

“Hands on Particle Physics” International Masterclasses

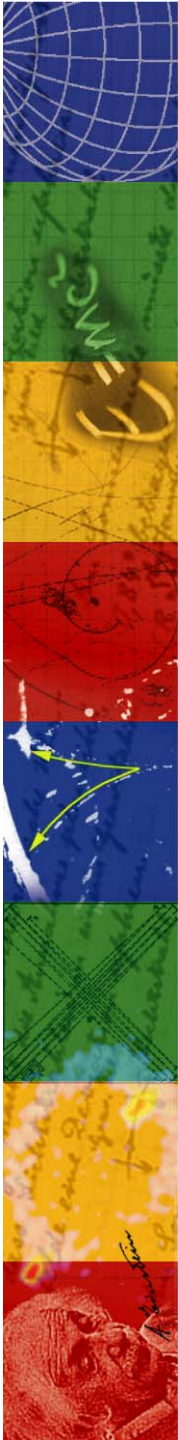
The Masterclass in the US

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In the US...

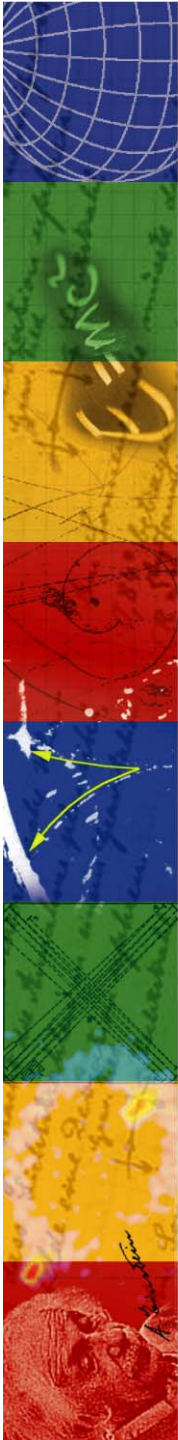
- QuarkNet organizes Masterclass
- In 2006 and 2007, a small number of US “Masterclass Institutes” participated with Europe
- In 2008, we created the **US Masterclass in collaboration with EPPOG**
- QuarkNet fellows design program and evaluation



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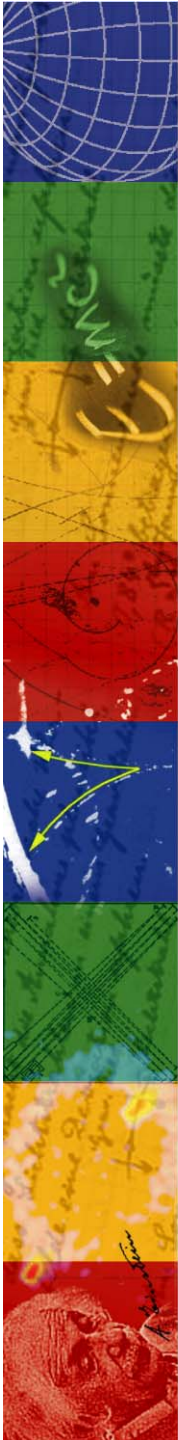
EPPOG Meeting

