

# SCHOLAR

Prògram Oilthigh Heriot-Watt



## The SCHOLAR Programme: Impact on Learning

Professor Phillip John  
Senior Dean of the University  
Heriot-Watt University

Executive Chair, SCHOLAR Forum

*MathSpeak Conference 2014*

*London 5 November 2014*

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



## What is the role of educational technology?

*..and I don't mean the technology!*

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



## Does educational technology work?

*..and I don't mean the technology!!*

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



Evaluation of Evidence-Based Practices in  
Online Learning  
A Meta-Analysis and Review of Online Learning Studies



## Four research questions

- How does the effectiveness of online learning compare with face to face instruction?
- Does supplementing face to face instruction with online instruction enhance learning?
- What practices are associated with more effective online learning?
- What conditions influence the effectiveness of online learning?

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



Evaluation of Evidence-Based Practices in  
Online Learning  
A Meta-Analysis and Review of Online Learning Studies



## Technology supports different models of online learning:

- **asynchronous** tools (email, discussion boards, social networking).
- **synchronous** tools approximate face-to-face classroom teaching using webcasts, chat rooms, desktop audio/video technology.
- **multiple forms** of synchronous and asynchronous online interactions as well as face-to-face teaching.

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



Evaluation of Evidence-Based Practices in  
Online Learning  
A Meta-Analysis and Review of Online Learning Studies



## Conclusions

“In recent studies contrasting blends of online and face-to-face instruction with conventional face-to-face classes ...

**blended instruction has been more effective**

... providing a rationale for the effort required to design and implement blended approaches.”

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



Evaluation of Evidence-Based Practices in  
Online Learning  
A Meta-Analysis and Review of Online Learning Studies



**Have we forgotten about the  
quality of learning experiences and  
outcomes?**

- asynchronous learning leads to self reflection

*and thus is*

- conducive to deeper understanding

## The SCHOLAR Forum in Scotland .....a legal partnership between HWU and ADES

- all 32 Education Authorities
- > 400 Scottish secondary schools
- 27 SCIS schools
- 5 FE Colleges
- ~ 100,000 enrolments
- Extensive staff development & pupil induction
- Content expansion (>£1m in 2013/16): 3 portfolios
- Development plan for CfE H & AH and National 5 Maths
- Evaluation (2012) carried out by Education Scotland



# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt

STEM subjects				
Biology	✓	✓	✓	
Chemistry	✓	✓	✓	
Computing	✓	✓		
Human Biology		✓	✓	
Information Systems	✓	✓		
Maths	✓	✓		✓
Physics	✓	✓	✓	

## Available subjects

- Advanced Higher
- Higher
- Revised Higher
- Intermediate 1/2

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt

Languages				
ESOL (English for Speakers of Other Languages)		✓		
French	✓	✓		
Gaelic		✓		
German	✓	✓		
Mandarin				✓
Spanish	✓	✓		

Business subjects				
Accounting	✓	✓		
Art & Design (Textiles)		✓		
Business Management	✓	✓		
Economics	✓	✓		
Psychology		✓		

## Available subjects

- Advanced Higher
- Higher
- Revised Higher
- Intermediate 1/2

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



The screenshot shows a Windows Internet Explorer browser window displaying the SCHOLAR website. The address bar shows the URL: <http://courses.scholar.hw.ac.uk/vle/scholar/session.controller?action=home>. The page title is "SCHOLAR - Welcome".

The main content area is titled "My SCHOLAR" and includes a search bar and text size controls. A "Welcome Super User" message is displayed, along with a notification that the user last worked on "Intermediate 2 Mathematics" on 24 Feb 2012 11:57. A link to a "Public site" is provided for the latest news.

The user is currently enrolled on the following courses:

Course Name	Tutor Resources	Discussion	FAQ
An Introduction to Simplified Mandarin		🗨️	
Level 3 Geography, Geology and Environmental Science		🗨️	
Intermediate 1 Mathematics		🗨️	
Intermediate 1 Mathematics (PREVIEW)		🗨️	
Intermediate 2 Mathematics		🗨️	
Intermediate 2 Mathematics (PREVIEW)		🗨️	
Intermediate 2 Mandarin		🗨️	
Intermediate 2 Mandarin (PREVIEW)		🗨️	
Higher Accounting	🎓	🗨️	
Higher Accounting (PREVIEW)		🗨️	
Higher Art and Design (Fashion/Textile Design)	🎓	🗨️	
Higher Art and Design (Fashion/Textile Design) (PREVIEW)		🗨️	
Higher Biology	🎓	🗨️	
Higher Biology (Revised)		🗨️	
Higher Biology (PREVIEW)		🗨️	
Higher Business Management	🎓	🗨️	
Higher Business Management (PREVIEW)		🗨️	
Higher Chemistry	🎓	🗨️	🗨️
Higher Chemistry (Revised)		🗨️	
Higher Chemistry (Revised) (PREVIEW)		🗨️	
Higher Chemistry (PREVIEW)		🗨️	

The left sidebar contains navigation links: Tools (My SCHOLAR, Reports, Revision Planner), Revision Today (None), Resources (Session Summary, Study with SCHOLAR, Technical Requirements, Special Character Bar), and SCHOLAR Links (Be safe on the internet).

The Windows taskbar at the bottom shows the Start button, Windows Live Messenger, Microsoft PowerPoint, and the SCHOLAR website.



