What makes students more employable?

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Quality Assurance Agency (Scotland)
Enhancement theme - Employability
What is Employability

“A set of achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen careers”.

or

How to help students get a good job
Major Themes

Subject specific Expertise

Project work

Transferrable skills

Work Placement

Personal development Planning

Student Enterprise

Embedded within the curriculum
Project work
Project work

A significant piece of original research leading to a thesis

- Independent thought
- Deductive reasoning
- Literature abstracting
- Research planning
- Research skills and instrumentation
- Communication (Colloquium, poster, writing)
- Publications or patents
Transferable skills Embedded in the Curriculum

Posters
Oral presentations
Essays
Chemical Newspaper
Miniproject

All involve Teamwork
Continuous motion of interference patterns using the angular Doppler effect

Introduction

Interference patterns are used in optical tweezers to enhance trapping and manipulation of microscopic objects.

Creating motion in an interference pattern requires a frequency difference of a few Hertz between the co-propagating beams. We create this very small frequency difference in the optical domain using the angular Doppler effect (also known as the rotation frequency shift).

This frequency shift is 14 orders of magnitude smaller than the laser oscillating frequency.

Optical Tweezers

Optical tweezers manipulate the gradient of light; at and just below the threshold, microscopic objects are observed. An essential feature of the angular momentum method is that particles are driven into the region of high intensity.

Particle manipulation

The angular Doppler effect

Angular momentum is conserved in the motion of the optical tweezers; this feature allows for the generation of rotation without a translation.

Experimental Set-up

A simple scheme consists of producing a laser beam and then using a prism to rotate it. The optical tweezers is rotated with a frequency that is precisely controlled and can be used to manipulate the motion of microscopic objects in optical tweezers.

Future Applications

To create interference patterns, a TEM00 mode laser beam of 532 nm wavelength is used. The laser beam is arranged at a particular frequency to achieve the desired interference effect.

The beam is split into two paths, one for the optical tweezers and one for the rotation. The rotation beam is then used to generate the interference pattern, allowing for the manipulation of microscopic objects.
Miniproject

- Not research
- Students (team of 5 or 6) given a project
- Research Literature
- Allocate tasks
- Design experiments
- Do Risk Assessments
- Conduct experiments
- Write Individual and group reports
- Give a joint presentation
- Peer assess one another
Oral Presentations
Chemical Newspapers

Put together by a team of 5-6 students
Work Placement

Period spent working outside the University
Usually in a company or Research Institute

Huge change in maturity after Placement

- Company focussed research
- Patents
- Increased profits or decreased costs
- Team work
- Reports Oral and Written
- Often students receive job offers
- Paid as an employee

Integrated into programme
8 months – 1 year

Vacation job
1-3 months
Undergraduate Skills Record
Royal Society of Chemistry
Why do Personal development Planning

If I ask a student at interview –
“Did you do any group work during your undergraduate degree?”
and they think for a while before saying
“I seem to remember putting a poster together with some other students in Second year”
I am not impressed.
If they can reply immediately with details of various activities, they are much more likely to get the job

Recruitment Officer, Quintiles, Edinburgh
Nine Key Skills

- Planning and Organisation
- Study Skills
- Handling Information
- Communication Skills
- Teamwork
- Scientific / Practical Skills
- Improving Learning and Performance
- Information/Communication Technology
- Problem Solving
Showing PDP is worthwhile

• Personal Development planning is for the benefit of the students

• They need to see it as worthwhile

• Senior students acting as mentors help because they can give practical examples of where it was important (Industrial Placement or job interviews)

• A staff member committed to the scheme makes the scheme work.
Undergraduate skills record

• Student centred
• Regularly updated
• Read over before interviews etc.
• Covers academic and non-academic activities
• Paper, on-line and downloadable formats available
Student Enterprise

Business Plan competition

• Work in groups to create a business plan
  – Idea
  – Market research
  – Costing
  – Timescale

• Substantial prizes

• Legal assistance in setting up a spin-out company
How you can help

• Raise awareness of employability issues within your department
• Think how you can include transferable skills within the modules you teach
• How can external placements be introduced into your department?
• Help and encourage students with personal development planning
• Encourage students to become involved in Student Enterprise

Teach your own subject brilliantly