THE QUALITY OF DESIGN WITHIN THE BUILT ENVIRONMENT

ICE/IStructE/ACED Annual Conference
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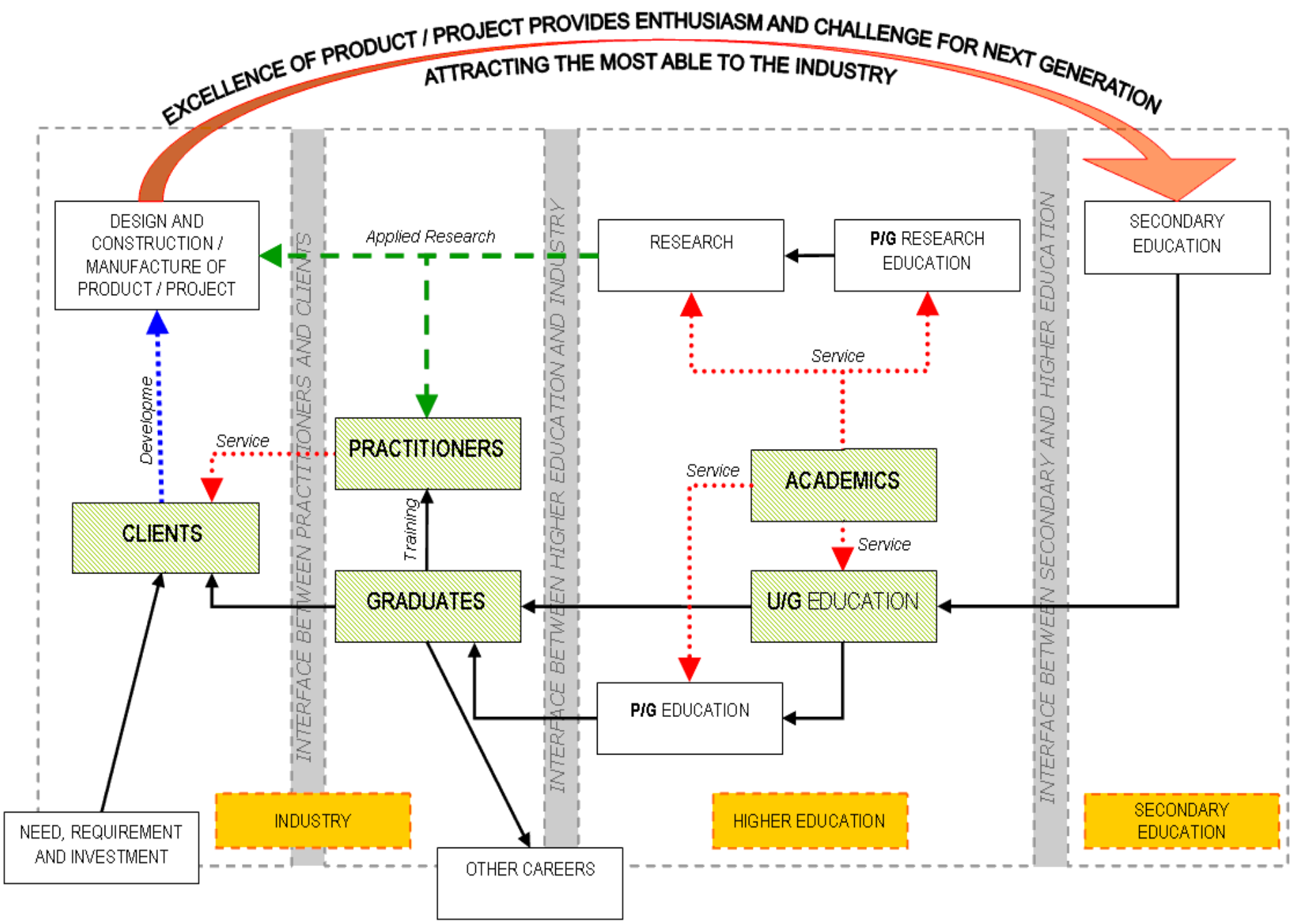

EXCELLENCE OF PRODUCT / PROJECT PROVIDES ENTHUSIASM AND CHALLENGE FOR NEXT GENERATION
ATTRACTING THE MOST ABLE TO THE INDUSTRY
DESIGN AND CONSTRUCTION / MANUFACTURE OF PRODUCT / PROJECT
Applied Research
RESEARCH
P/G RESEARCH EDUCATION
SECONDARY EDUCATION
Service
Developme
Service
PRACTITIONERS
Service
ACADEMICS
CLIENTS
Training
Service
GRADUATES
U/G EDUCATION
P/G EDUCATION
INTERFACE BETWEEN PRACTITIONERS AND CLIENTS
INTERFACE BETWEEN HIGHER EDUCATION AND INDUSTRY
INTERFACE BETWEEN SECONDARY AND HIGHER EDUCATION
NEED, REQUIREMENT AND INVESTMENT
INDUSTRY
OTHER CAREERS
HIGHER EDUCATION
SECONDARY EDUCATION

Questionnaires

Target stakeholders:

- Practitioners
- Graduates
- Students
- Academics
- Clients.