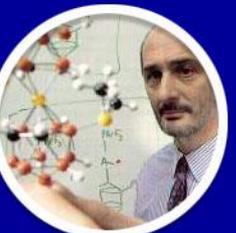
# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



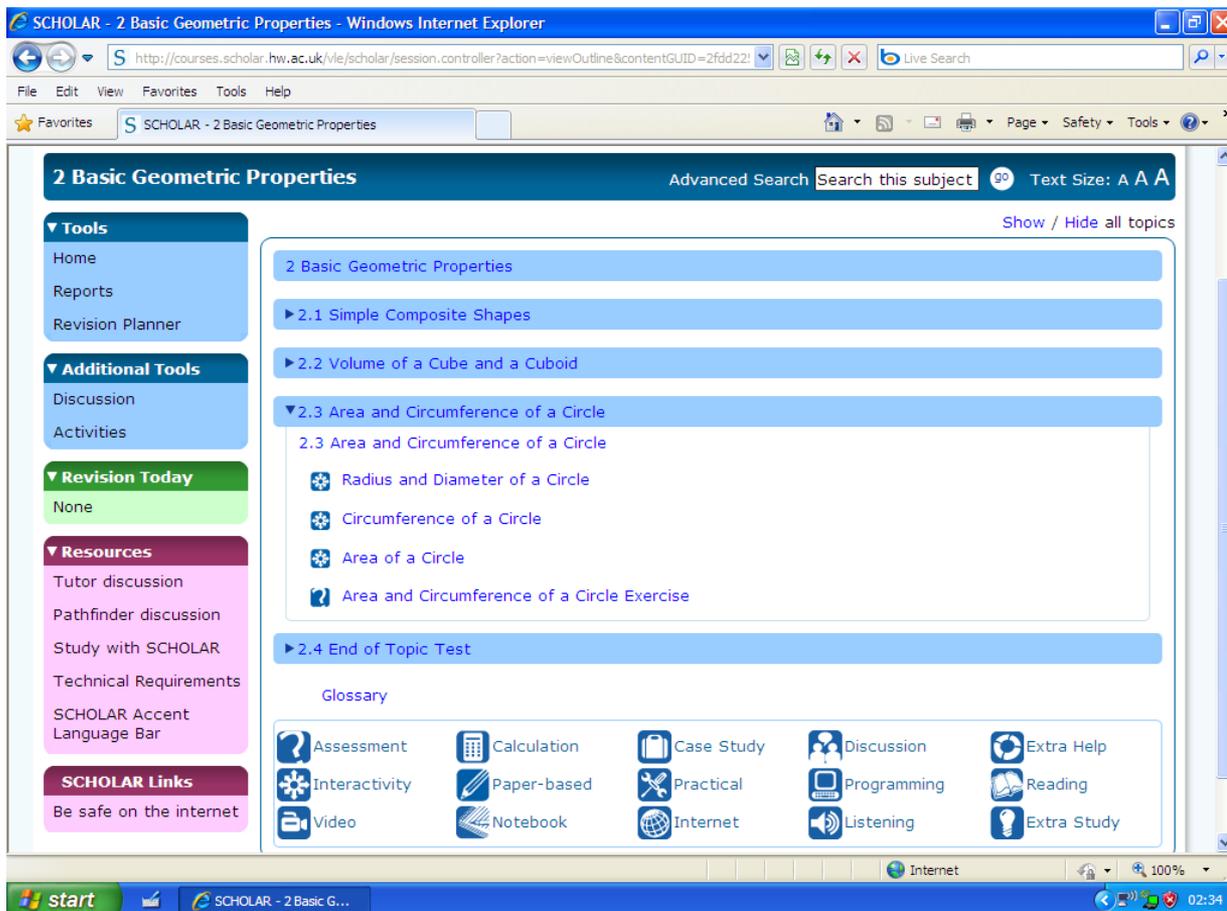
Each subject is equivalent to 240 student effort hours (seh) ... at Level 5,6 or 7 within the SCQF.

- \* each Unit is divided into 'topics' equivalent to roughly 10 seh (or 1 SCQF credit)
- \* printed study guide plus on-line material
- \* interactive: simulations, animations, drag-and-drop, video clips
- \* formative assessments: end of topic, end of module and end of course
- \* recommended times per topic



# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



The screenshot shows a Windows Internet Explorer browser window displaying the SCHOLAR website. The address bar shows the URL: <http://courses.scholar.hw.ac.uk/vie/scholar/session.controller?action=viewOutline&contentGUID=2fdd22!>. The page title is "SCHOLAR - 2 Basic Geometric Properties".

The main content area is titled "2 Basic Geometric Properties" and includes an "Advanced Search" box and a "Text Size: A A A" option. The page is organized into several sections:

- Tools:** Home, Reports, Revision Planner.
- Additional Tools:** Discussion, Activities.
- Revision Today:** None.
- Resources:** Tutor discussion, Pathfinder discussion, Study with SCHOLAR, Technical Requirements, SCHOLAR Accent Language Bar.
- SCHOLAR Links:** Be safe on the internet.

The main content area lists the following topics:

- 2 Basic Geometric Properties
- ▶ 2.1 Simple Composite Shapes
- ▶ 2.2 Volume of a Cube and a Cuboid
- ▼ 2.3 Area and Circumference of a Circle
  - 2.3 Area and Circumference of a Circle
    - ⚙️ Radius and Diameter of a Circle
    - ⚙️ Circumference of a Circle
    - ⚙️ Area of a Circle
    - 🔗 Area and Circumference of a Circle Exercise
- ▶ 2.4 End of Topic Test

Below the topics is a "Glossary" section with a grid of icons and labels:

🔍 Assessment	📊 Calculation	📁 Case Study	🗣️ Discussion	🔗 Extra Help
⚙️ Interactivity	📝 Paper-based	🔧 Practical	💻 Programming	📖 Reading
📺 Video	📓 Notebook	🌐 Internet	🔊 Listening	💡 Extra Study

The Windows taskbar at the bottom shows the Start button, the current browser window, and the system tray with the time 02:34.



