
- Course was important to concentrate the knowledge accumulated in this 3rd year
- Here in Albania we do much theoretical things, but in practice we haven't done so much
- This course is valuable – however, without any software projects developed by us, the output is not so big
- Too much information in a week; I hope we learn it better in the next weeks by reading the materials once more
- One week is too short ... Too much information within one week ...
- I liked best case studies and examples (useful in practice)
- Lections too much concentrated to the first phase → more design

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Some students comments 2008 (2)

- It is hard to find a company in Albania that truly use SE
- You should come again to Albania ☺
- More breaks needed: 10 minutes after 60 minutes lessons
- We are very pleased to get lectures from you
- Lecturers were very friendly with us ☺
- Lecturers were patient with us
- Good: change of lecturers during a day
- Sorry to come late into lectures
- Interesting: information from newspapers

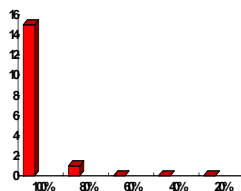
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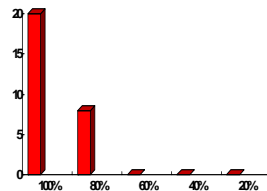
Questionnaire results (11)

- How many lectures did you attend (percentage)

Tirana

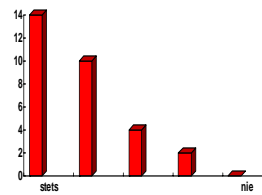


2007



2008

HU Berlin



2005

At HU: no obligation to attend the classes,
no name lists allowed due to data protection laws

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Lecturers invited to a café after the week of lessons also in 2008



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What really would be useful to be improved (1)

- More recent material:
newspaper advertisement (1996, 1997, 2004, 2005),
statistics from GI (1993), EU (1994)
- New topics, e.g. extreme programming
- Tool demonstration:
CTE, ATOS, UML tool, metrics tool
- Connected with each topic:
also assignments, quizzes, questions for self-study

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What really would be useful to be improved (2)

- Not only 6 days of lectures
- Longer breaks
- Not the same assignments
- Examination: too many too small questions because of
the distance mode (all answers to be typed in a file and
send to the examiners)

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Thank you



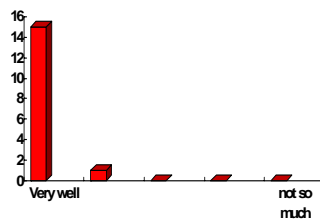
Appendix: Some more questionnaire results

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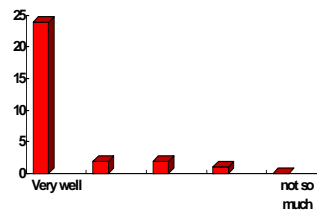


Questionnaire results (14)

- Is the lecturer familiar with the contents of the lecture?



2007



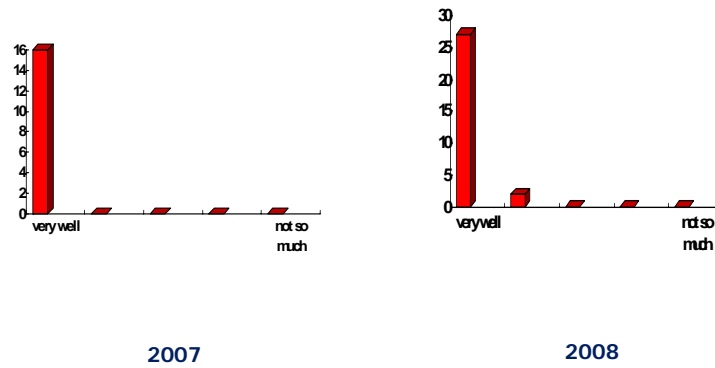
2008

48



Questionnaire results (15)

- Do the lectures seem to be well-prepared?

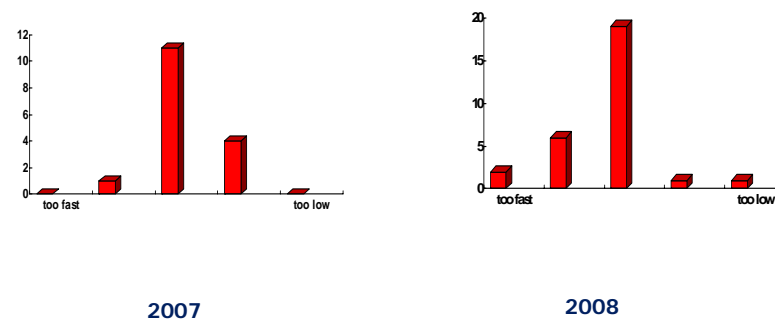


49



Questionnaire results (16)

- Is the presentation of the lecture

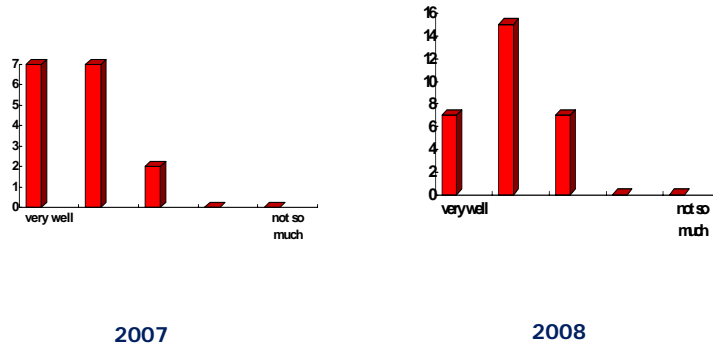


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Questionnaire results (17)

- Does the presentation style encourage you to follow the lecture?

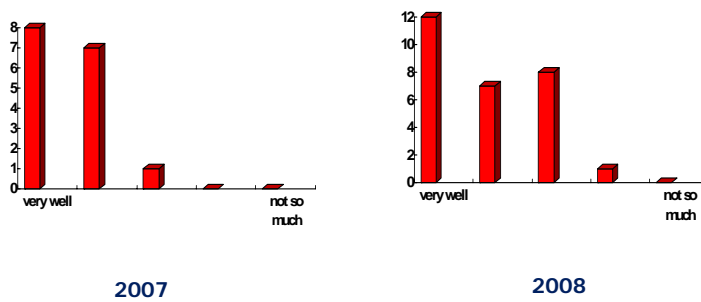


51



Questionnaire results (18)

- Is the amount of information on the slides adequate?



52



Questionnaire results (19)

- Are the slides well-structured and clearly-arranged?