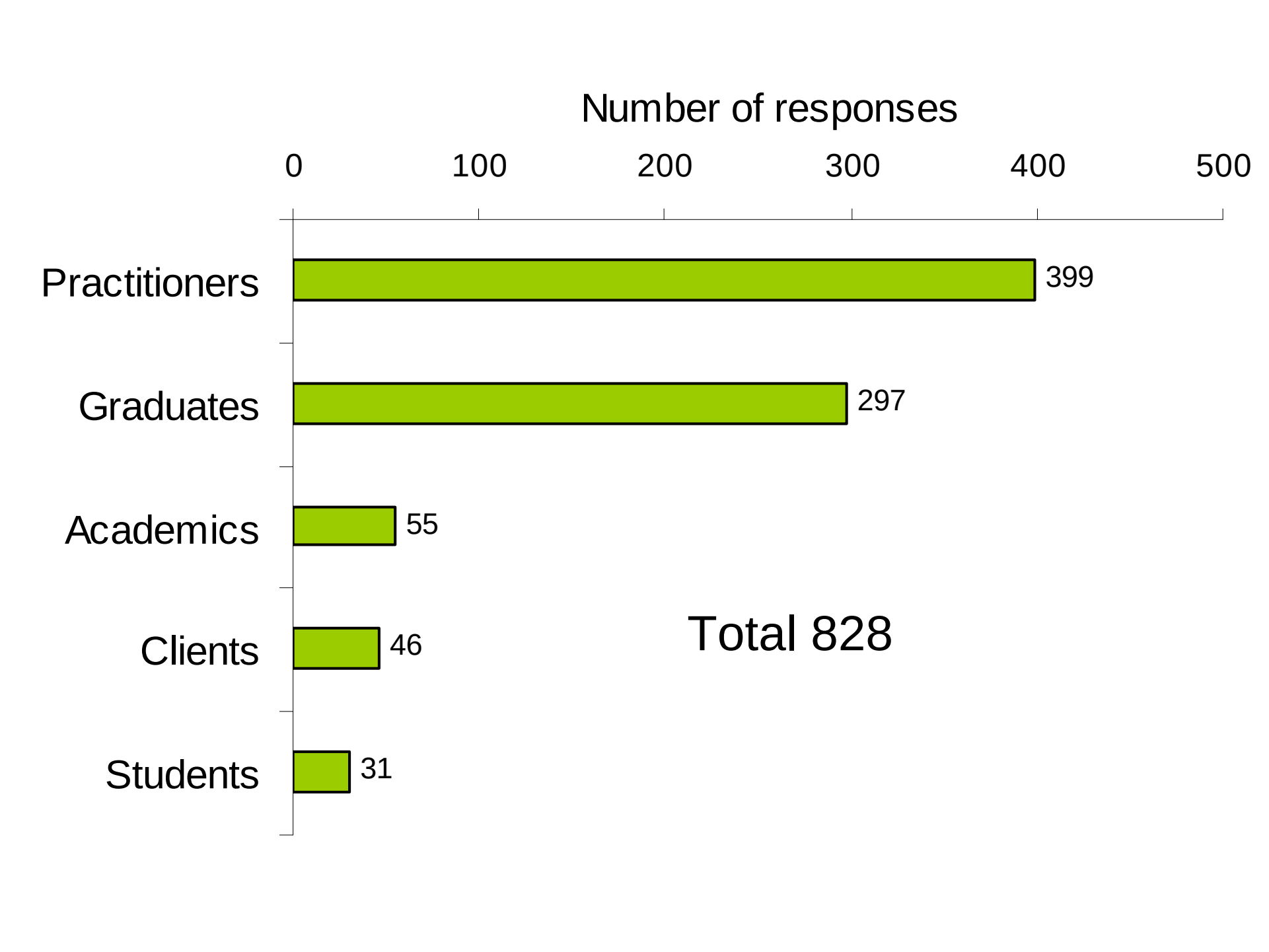
828 responses

(Some very detailed)

Aims of the questionnaires

To assess:

- The adequacy of undergraduate education programmes.
- The quality of graduates
- Good design practice.
- Level of design skills.
- Requirements for continuing professional development.
- The typical design process adopted.


Number of responses
0
100
200
300
400
500
Practitioners
399
Graduates
297
Academics
55
Clients
46
Students
31
Total 828

