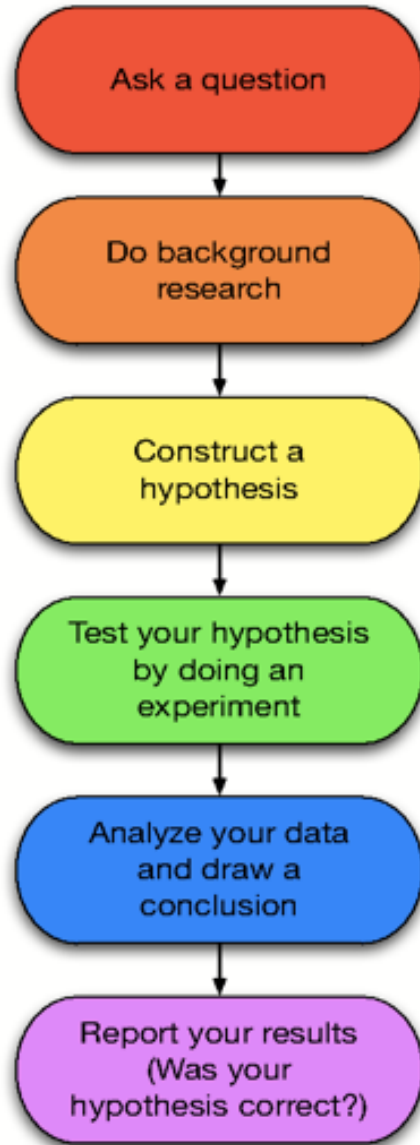


U Assessing the stages of scientific inquiry: An assessor's toolkit B

Dr Victoria Burns

The Scientific Method



Common assessments

- Essays
- Multiple choice and short answer tests
- Standard laboratory practicals
- Dissertation projects

Designing innovative assessments to encourage positive student learning behaviours



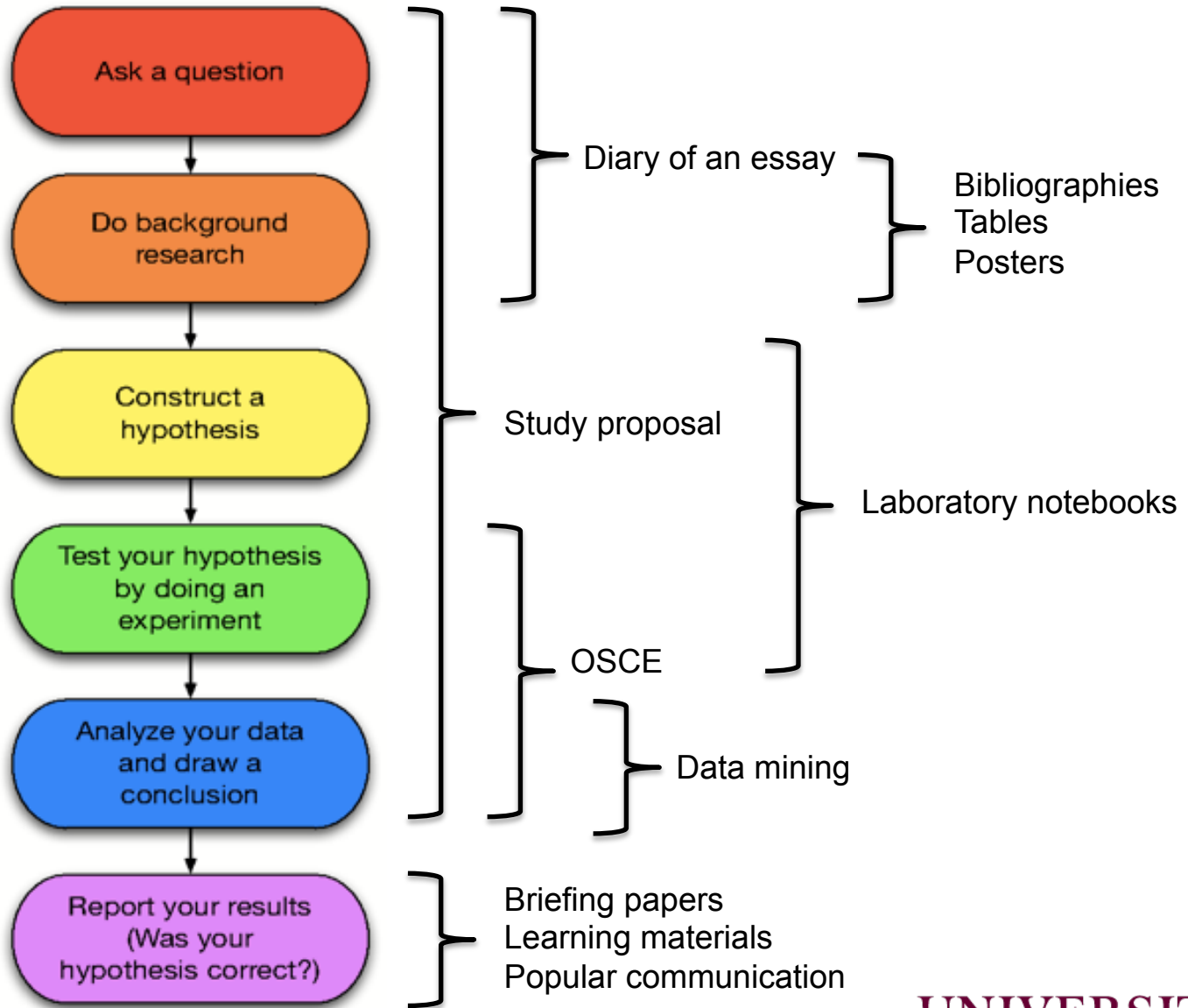
Purpose of assessment

- to measure achievement (*summative assessment*)
- to engender learning (*formative assessment*)
- to develop graduate attributes which enable students to put real-life skills to work in employment and life settings (*long-term learning*)
- *To encourage positive student learning behaviours*