1-2 October 2008, CERN

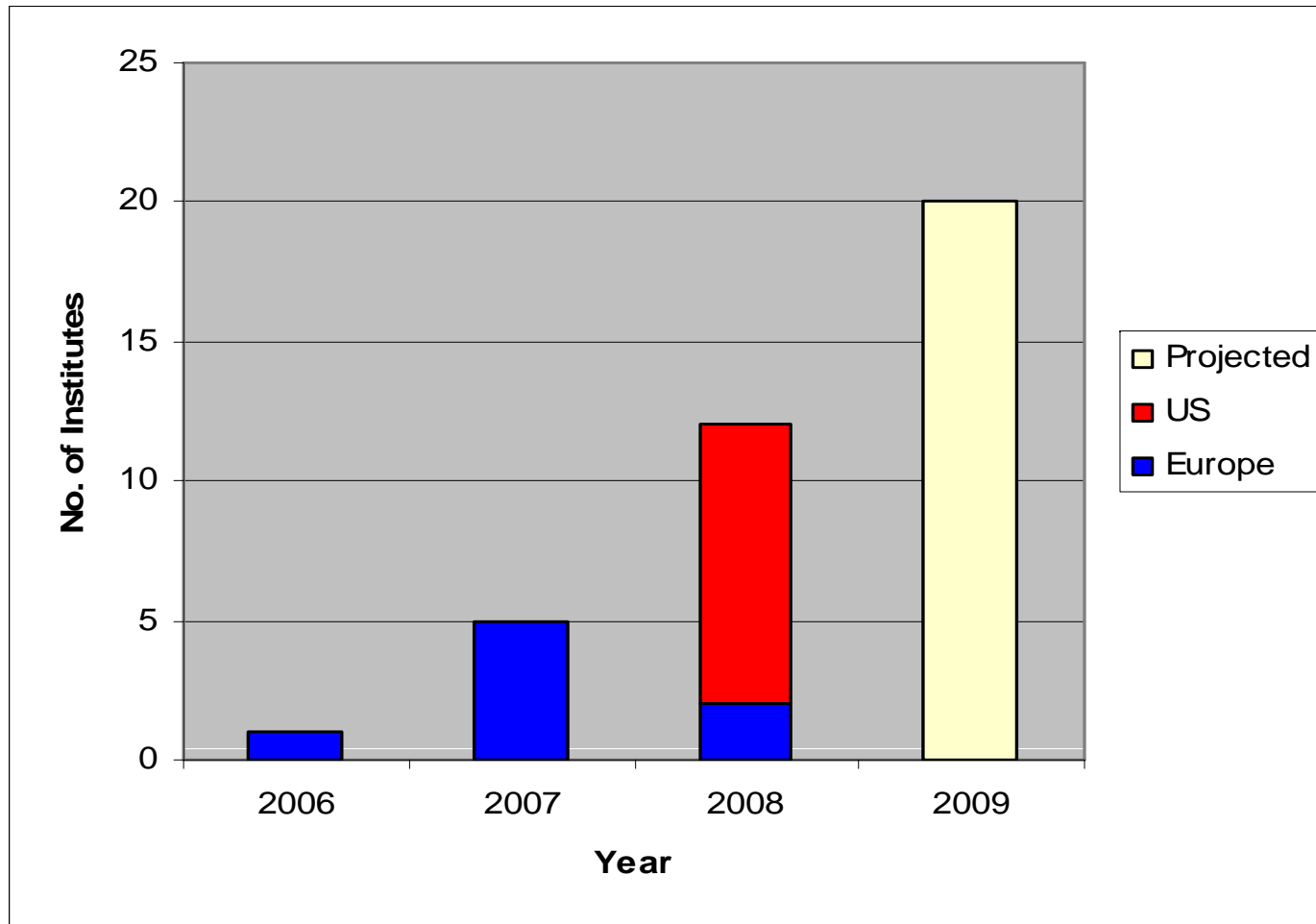


US Masterclass overview

- All students analyzed DELPHI Z-decays
- 10 Institutes moderated from Fermilab over 3 days
- 2 Institutes connected with Europe
 - BNL with CERN and others
 - UC Riverside with Faro, Portugal (*obrigado*, Pedro Abreu)
- ~170 students / ~30 teachers
- Recommended 60 min preparation plus all day Masterclass
- Evaluated by Masterclass Questionnaire and Pre-test/Post-test