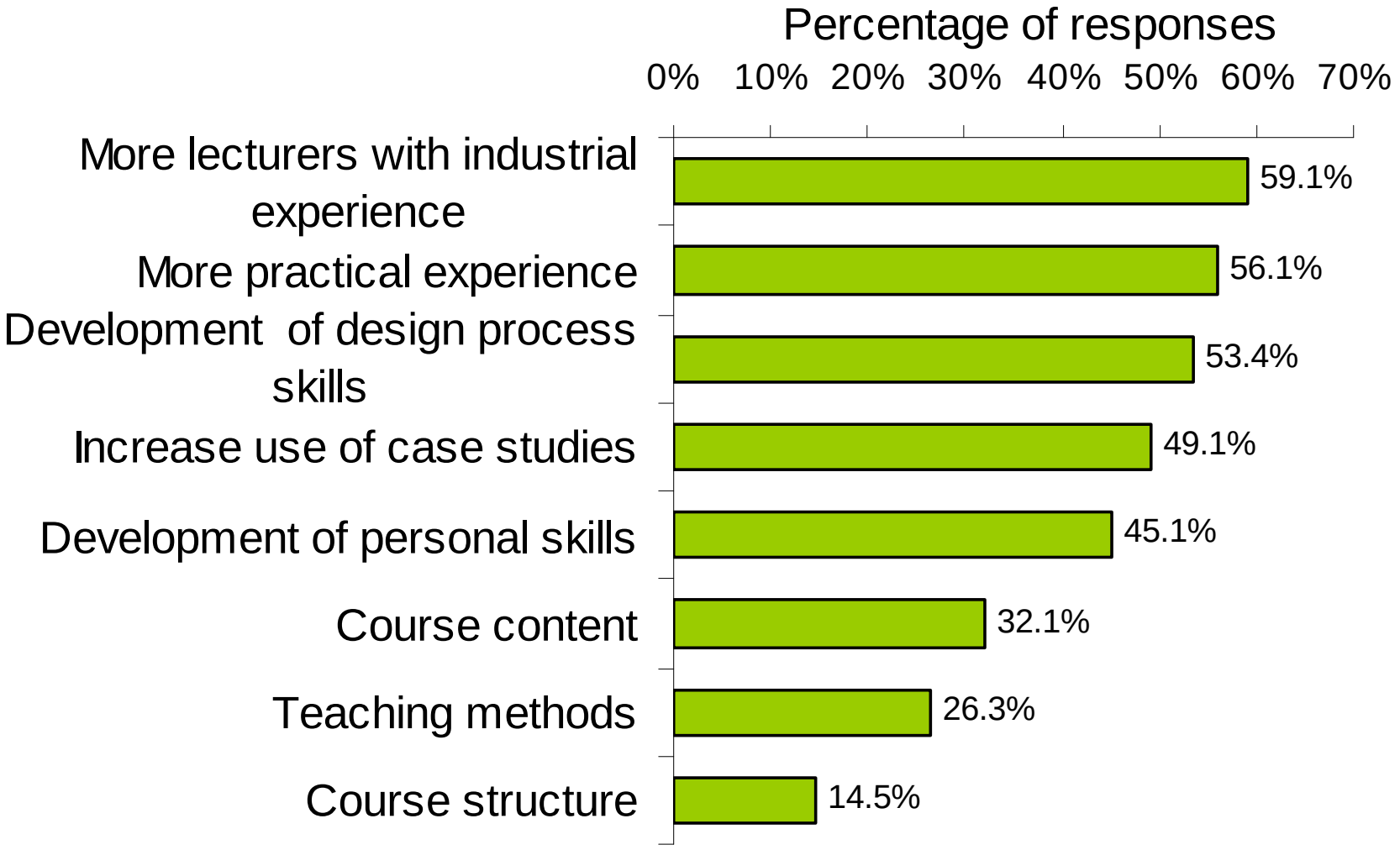
The breakdown of disciplines for both practitioners and graduates

Discipline	Practitioners	Graduates
Consultants	67%	72%
Contractors	13%	19%
Others	20%	8%

Majority of responses were civil and structural engineers

Practitioners response to undergraduate education:

Only 1.5% of the respondents stated that their education was adequate and they would <u>not</u> change it.



Practitioners response to undergraduate education:

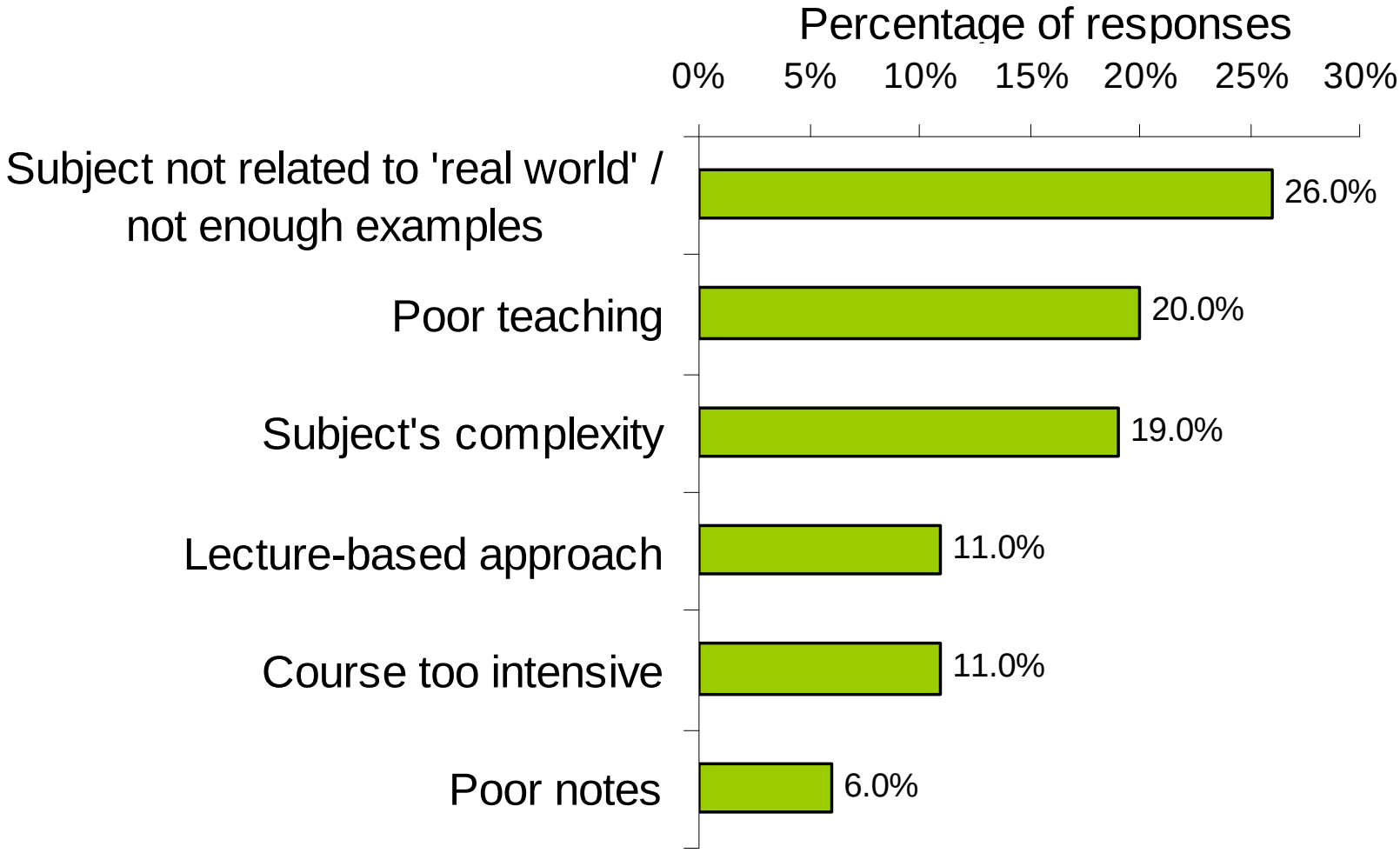
Asked how they would change it – written response