Designing assignments

- What do we want them to be able to DO?
- Guide where students put their efforts
- Develop longer lasting learning skills
- Using your talents and interests as an individual

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Background and context



28,000 students from 150 countries
Over 2000 members of academic staff

Life and
Environmental
Sciences

Engineering
and Physical
Sciences

Arts and Law

Social
Sciences

Medical and
Dental
Sciences

School of Sport, Exercise and Rehabilitation Sciences

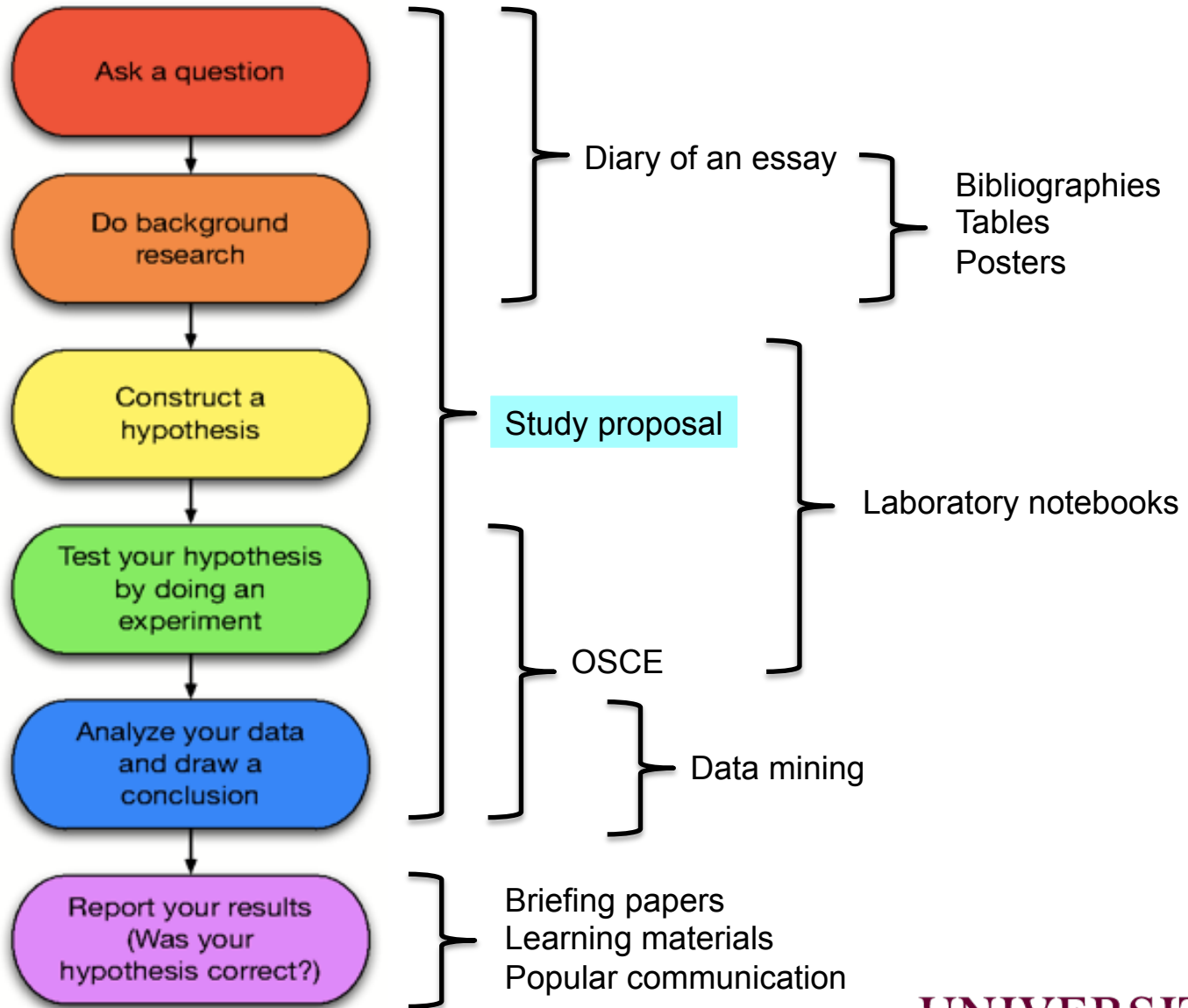
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About me



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Study proposals

- Asked to design a study in response to a choice of “grant calls”

“Practitioners at the Behavioural Intervention Centre are trained to run psychological or exercise interventions in a range of healthy and more vulnerable populations. They are keen to collaborate with a team of Behavioural Immunologists to explore whether a behavioural intervention could improve immunological health. However, to secure funding, they are relying on you to identify an appropriate population, to design the intervention that they would run for you, and to select the appropriate immunological outcomes.”