## Role of the Computer in Assessment

What forms can assessment take on the computer?

**Diagnostic** --- identify strengths

**Self-test** --- give fast feedback

**Monitor** --- continuous assessment

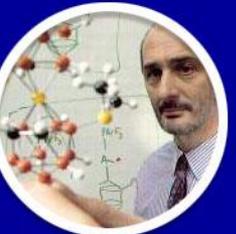
**Summative** --- grades that count for an award

How does SCHOLAR exploit this?

## Formative Assessment

- \* Inform on strengths/weaknesses
- \* Motivate --- review and consolidate
- \* Enable demonstration of knowledge, skills and understanding
- \* Prepare students for summative exams

..... *maximises performance in 'high-stakes' exams*



# SCHOLAR

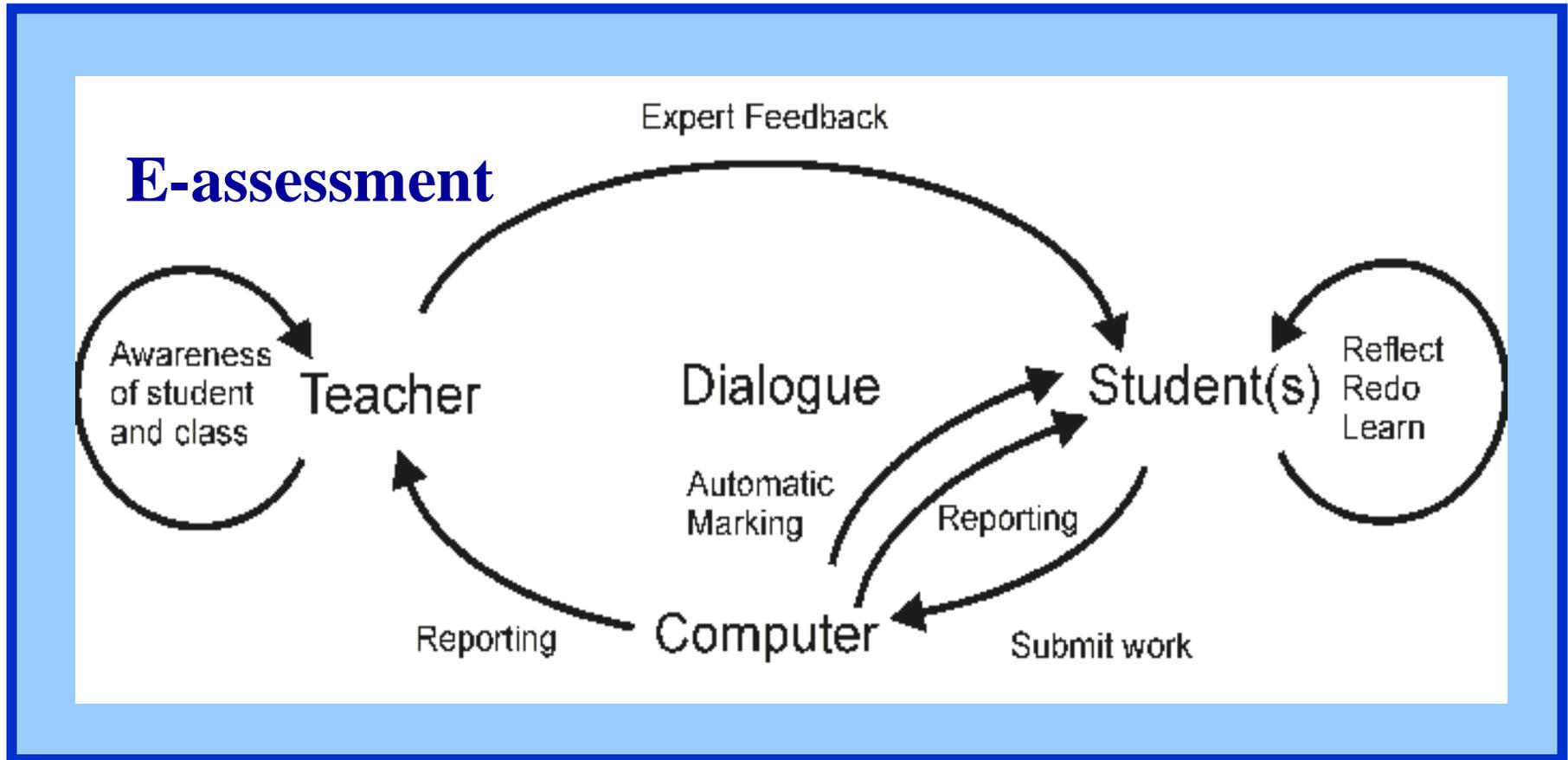
A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt

A screenshot of a web browser displaying the SCHOLAR website. The browser's address bar shows the URL: http://courses.scholar.hw.ac.uk/vle/scholar/session.controller?action=viewCourse&id=... The page title is "SCHOLAR - Home Page#". The website header includes the "SCHOLAR" logo and the text "A Programme of Heriot-Watt University" and "Prògram Oilthigh Heriot-Watt". A navigation bar shows "My SCHOLAR > Intermediate 2 Mathematics >". A search bar contains the text "Advanced Search Search this course" and "Text Size: A A A". A sidebar on the left lists various sections: "General" (My SCHOLAR, Reports, Revision Planner), "Resources" (Activities), "Revision Today" (None), "Tools" (Special Character Bar), and "Information" (Live Online Sessions, Technical Requirements, Be safe on the internet). The main content area displays a list of units for "Intermediate 2 Mathematics":