The main thrust – relate course to the '***real world***'

- Lecturers with practical experience
- Strengthen links between academia and industry
- More problem solving/team-based projects
- Increasing the emphasis on commercial/management/communication skills.
- Improving competency of lecturers (adequate training and teaching qualifications)

Graduates: - written responses

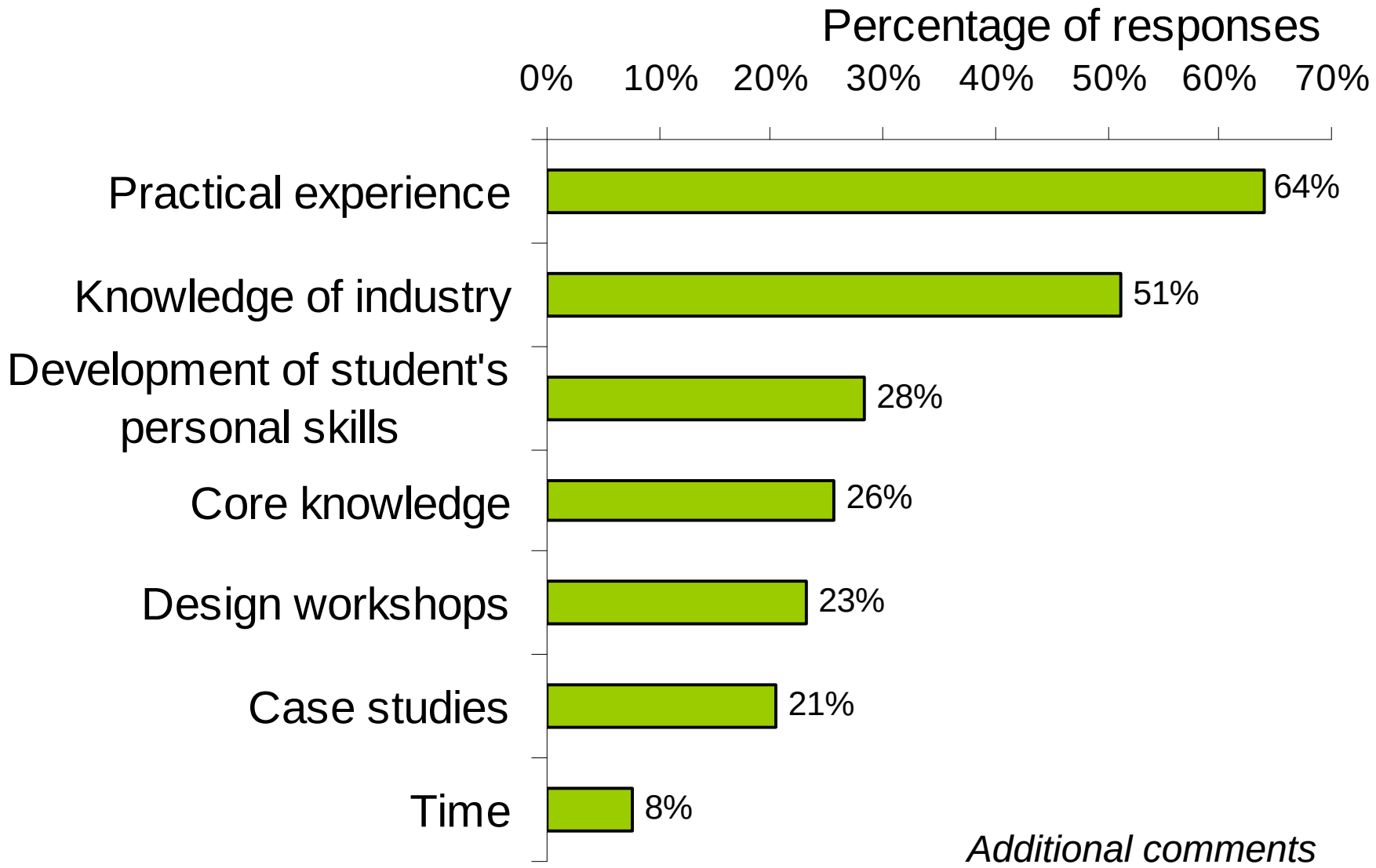
- difficulties with subjects during their university studies mainly due to due to the fact that the subject was not related to the '*real world*' and '*poor teaching*'