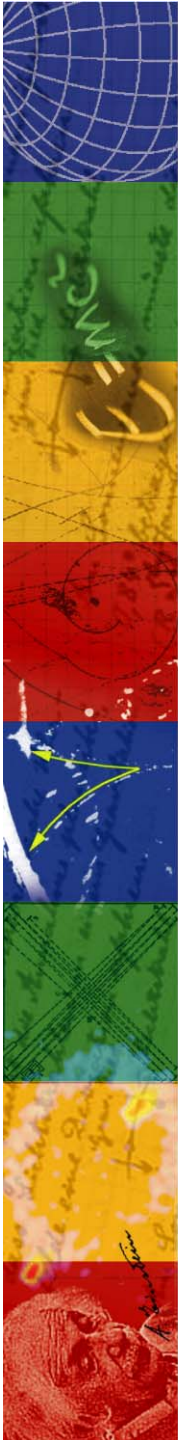


US Masterclass growth

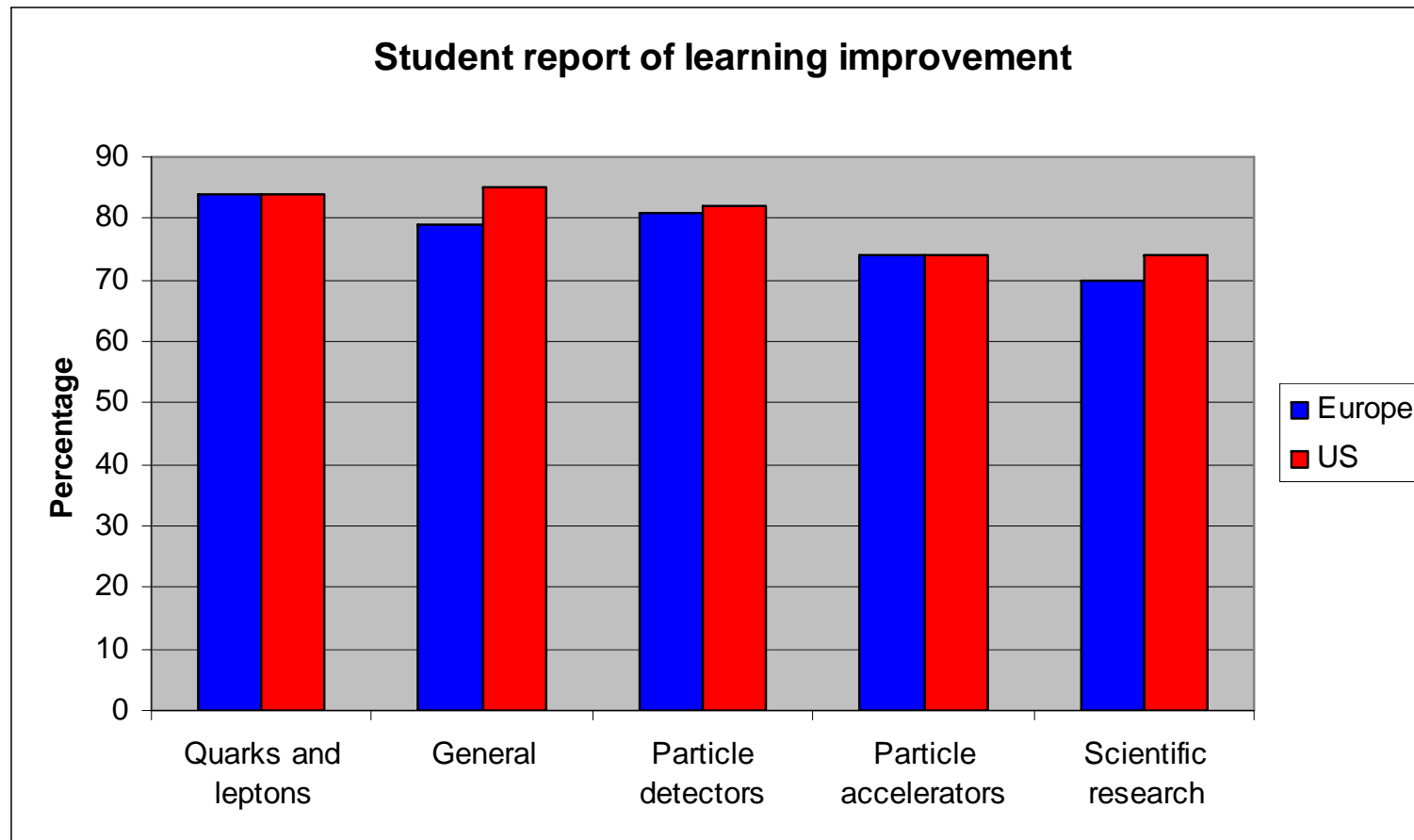


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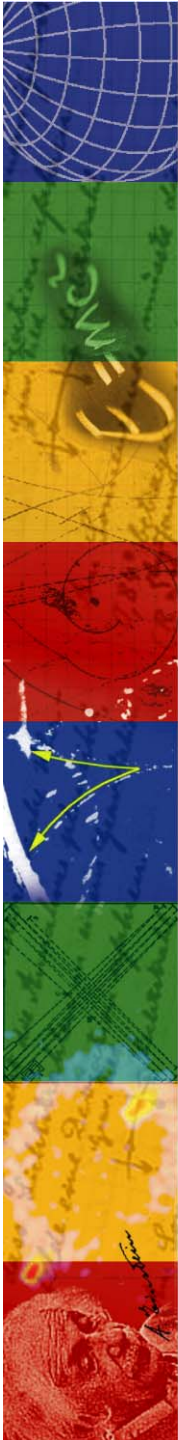


Evaluation Results – Survey 2007 survey in Europe, 2008 in US