- Unit 1
  - 1. Calculations Involving Percentages
  - 2. Volumes of Solids
  - 3. Linear Relationships
  - 4. Algebraic Operations
  - 5. Properties of the Circle
  - 6. End of Unit 1 Test
- Unit 2
  - 1. Trigonometry
  - 2. Simultaneous Linear Equations
  - 3. Graphs, Charts and Tables
  - 4. Simple Statistics
  - 5. End of Unit 2 Test
- Unit 3
  - 1. Algebraic Operations
  - 2. Properties of Quadratic Functions
  - 3. Further Trigonometry
  - 4. End of Unit 3 Test
- Unit 4
  - 1. Calculations in a Social Context
  - 2. Logic Diagrams
  - 3. Formulae in Applications
  - 4. Statistical Assignment
  - 5. End of Unit 4 Test

The browser's taskbar at the bottom shows the date and time as 03/11/2014.

“Formative assessment is tailored to the curriculum providing student and teacher with feedback at a topic, unit and course level”



*Formative e-assessment is a key ingredient of success....over 30,000 items*

## Assessment and Reporting System

C:\Documents and Settings\Administrator\Desktop\i2\_mth2\_2\_Practice4.swf - Windows Internet Explorer

C:\Documents and Settings\Administrator\Desktop\i2\_mth2\_2\_Practice4.swf

File Edit View Favorites Tools Help

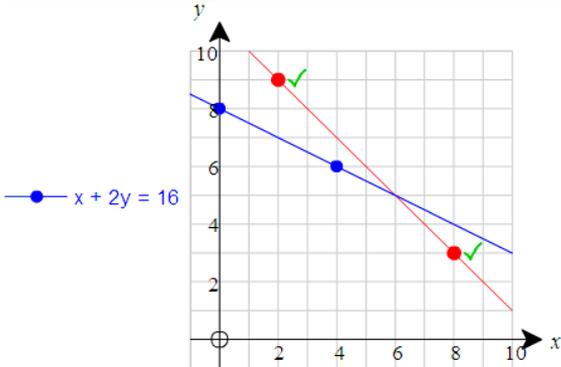
★ Favorites C:\Documents and Settings\Administrator\Desktop\2...

**Practice: Using a graph to solve a system of equations (2)** ⓘ

The line  $x + 2y = 16$  is drawn on the graph.

a) On the same graph plot the line  $x + y = 11$

b) Use the graph to solve the system of equations  $x + 2y = 16$  and  $x + y = 11$



Solution is:  $x =$    $y =$

Click on the graph to mark points for  $x + y = 11$ . Drag the points to move them. Enter the solution to the equations in the grey boxes. Press 'submit' to check your answer.

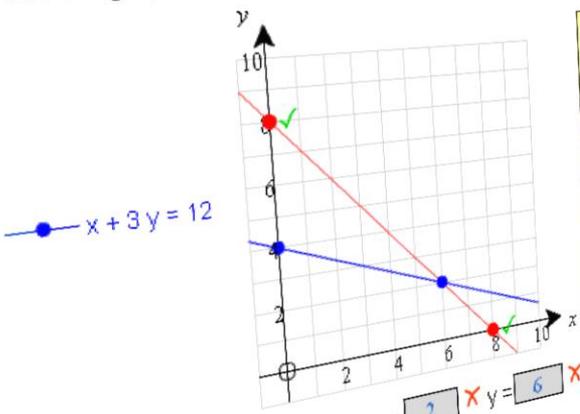
© Heriot-Watt University 2008

Done My Computer 100% 01:17

## Assessment and Reporting System

**Q3** Outcome 2 - Simultaneous Linear Equations

The line  $x + 3y = 12$  is drawn on the graph.  
 a) On the same graph, plot the line  $x + y = 8$   
 b) Use the graph to solve the system of equations  $x + 3y = 12$  &  $x + y = 8$



**Feedback**  
You've plotted the equation correctly, but not entered the intersection point correctly.

Solution is:  $x = 2$   $y = 6$

Click on the graph to mark two points for the second line. You can drag the point move them. Enter the solution to the equations in the grey boxes.

restart reveal submit [2 out of 3 marks]

Last Name	First Name	Q1 (1)	Q2 (2)	Q3 (3)
Class	Average			
Bloggs	Jo			
Smith	Peter			
White	Jane			
Black	Anne			
Jones	Paul			
Green	Neil			
Brown	Graham			

# SCHOLAR

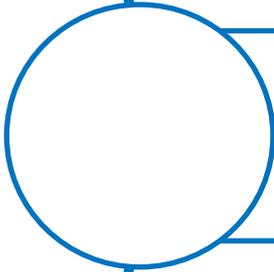
A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



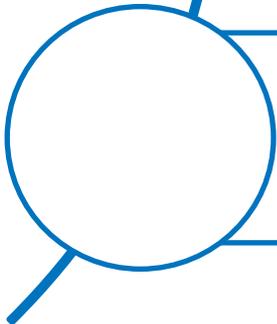
## Independent evaluation 2012



Evidence of the impact of SCHOLAR on:  
Students' use of SCHOLAR  
Attainment in specific subjects



Teachers' approaches and methods as a result of using  
SCHOLAR  
The breadth of curriculum available in schools



Views and recommendations related to the use of Glow as a  
platform for SCHOLAR – and SCHOLAR's future development

# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



## How are pupils using SCHOLAR?



# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



## Independent evaluation 2012

Over 6,000,000 'hits' – converted into sessions data



**Location**



**Timing**



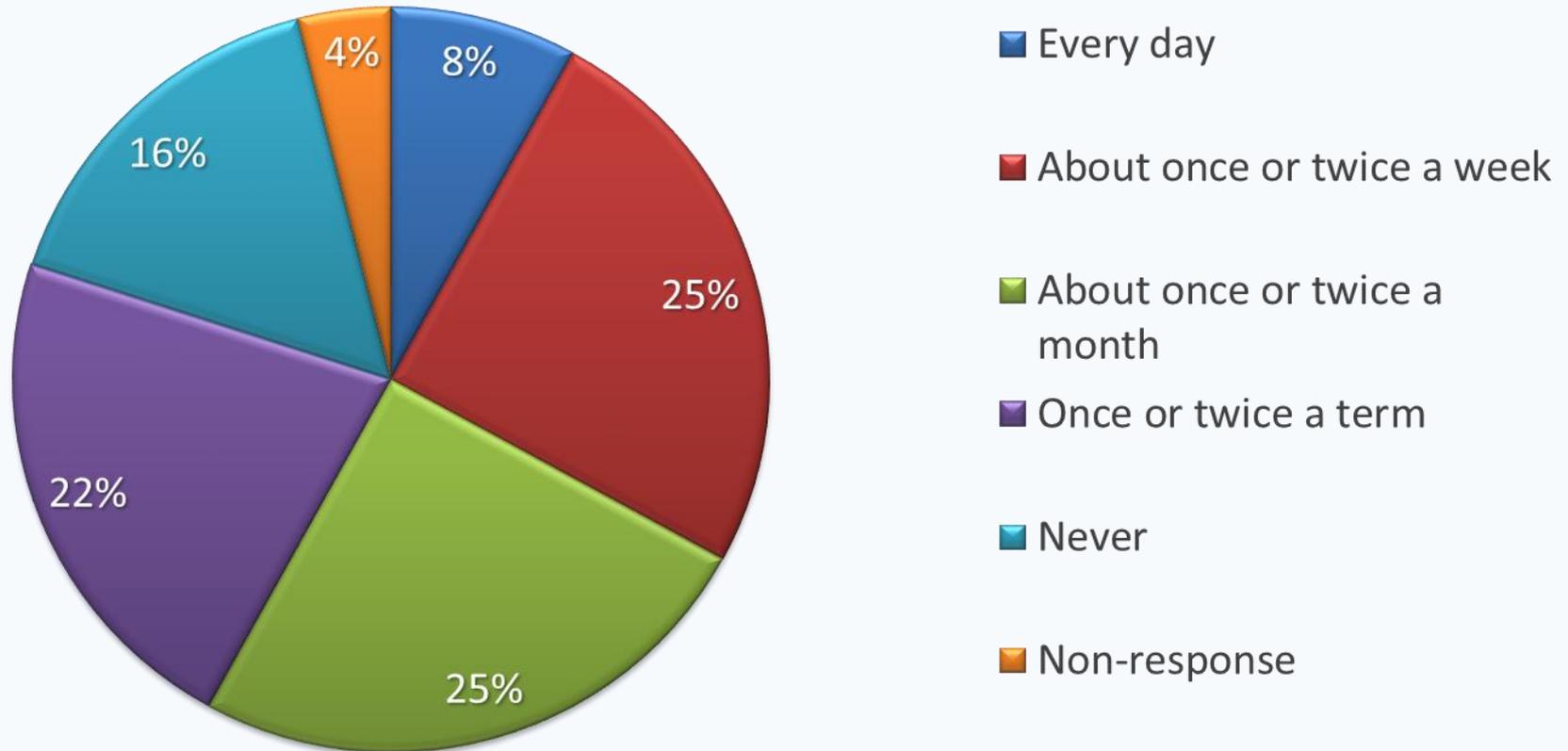
**Intensity**



*A session = user changes between subjects areas or 30 minutes elapses...MSN and Google are reported to use a similar heuristic*