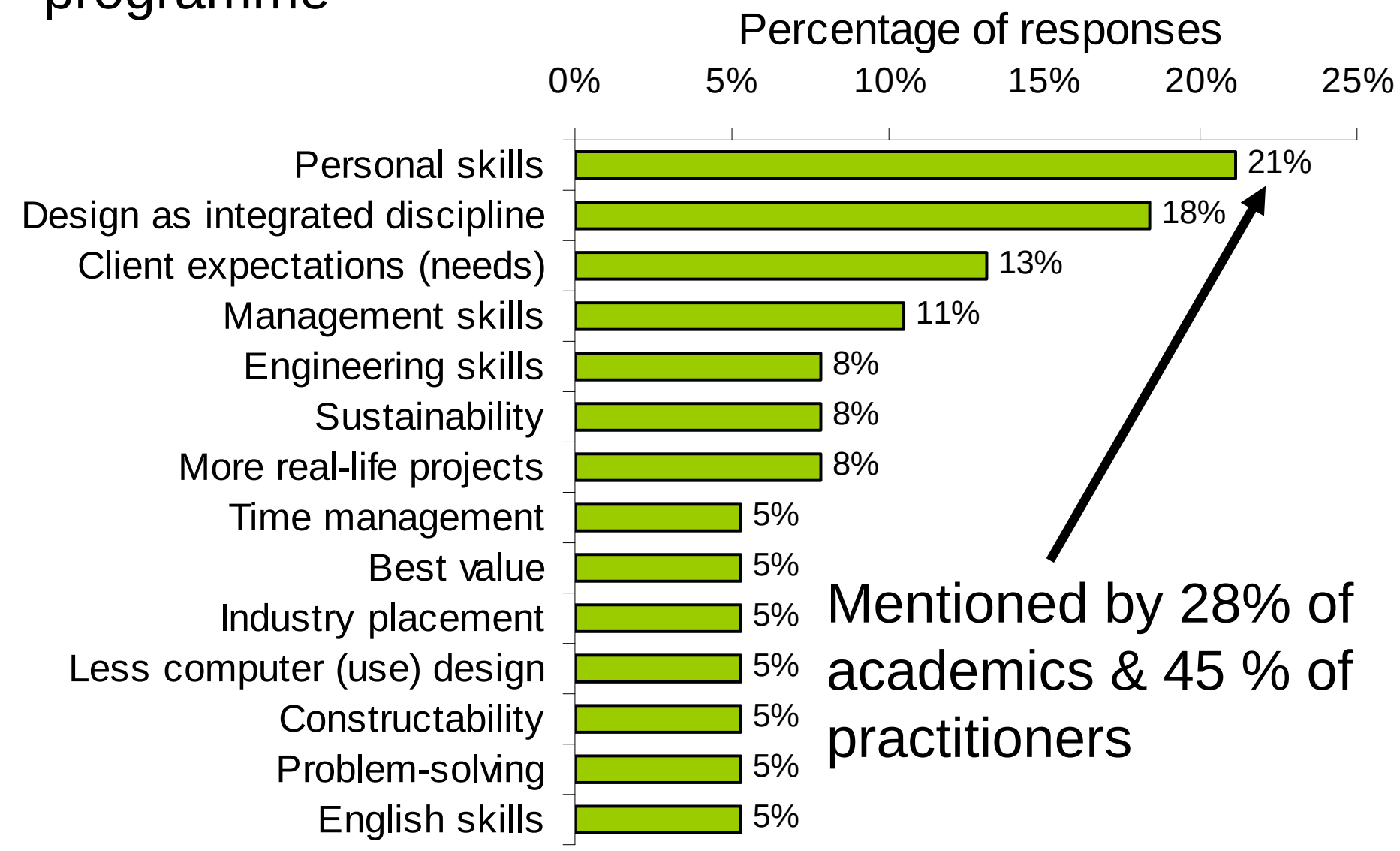
Relating course to the real world, more lecturers with practical experience and poor teaching has been an on-going problem and is not just a recent problem.

Based on answers from graduates and practitioners (most graduates are 21-25, most practitioners 46-60)

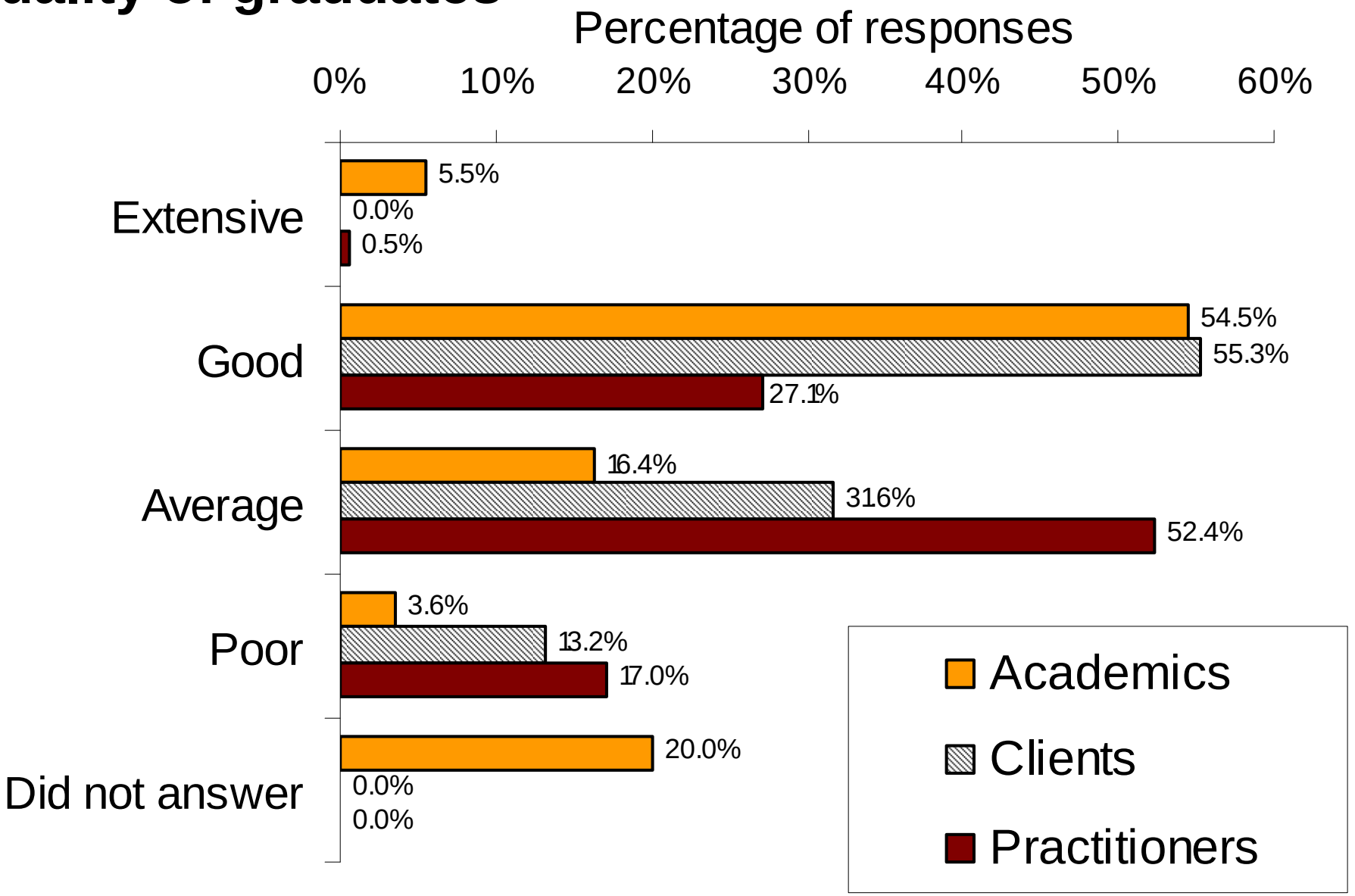
71% of academics felt that there were gaps/weaknesses in the programmes



