

Online pre-laboratory exercises enhance student preparedness for first year biology practical classes



Susan M. Jones and Ashley Edwards
School of Zoology, University of Tasmania



Introduction

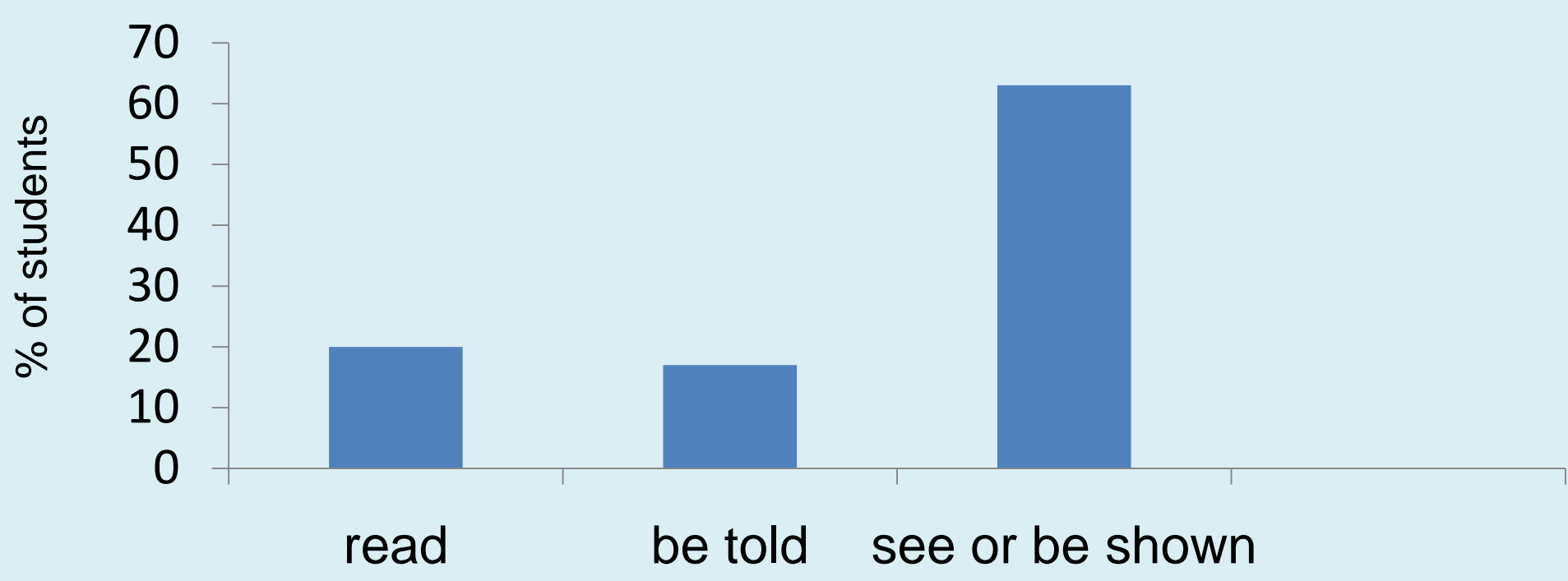
Without effective preparation for practical classes, students are at risk of “information overload” as they attempt to simultaneously come to terms with novel technical or manipulative tasks as well as learning new concepts. Design of learning activities must take account of students’ preferred learning styles

Pre-laboratory preparation is one effective way to reduce cognitive load and to increase meaningful learning during laboratory classes.

We designed on-line multi-media pre-laboratory exercises (Pre-labs) to support dissection-based practicals in a first year biology unit.

BEFORE the pre-labs

- only 15% of students reported that they did a substantial amount of preparation for practical classes (4 or 5 on a Likert scale of 0-5)
- only 22.4% felt *very well prepared* for that prac class
- most prefer to see or be shown what to do



Sample Pre-Lab slides

Putting on a scalpel blade

Scalpel blades are **very** sharp. Use the foil cover to protect your fingers as you put the blade onto the handle. Dispose of used blades in the “Sharps” container in the lab.

1. Match the angle on the blade with the angle on the handle.
2. Slip the blade over the ridge so that the ridge fills the hole in the blade shaft.
3. Push the blade right down the ridge so it sits flat.

Making the first cut

1. Using fine scissors, make a small transverse cut across the mid-line, posterior to the clitellum. This cut helps you to insert your scissors into the body cavity.
2. Insert your scissor blade into the cut and cut forwards, towards the worm's head.

Special note: you will dissect under water: this ensures the specimen does not dry out. However, to help with photography, we have done this one without water.

- try to keep your cut to the midline.
- use the tip of your scissors only.

Opening the body cavity

1. Use your scalpel to separate the septae from the body wall.
2. Then you can pin out the body wall as shown below.

Note that we do not dissect the whole worm. Why not?

What is the meaning of:

- septum
- annulus
- prostomium?

Use your manual to identify the main structures in this worm

Special note: this is a “bush worm”. Its anatomy is like that of an African Giant Crawler. Unlike the typical *Lumbricus* in your textbook, it has prominent **prostate glands**. Also, the large **gizzard** is placed just below the **pharynx**. It has little **chlorogogen tissue** around its **intestine**.