- Both as coursework and in an exam

Study proposals

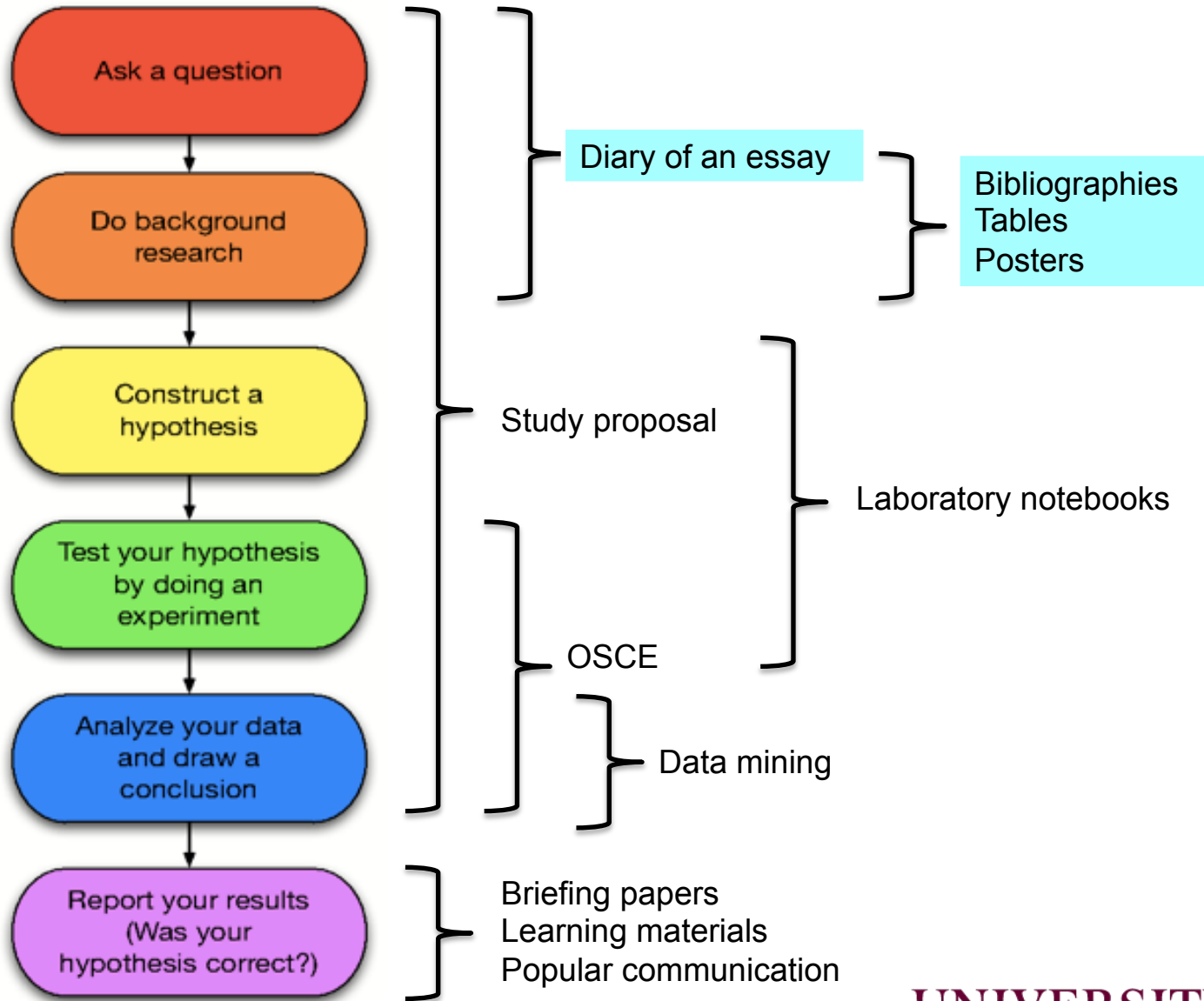
- Structure (5 pages inc references)
 - Background of the proposed study (30%)
 - Aims and designs of proposed study (35%)
 - Outline of hypothesised results (15%)
 - Outline of ethical issues (10%)
 - Description of statistical analyses (10%)

Benefits of this approach

- Selecting the topic changes how students read
- Designing the study changes how students think
- Inspiring interest and life long approaches



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Diary of an essay

- Set an essay AND a reflective diary
- Chronological account
 - How did they plan?
 - What search terms did they use?
 - What iterations did they go through?
- Marks for reflection, not for how “perfect” it is
- Encourages a metacognitive approach
- Peer assessment