Clients : what changes they would make to the programme



Quality of graduates



by practitioners, clients and academics

Comparison of graduates' strongest abilities

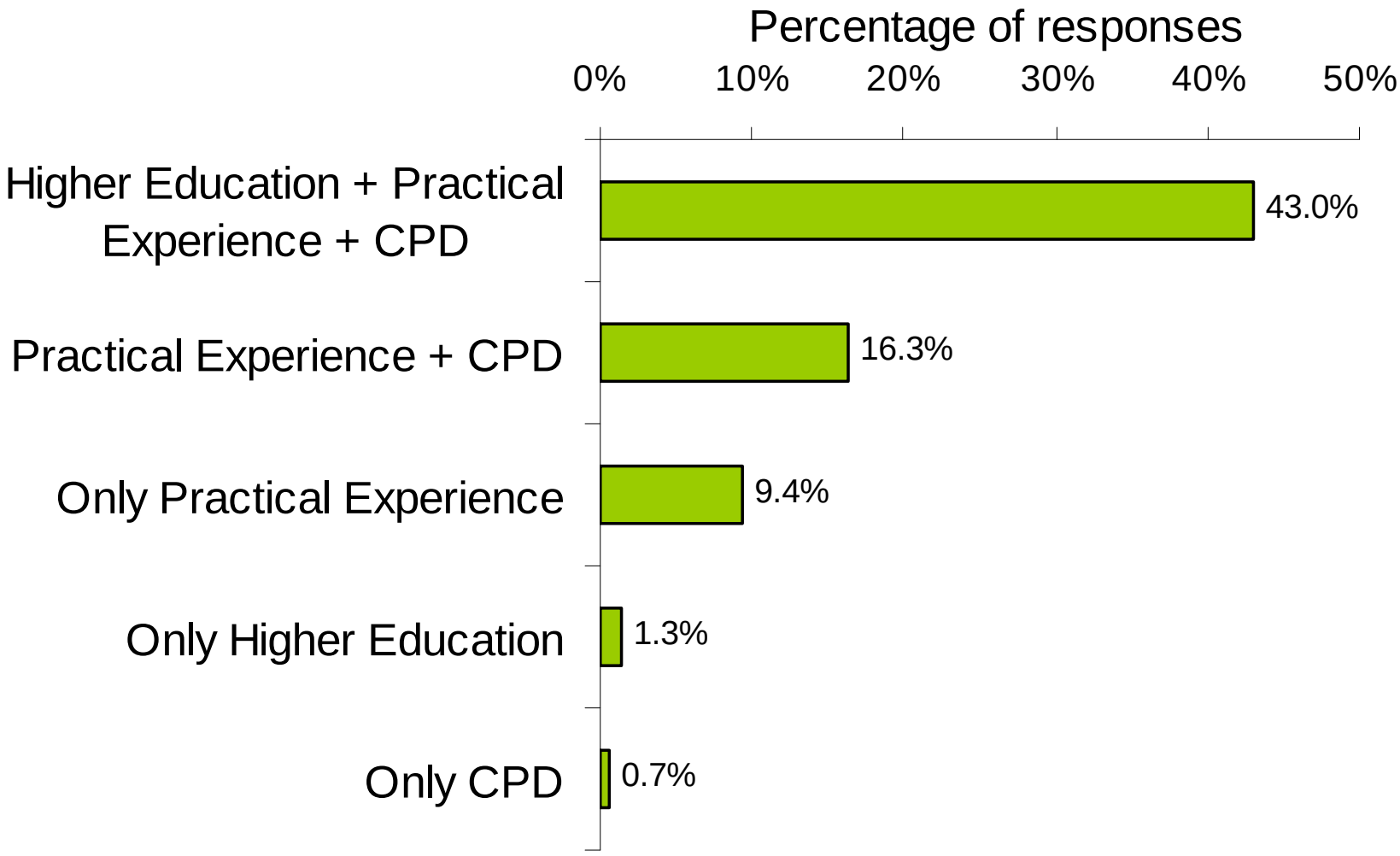
Practitioners	Clients	Graduates
Open minded	Calculations	Team-working
Calculations	Open minded	Problem-solving
Self confidence	Self confidence	Communication
Team-worker	Team-worker	Open minded