Use your manual to identify the main structures in this worm

Can you identify the organs or structures labeled here?

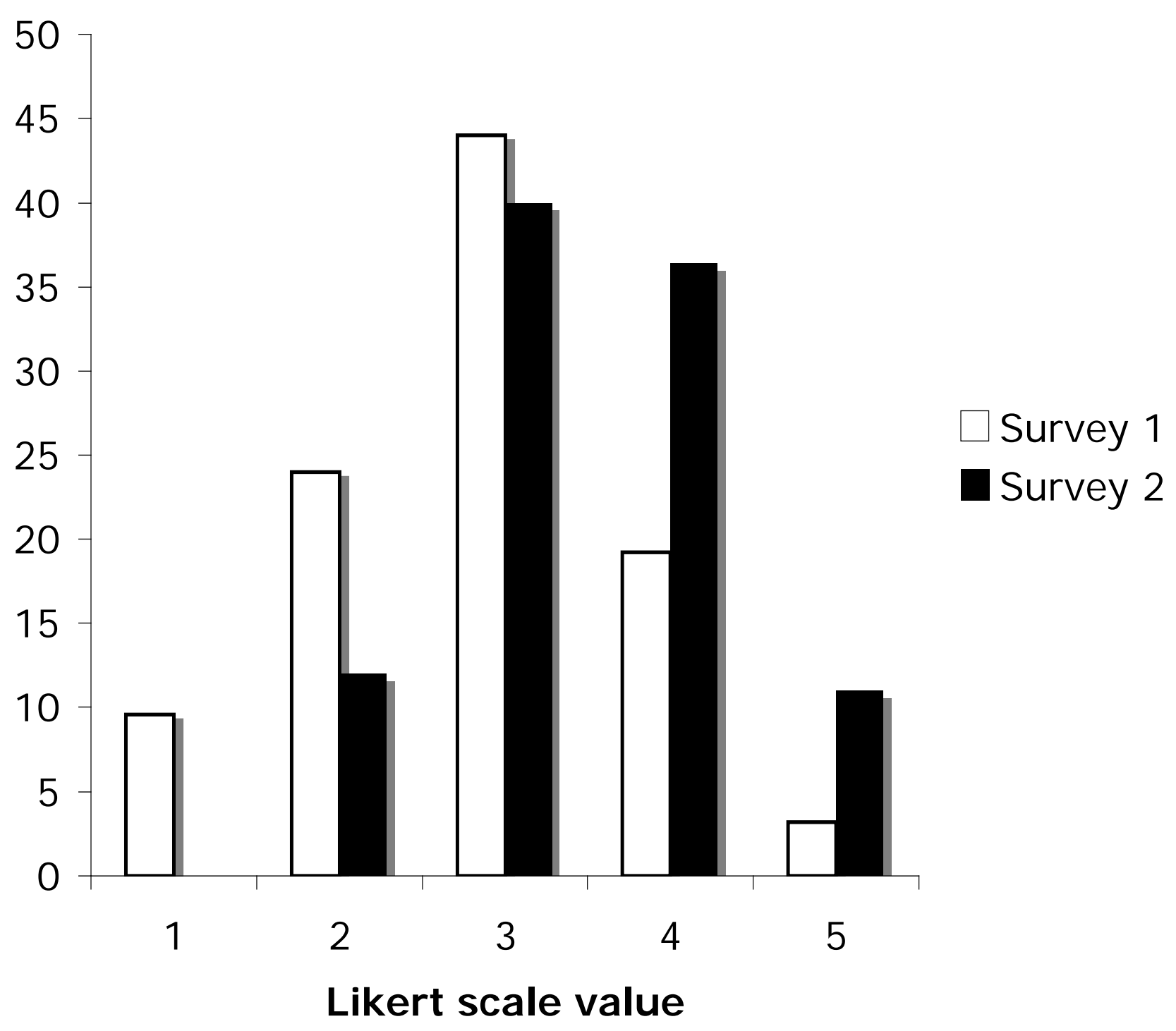
Vocabulary

Do you know what the following words mean?

—	prostomium
—	pharynx
—	septum
—	nephridium
—	chaetae
—	chlorogogen tissue
—	pseudoheart
—	ganglion

Look up as many as you can before you come to the prac class!

More students reporting feeling well-prepared for practical activities increased after (black) compared with before (white) the introduction of Pre-Labs



Student comments about Pre-Labs

- “The prelabs made me able to know what I was looking for even before I came to the lab. This meant that looking at the prelab for 30 mins saved me an hour in the lab.”
- “It made me feel more confident in what I was expected to do and how to do it”
- “ Gave me better understanding of how to start and finish the prac appropriately”
- “It was very good to see what we would be looking at before we came to class, so we could prepare and know what the real specimens look like.”
- “.....really help to orientate before lab classes”
- “I found printing them out and referring to them in class was even better”
- “...could see if yours was not looking right!”

% Use of on-line resources over entire semester

Pre-lab. Exercises indicated by Ⓟ