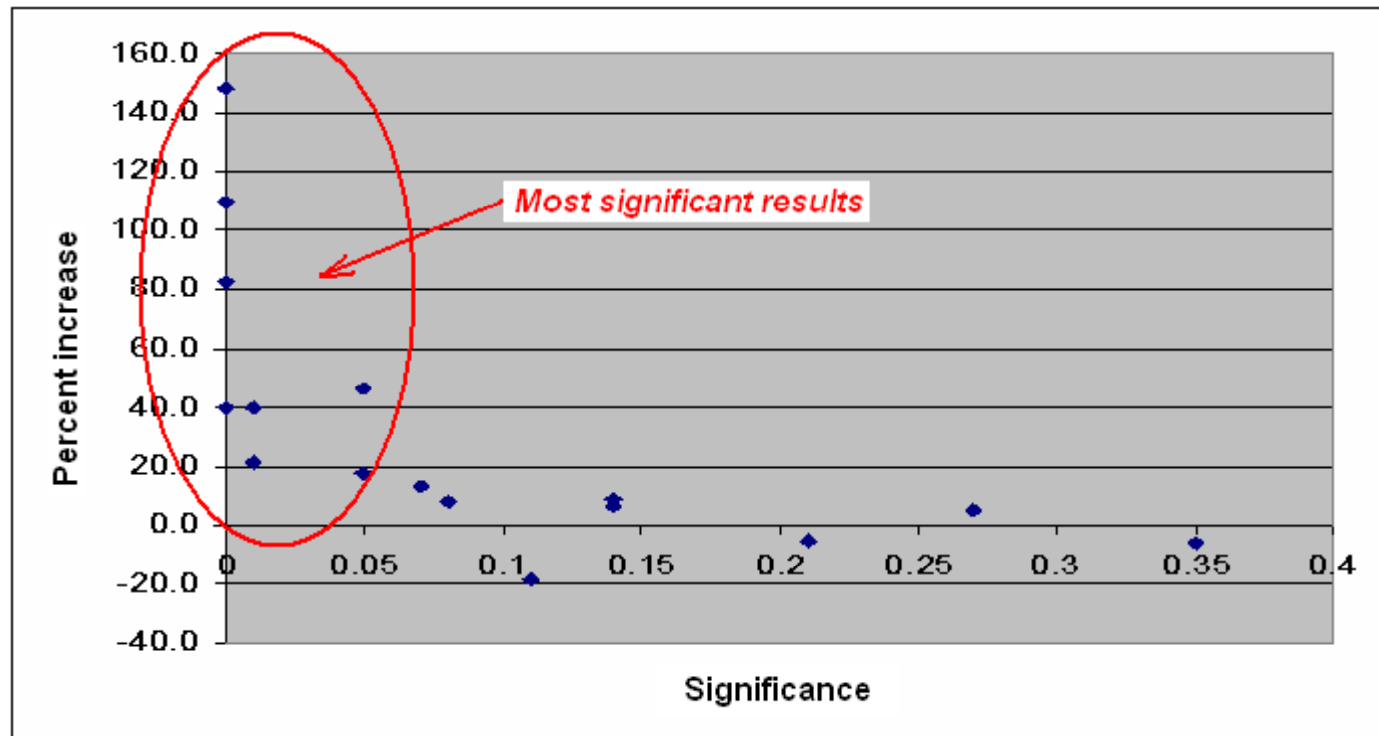
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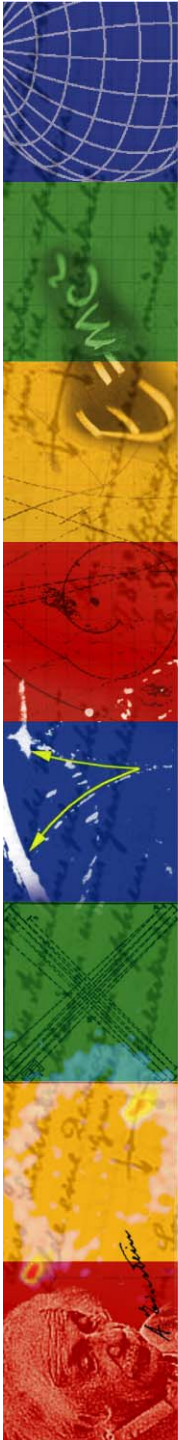
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Pre- and post test