Background reading

- Annotated bibliographies
 - Written or graphical

- Summary tables
 - Provide headings

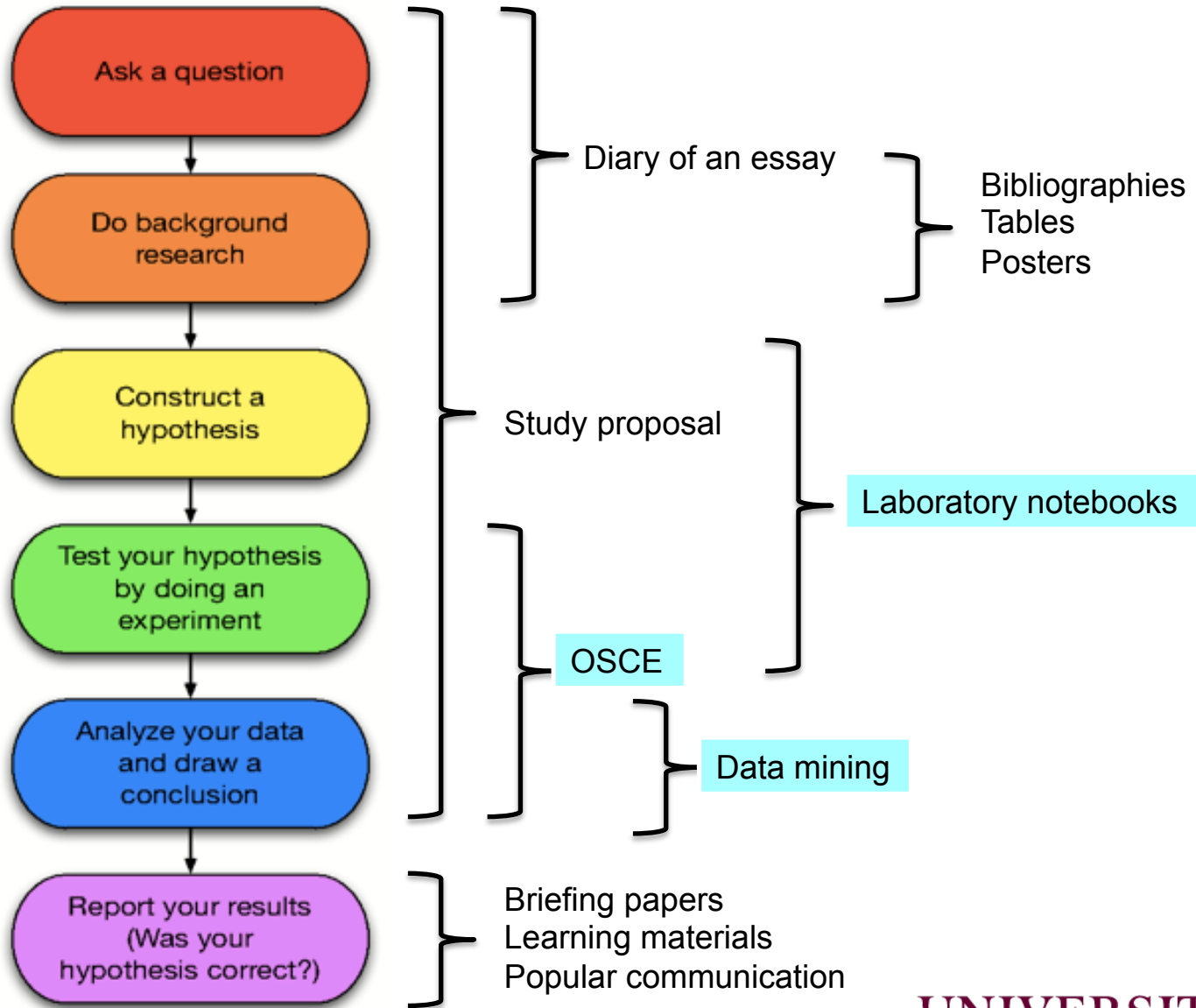
- Online bibliographies
 - ePortfolios using Google templates
(Sobko and colleagues at IHP)

Posters

- Summarise studies
- Pick out key information – could be highly structured
- Opportunity for peer learning and community development