Comparison of graduates' weakest abilities

Practitioners	Clients	Graduates
Design skills	Design skills	Innovative
Communication	Communication	Self confidence
Problem solving	Job confidence	Job confidence
Innovative	Innovative	Design skills

Adequate Training

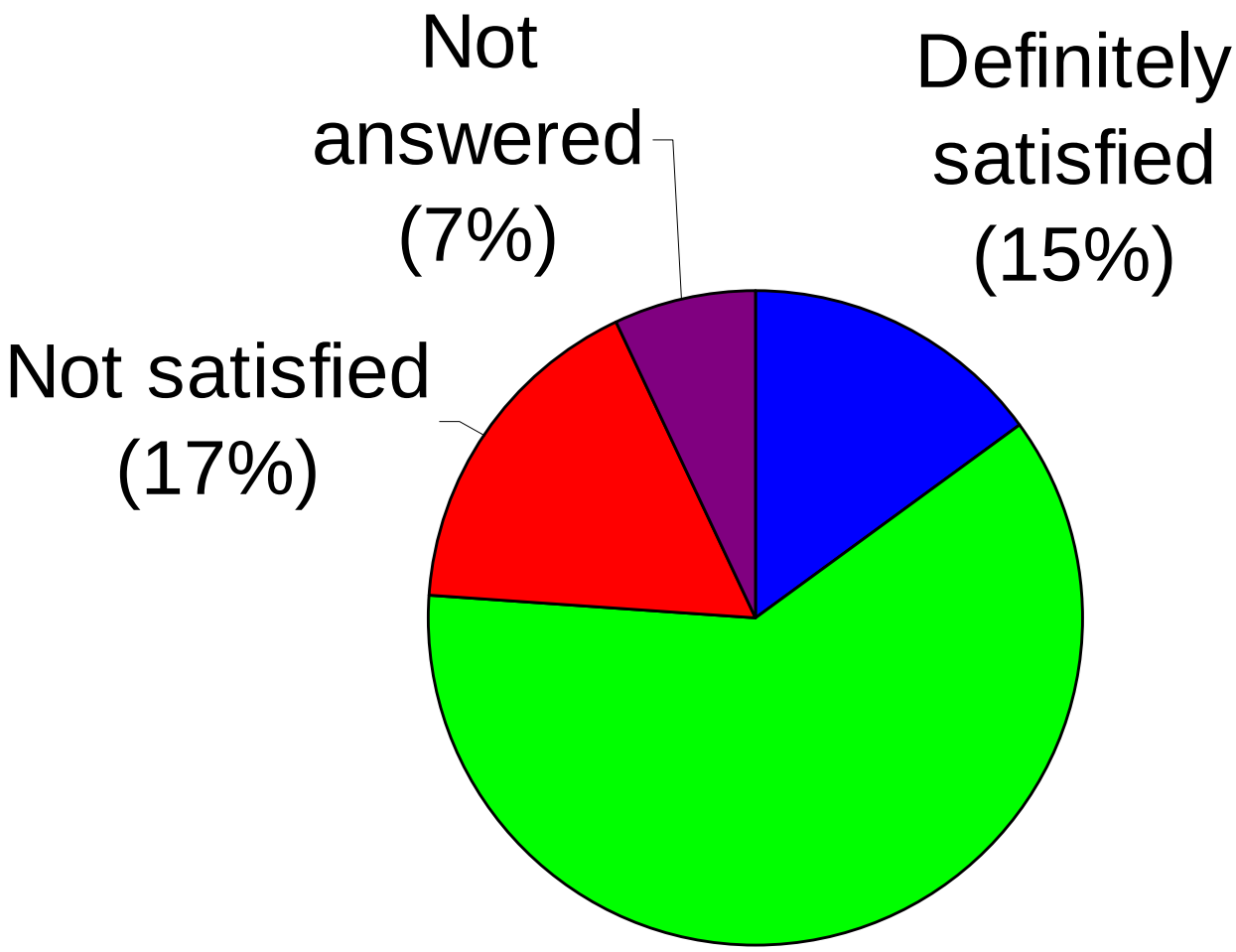
77% of the practitioners said they had received adequate design training



CPD workshops required by Practitioners, Graduates and Clients

1) Working in distributed teams
2) Design for minimizing energy use
3) Design for sustainability
4) Design for Health and Safety
5) Risk Assessment Methods (Business – Project Strategy)
6) Design for Best Value
7) Promoting creativity and innovation
8) Working in multidisciplinary design teams
9) Increase use of ICT for management
10) Risk assessment methods (Design)
11) Managing the design process
12) Communication
13) Review and evaluation process
14) Presentation skills
15) Future maintenance and durability requirements