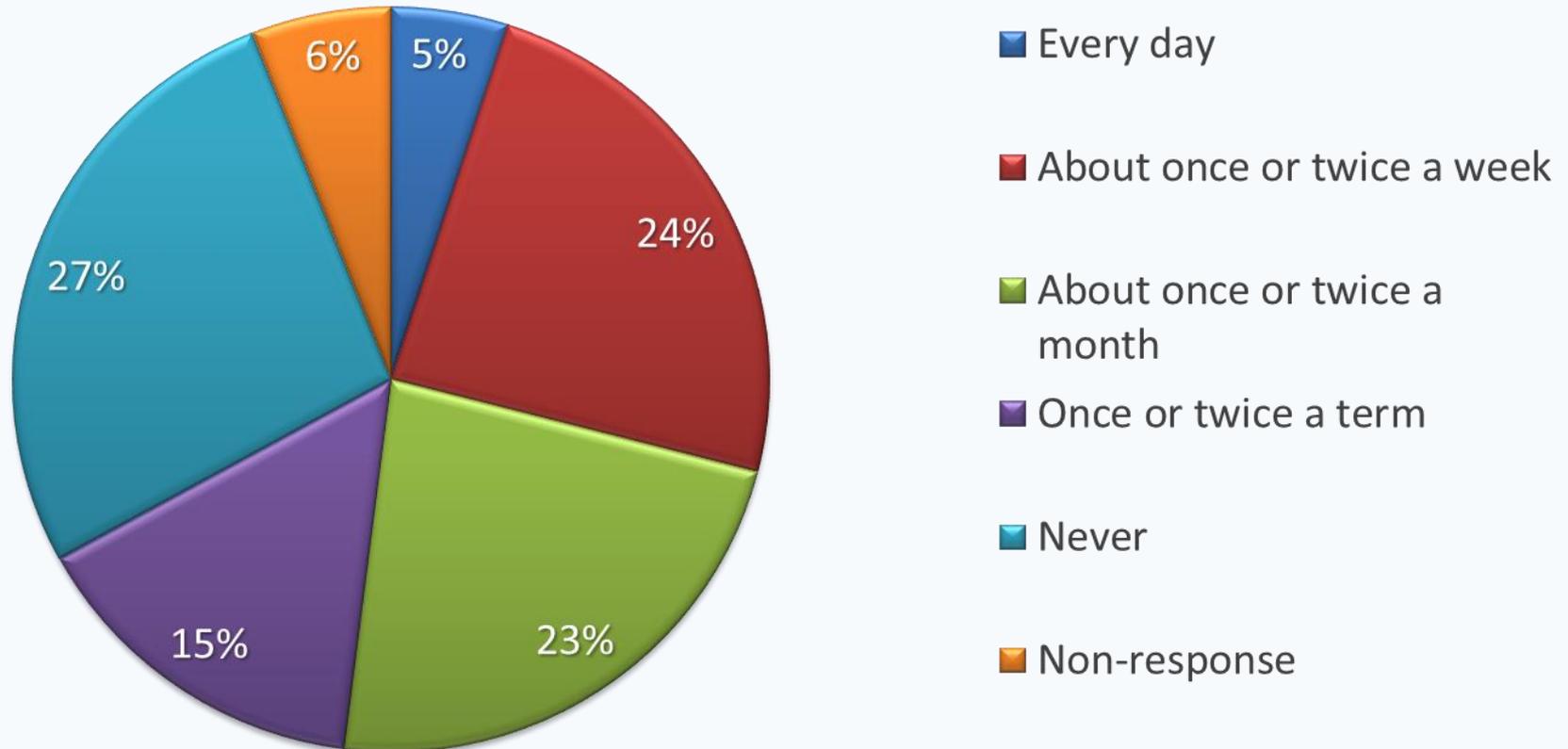
# SCHOLAR Evaluation 2012

I use SCHOLAR in class with a teacher present



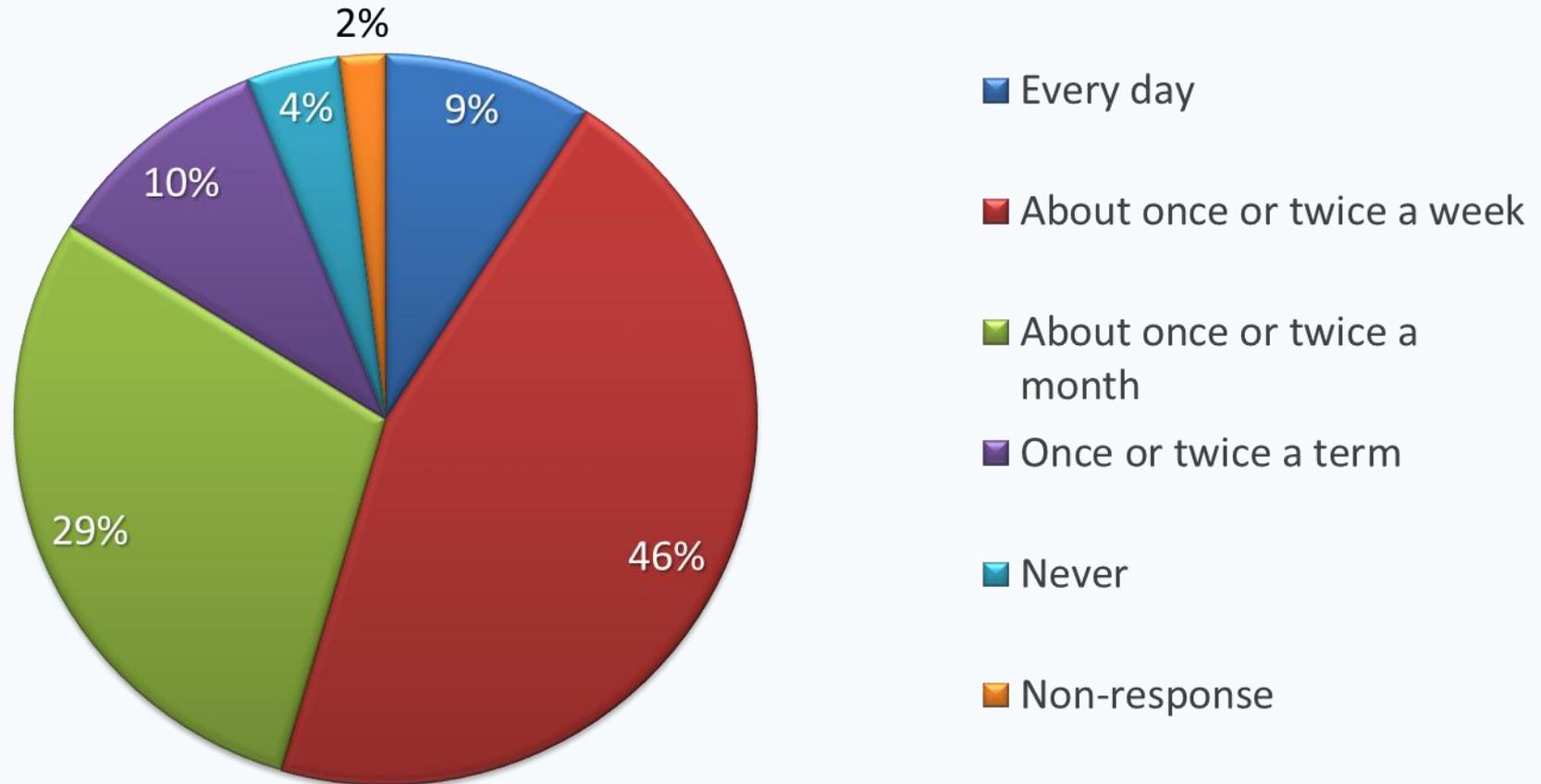
# SCHOLAR Evaluation 2012

I use SCHOLAR on my own in school

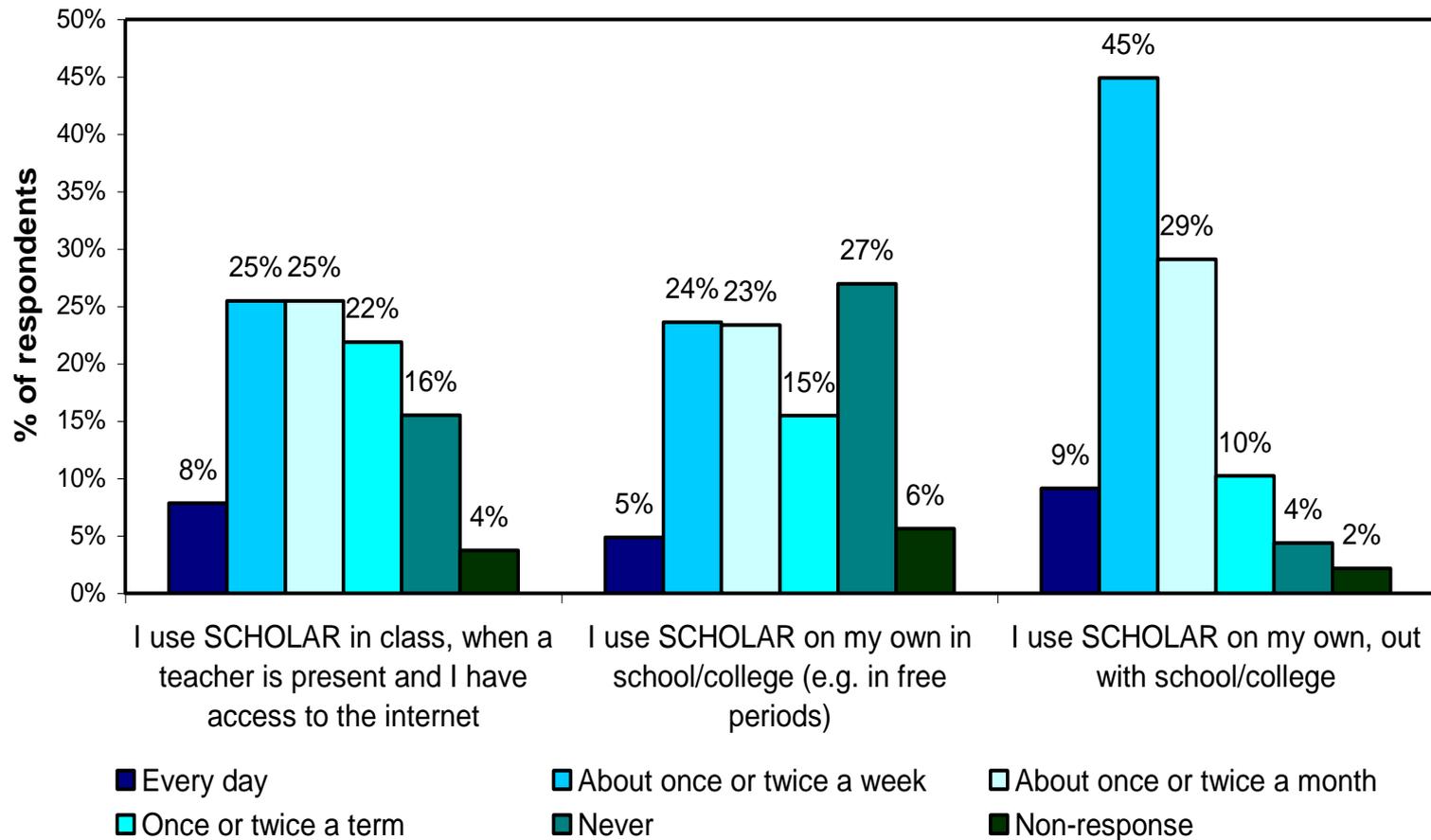