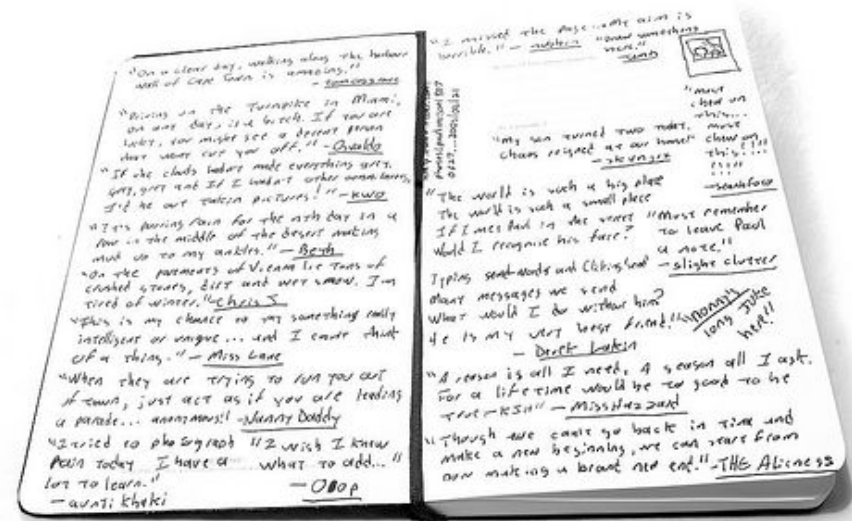


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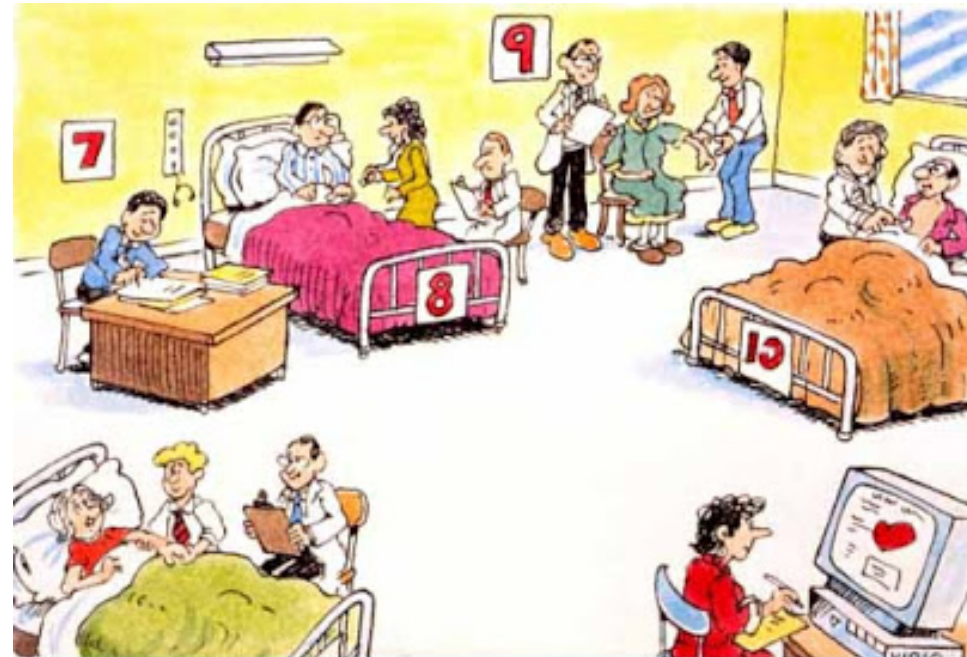
Lab notebooks

- ❑ Make laboratory experience similar to real laboratory work
- ❑ Develop skills in the laboratory
- ❑ Formative feedback
- ❑ Exhibitions



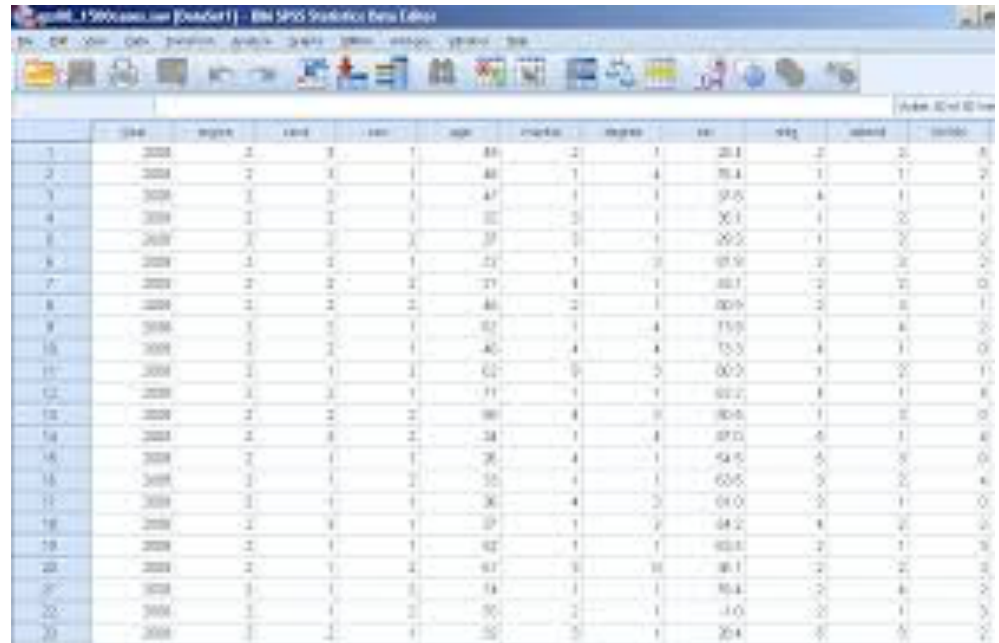
Objective Structured Clinical Examination (OSCE)