Defining Good Practice



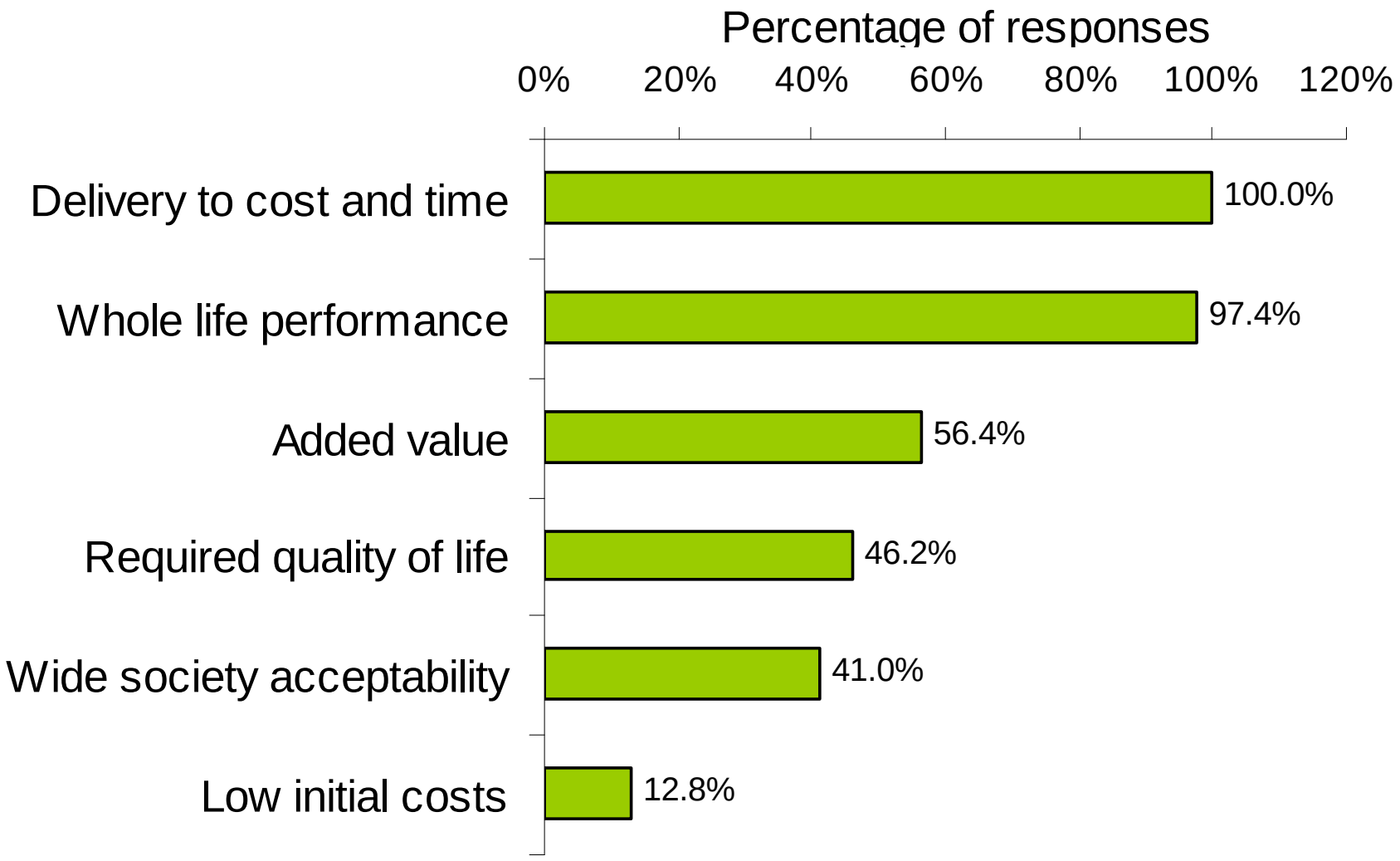
Clients asked to rate the service they receive.

Defining Good Practice

Clients

50% of clients were **not** satisfied with methods of measuring the performance of completed projects

Clients' defined current best practice in design as:



Design Development process

Presented the four-stage design development process based on the template from the Royal Academy of Engineering and RIBA Plan of Work

1. Interpret (clarification of task)
2. Conceive (conceptual design)
3. Transform (embodiment design)
4. Converge (detail design)

Practitioners:

- In general follow the four-stage design process
- The stages may be referred to by different names
- Stages often overlap and merge (particularly stages 2 and 3)
- Stages can vary from project to project
- In many cases a detailed investigation of alternative designs does not take place (time and cost constraints):
  - Procurement methods and reliance on similar, previous projects
  - Designers move directly from stage 1 straight to stage 4
  - Designers rely on experience and ‘gut’ feel.

Clients

Most Clients were aware of the design process

Level of detail (& extent of work) of each stage was less than that highlighted by the practitioners

Some clients felt that they do not need to know the details of the design process.

54% of clients said that they have never been surprised by design team presenting non-standard solutions

Academics:

- 66% of academics encourage their students to follow the 4 stage design process
- 6% use different terminology
- 20% did not respond
- 15% did not encourage students, for the following reasons;

  ‘*The design process is not recognised by the department’*

  ‘*Students should discover their own process’*

  ‘*In early years students do not need this structure*’.

Summary:

Room for improvement in current design services and education base.

Need for improvement between the interfaces

Positive ! – in terms of education

Strongest capabilities of graduates are:

Calculations (detail design)

Being open-minded

Can contribute to detail design but lack appreciation of the holistic design process

Can be addressed

Concerns:

Education programmes are not linked to the real world with a lack of lecturers with practical experience and training

Ongoing problem

Suggestions: University/Industry links

RAEng Visiting Professor Scheme

Use of External lecturers

Industrial advisory board

In-house consultancies

Industrial specified UG projects

Industrial case studies

RAEng industrial secondment schemes

Applied Research / Consultancy

Wealth of expertise/facilities within universities not utilised by Industry

Needs to be costed properly

FEC – minimum

Be commercial !

Institutions need to do more.

Work on improving the links between Industry and Universities.

Need to educate Clients (Increase fees)

Need to address the dissatisfaction of Clients

Benefits in defining terminology of the design process in relation to the BE

This Project ?

Improvement of the design spine through the course.

Development of CPD/UG workshops based on needs of industry

Network ?

Funding secured from CITB to develop CPD/UG workshops

1) Working in distributed teams
2) Design for minimizing energy use
3) Design for sustainability
4) Design for Health and Safety
5) Risk Assessment Methods
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Designing for Sustainability

Facilitator Notes

Working in Distributed Teams

Facilitator Notes

Thank You