# SCHOLAR Evaluation 2012

## I use SCHOLAR on my own at home



## Independent evaluation 2012



# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt

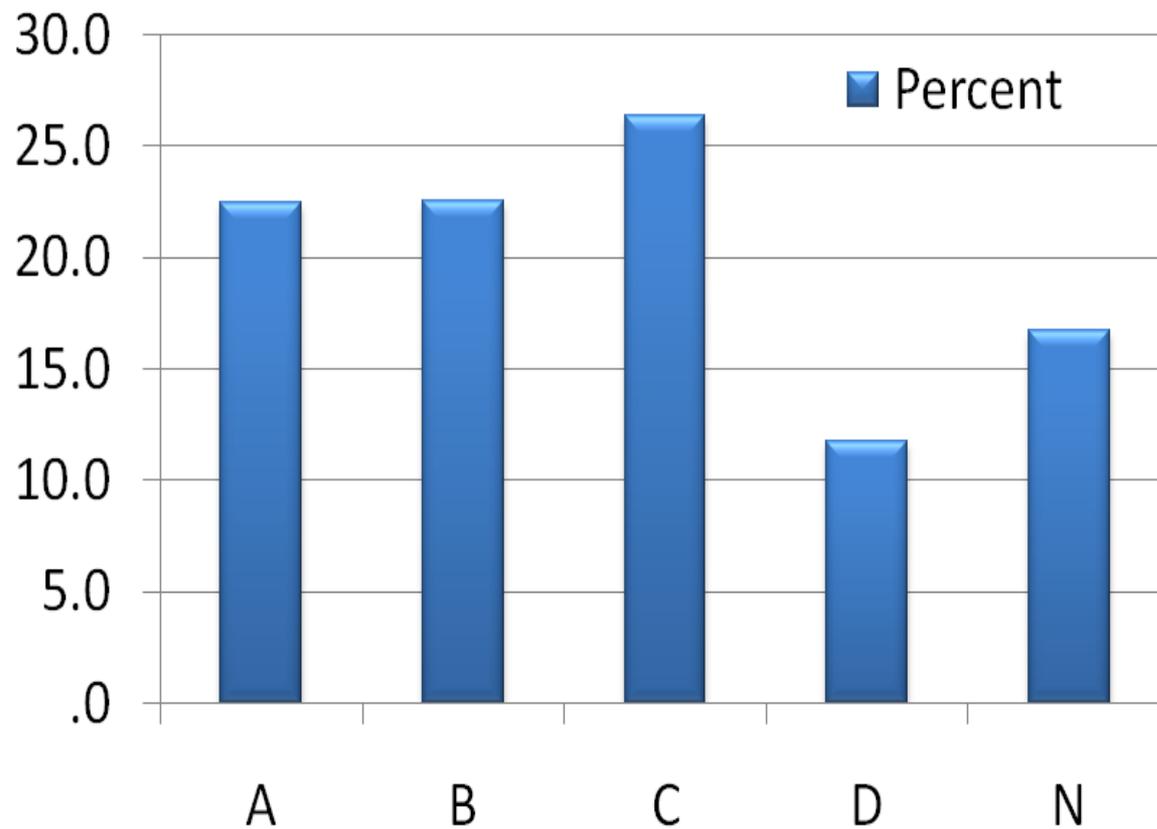


Does SCHOLAR affect pupil's attainment?



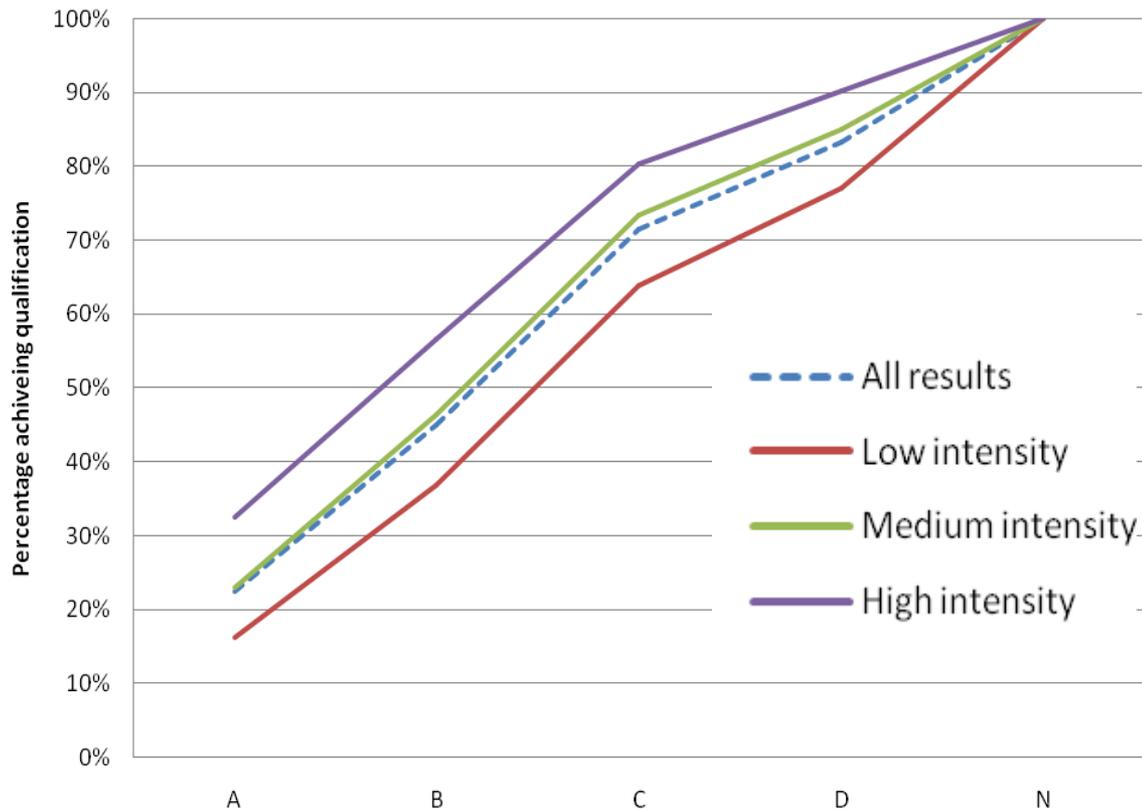
## Independent evaluation 2012

### Higher Biology 2010



## Independent evaluation 2012

### Higher Biology 2010



# SCHOLAR

A programme of Heriot-Watt University  
Prògram Oilthigh Heriot-Watt



## Questions?



scholarprogramme



@SCHOLARuk

<http://www.scholar.hw.ac.uk>