- Test technical skills
- Test safety awareness
- Test accuracy
- Mini vivas



Data mining

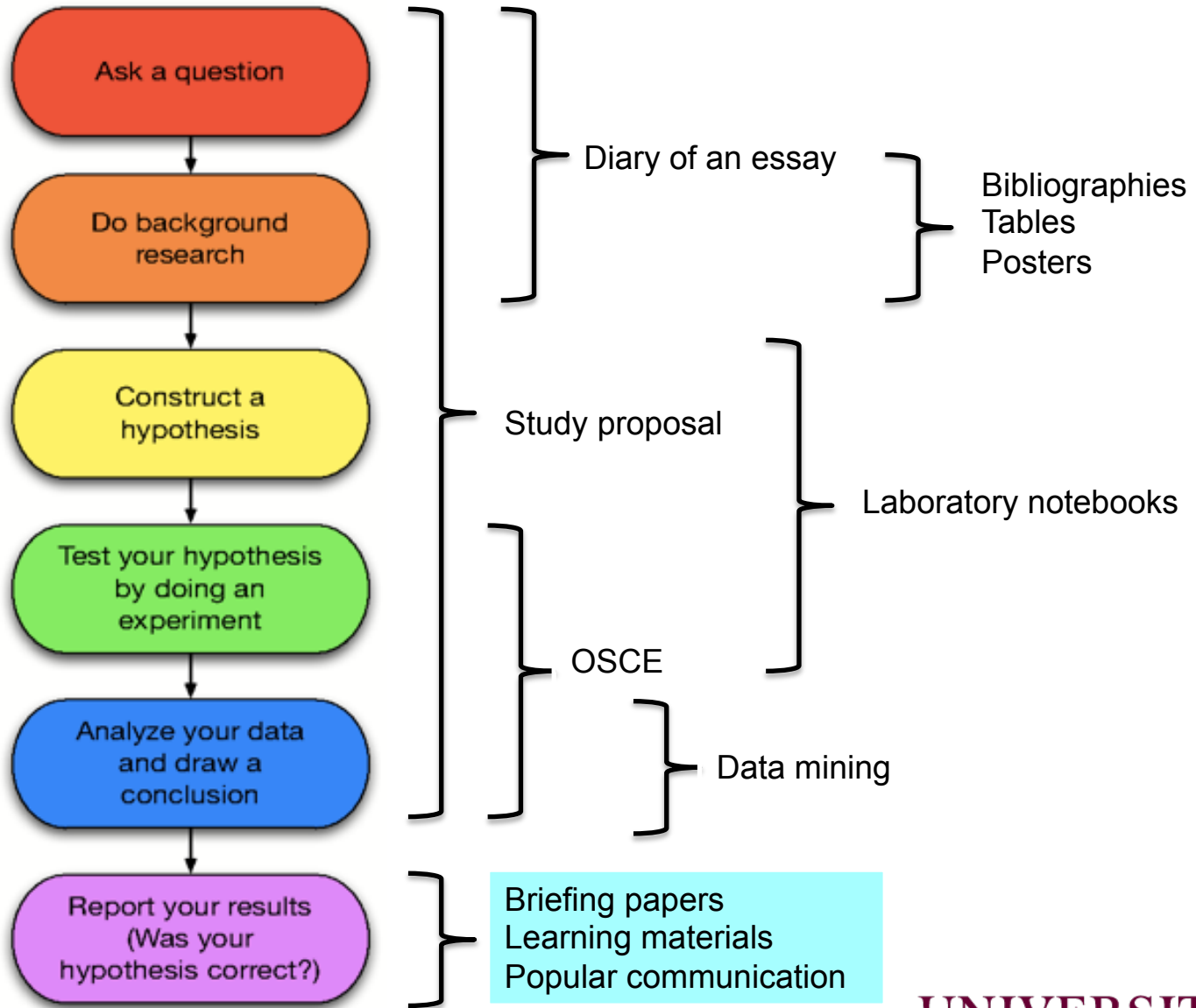
- Test statistical skills
- Test interpretation
- Test data presentation
- Hypothesis?



The image shows a screenshot of the SPSS Statistics software interface. The main window displays a data editor with a grid of data. The columns are labeled with variables: 'year', 'region', 'area', 'sex', 'age', 'marital', 'degree', 'sex', 'age', 'region', 'area', 'sex', 'age', 'region'. The rows represent individual data points, numbered 1 through 30. The data values are numerical, representing various attributes for each individual.

	year	region	area	sex	age	marital	degree	sex	age	region	area	sex	age	region
1	2008	2	3	1	88	2	1	1	20.1	2	2	2	2	8
2	2008	2	3	1	48	1	4	1	18.4	1	1	1	1	2
3	2008	3	3	1	47	1	1	1	19.5	4	1	1	1	1
4	2008	3	3	1	32	1	1	1	20.1	1	1	2	2	1
5	2008	3	3	1	37	1	1	1	19.2	1	1	2	2	2
6	2008	3	3	1	29	1	2	1	19.9	2	2	2	2	2
7	2008	2	2	2	39	4	1	1	18.7	2	2	2	2	0
8	2008	2	2	2	46	2	1	1	18.9	2	2	2	2	1
9	2008	3	3	1	32	1	4	1	19.8	1	4	4	4	2
10	2008	3	3	1	40	4	4	1	19.5	4	4	4	4	0
11	2008	3	3	1	32	2	5	1	19.2	1	2	2	2	1
12	2008	3	3	1	31	1	1	1	19.2	4	1	1	1	8
13	2008	2	2	2	36	4	2	1	18.6	1	2	2	2	0
14	2008	2	8	2	34	1	4	1	19.0	4	1	1	1	4
15	2008	2	1	1	36	4	1	1	19.5	5	5	5	5	0
16	2008	3	1	2	30	1	1	1	19.5	3	2	2	2	4
17	2008	3	1	1	36	4	2	1	19.0	2	1	1	1	0
18	2008	2	3	1	37	1	2	1	14.2	4	2	2	2	2
19	2008	2	1	1	42	1	1	1	18.8	2	1	1	1	3
20	2008	2	1	2	47	2	2	1	18.1	2	2	2	2	2
21	2008	3	1	1	34	1	1	1	18.4	2	4	4	4	2
22	2008	3	1	2	30	2	1	1	19.0	2	1	1	1	3
23	2008	3	2	1	32	2	1	1	18.4	5	5	5	5	2