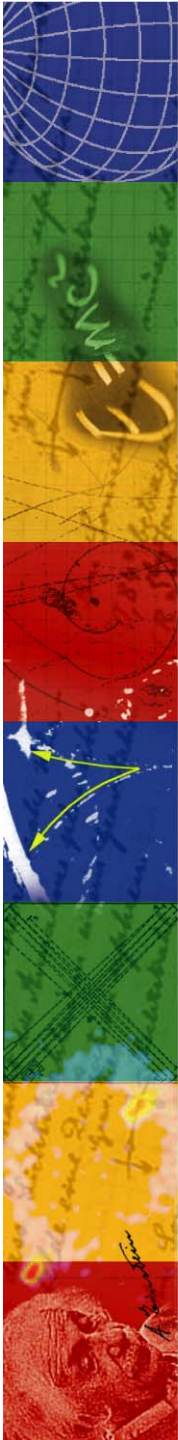
- Greater significance closer to zero
- Most significant results show learning of objectives





Most significant results

Item	Mean Pre	Mean Post	Significance
1. $E_{\text{cms}} = 91 \text{ GeV}$; $E_{\text{measured}} = 18.2 \text{ GeV}$.	0.66	0.8	0.01
2. Muon tracks back-to-back	0.61	0.85	0
5. Identify decay products of a Z boson from event display	0.31	0.77	0
6. Where is a neutron detected?	0.28	0.51	0
7. Where is a neutrino detected?	0.3	0.63	0
8. Quarks interact mostly through the exchange of...?	0.4	0.56	0.01
10. Generation I quarks	0.43	0.6	0



Conditions and conclusions

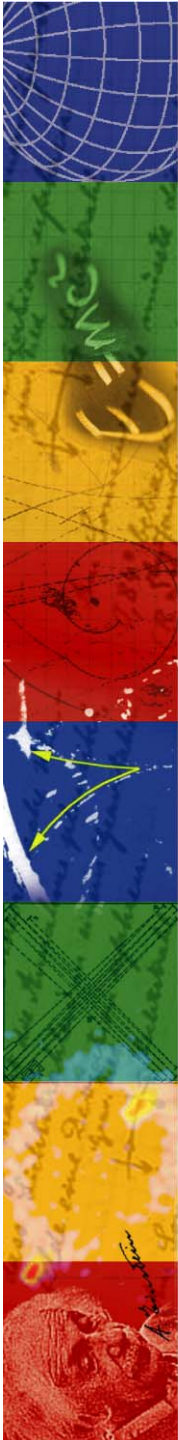


- Evaluator Jean Young
- 12 Institutes: 10 provided pre- and post-tests, 6 provided questionnaires
- Questions of poor significance will be changed or eliminated in 2009
- Students learn particle physics from the Masterclass
- Results can translate across borders and an ocean

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Developments and plans

- Hope to expand number of Institutes
- More complete evaluation
- “US Model” → 5 hrs prep
- Review videoconference model → objective based
- Deeper collaboration with Europe
- Use both LEP/DELPHI and an RAL test Masterclass
- Possible “one-off” Masterclasses



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