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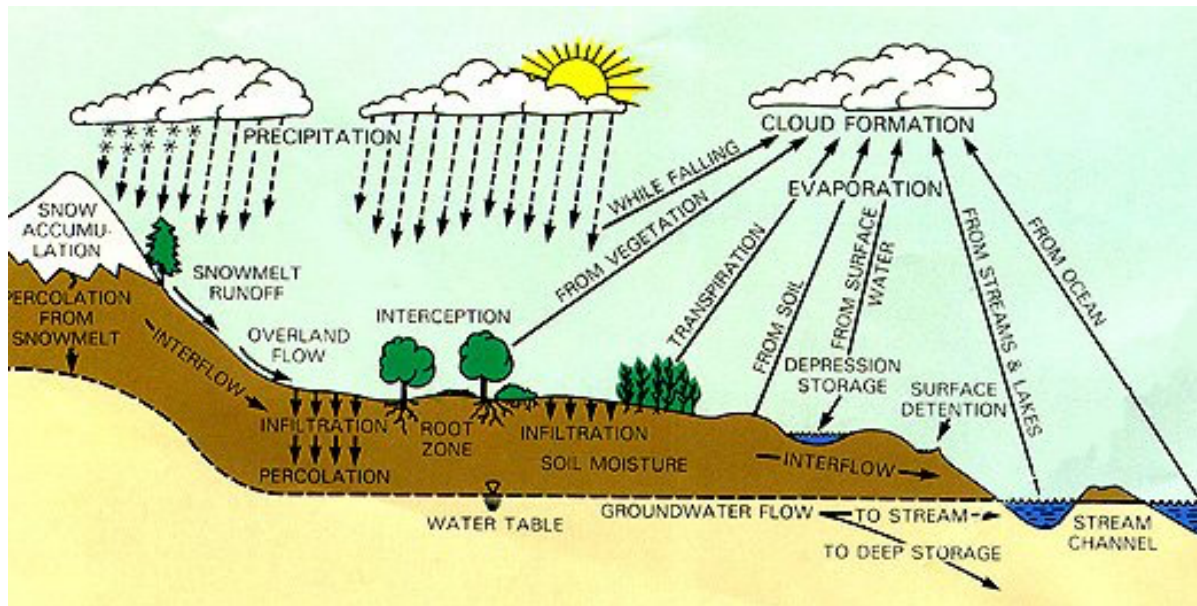
Briefing papers

- ❑ Written by experts for ministers or executives
- ❑ Summarise relevant background, highlight issues of concern, discuss possible next actions
- ❑ Advocate or balanced approach?
- ❑ Could be tied to experiential learning

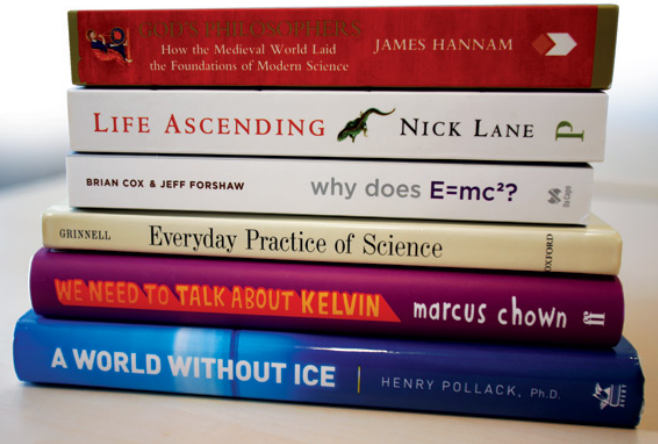


Creating learning materials

- Playing to strengths
- Clarifying understanding at different levels
- Creates community of practice



Science communication



If You Smoke, Quit.
The National Heart, Lung, and Blood Institute has some inspiring news about quitting smoking and improving your heart health. They maintain, "Cigarette smoking greatly increases the risk of heart attack and stroke, as well as lung cancer and other serious diseases. There is simply no safe way to smoke. But the rewards of quitting are enormous. Just 1 year after you stop smoking, your heart disease risk will drop by more than half."



Talk with your doctor about what lifestyle changes are right for you.

Make sure to get a **checkup** at least once every five years.

See a dietitian for more food and nutrition guidance – visit eatright.org to find a good match for you.

Reduce Your Risk of Diabetes

Did you know that diabetes is a major risk factor for heart disease? In fact, there is even a condition called **diabetic heart disease**, which develops in people with diabetes.

According to the National Heart, Lung, and Blood Institute, "People who have type 2 diabetes have the same risk of heart attack and dying from heart disease as people who already have had heart attacks."

Having diabetes raises your overall risk of developing heart trouble, and it also makes it more likely that you will develop that trouble earlier and/or in a more severe form than other people, who don't have diabetes, would.

Lowering your weight to normal and being physically active, along with a healthy diet, will help you reduce the risk for diabetes.





© Heart and Blood Research Institute, Inc. www.heartandblood.com

My background

The Telegraph

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Could the brain of a monkey help to improve an athlete's performance?

By **Vikki Burns**

12:01AM GMT 29 Nov 2005

 [Comment](#)

Monkeys and neuroscientists are not the usual training aids for an athlete. Researchers at the University of Birmingham, however, believe that neurons first discovered in the brains of monkeys could help us understand why mental imagery is beneficial for athletes.



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Popular science communication

□ Task

- Select a relevant interesting robust study published this year and produce a popular science article or video presenting its findings for a general audience

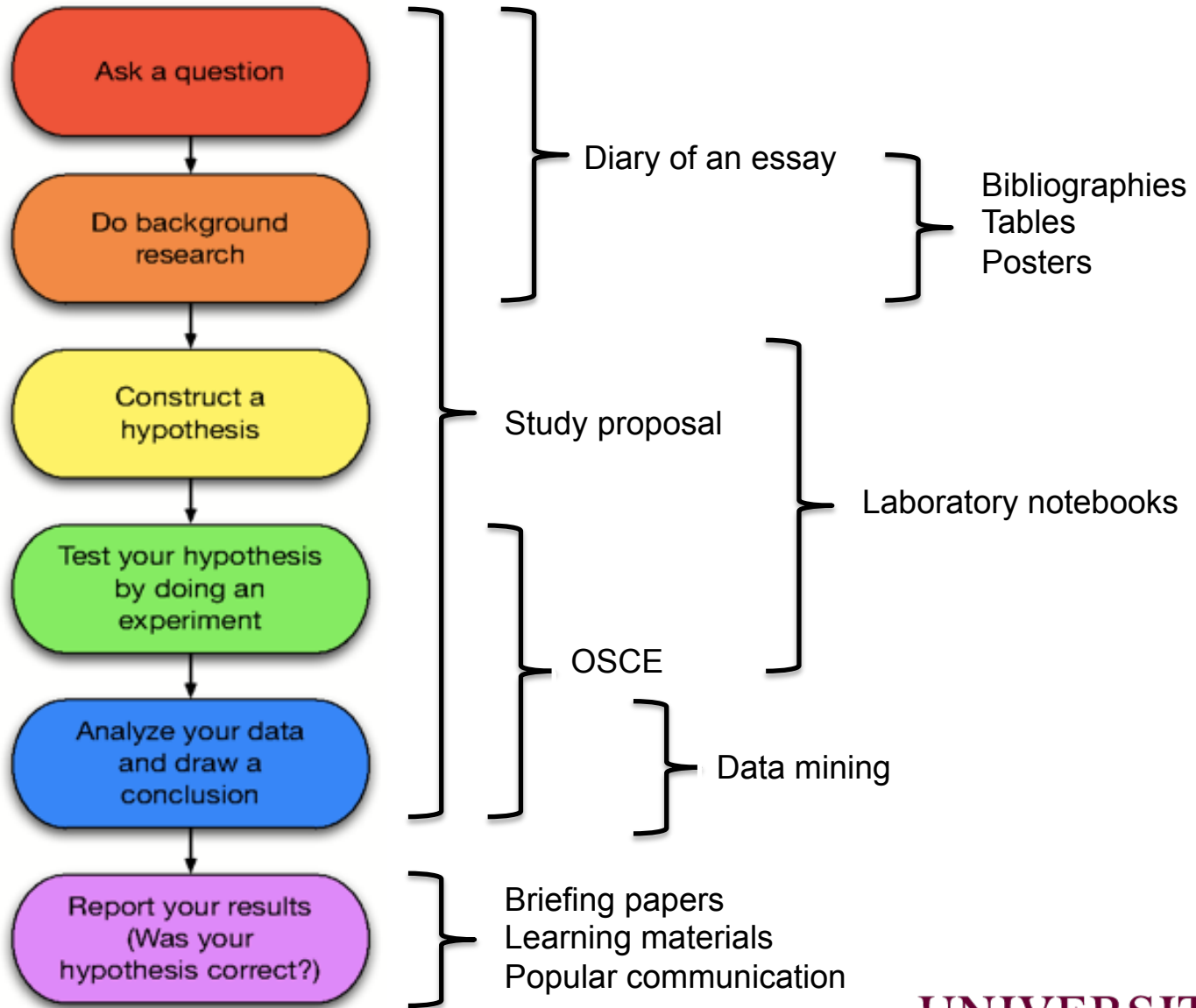
□ Benefits

- Identifying the paper
- Creating the piece of work

□ Cautions

- Publish?
- Purpose?

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A programmatic approach

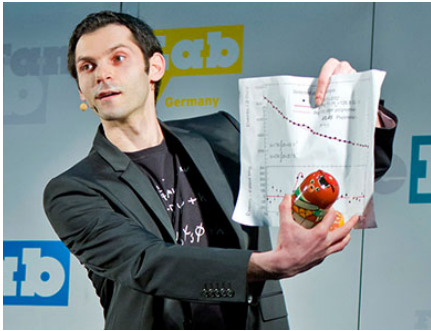
- *“iterative cycles of assessment, feedback, reflection and action implied by assessment for life-long learning are only plausible at the programme level”* (Boud and Falchichov 2006)
- Transforming the Experience of Students through Assessment (TESTA)
- Birmingham Assessment for Learning Initiative (BALI)



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Conclusions:

What do you want students to spend their time doing?

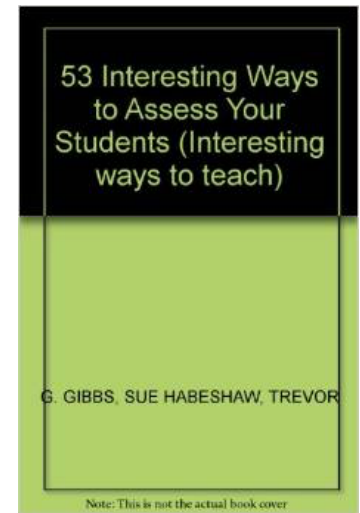


Acknowledgements

□ My students and colleagues

□ Frontinus Ltd

– Publishers of 53 Interesting Ways to Assess Your Students



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