

# Digital Workbooks to Develop and Evidence Learning in a Flipped Nutrition Classroom in Higher Education



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## ABSTRACT

**Objective:** To evaluate student use and perceptions of a digital workbook in three undergraduate nutrition courses taught with a flipped classroom approach (FCA).

**Use of Theory or Research:** Within the FCA three phases of learning are aligned with Bloom's Taxonomy: prepare (self-directed pre-class activities: remember and understand); participate (facilitated in-class activities: apply and analyse) and recap (self-directed post class activities: evaluate and create). While technology can support the delivery of the FCA, there is little evidence for the most effective delivery of FCA learning experiences for nutrition students.

**Target Audience:** One-hundred and sixty-two undergraduate nutrition students at a regional Australian University in Semester 1, 2019.

**Course/Curriculum Description:** PebblePad digital workbooks were used to deliver three FCA courses. Each digital workbook contained weekly workbook tabs with interactive pages based on the FCA phases. Students used the workbook to access and participate in learning experiences during each FCA phase.

**Evaluation Methods:** An online survey measured self-report student satisfaction and patterns of digital workbook use. Student perceptions of engagement with, usefulness of, and suggestions for assessment and learning to use the digital workbook were collected. Quantitative data was analysed descriptively and qualitative data analysed using conventional content analysis.

**Results:** Thirty-nine students (24%) participated. Majority of students reported the digital workbook was engaging. Useful aspects included workbook structure, development of a learning artefact and convenience. Digital workbooks were well utilised for learning activities related to learning, applying and consolidating knowledge, with most students accessing their digital workbook several times a week. Less useful aspects included technology issues and limited feedback provided. Suggestions for future use included more 'how-to' resources and integration of quizzes.

**Conclusions:** Well-structured digital workbooks can support FCA delivery in nutrition education. Further exploration of feedback integration and student technology support mechanisms would be useful for educators using the FCA.

## Background

The flipped classroom approach (FCA) is an emerging pedagogical approach for teaching nutrition and dietetics (N&D)<sup>1,2</sup>. Technological tools, such as digital workbooks, may support higher education students learning. The use of digital workbooks to design and deliver a FCA, has not yet been explored in N&D higher education.

**Objective:** To evaluate student use and perceptions of a digital workbook (DWB) in three undergraduate nutrition courses taught with a flipped classroom approach (FCA).

## Methods

- Students in three undergraduate nutrition courses (introduction to nutrition; food studies, and food and the consumer) were invited to participate in a self-administered, cross-sectional online survey to assess self-report student satisfaction and patterns of use, perceptions of engagement with, usefulness, and suggestions for improvements to assessment and learning for the DWB used in each course.
- Quantitative data was analysed descriptively and qualitative data analysed using conventional content analysis.
- Ethical approval provided by the Human Research Ethics Committee of the authors institution (A191246)

## Workbook design

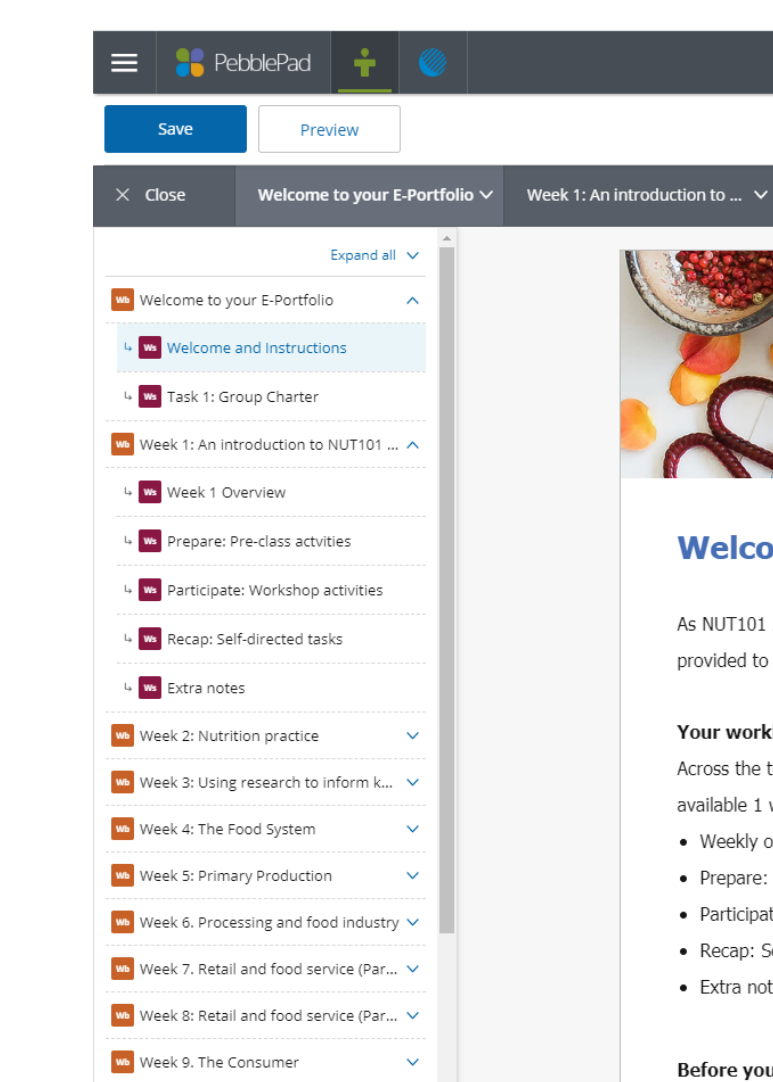
Digital workbooks are based on the three phases of learning;

- Prepare** (self-directed pre-class activities) Blooms taxonomy: *Remember and Understand*
- Participate** (facilitated in-class activities) Blooms taxonomy: *Apply and Analyse*
- Recap** (self-directed post class activities Blooms taxonomy: *Evaluate and Create*

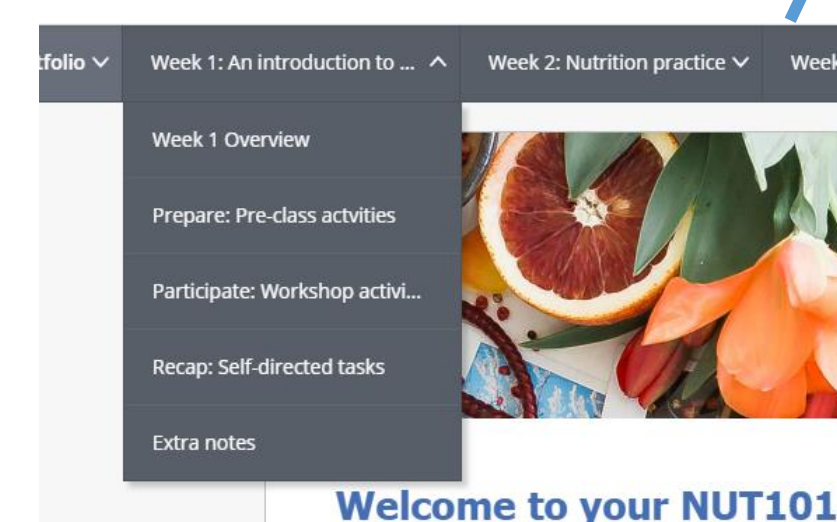
PebblePad<sup>3</sup>, an e-portfolio tool was used to create a digital workbook for each course.

The structure of the workbook includes;

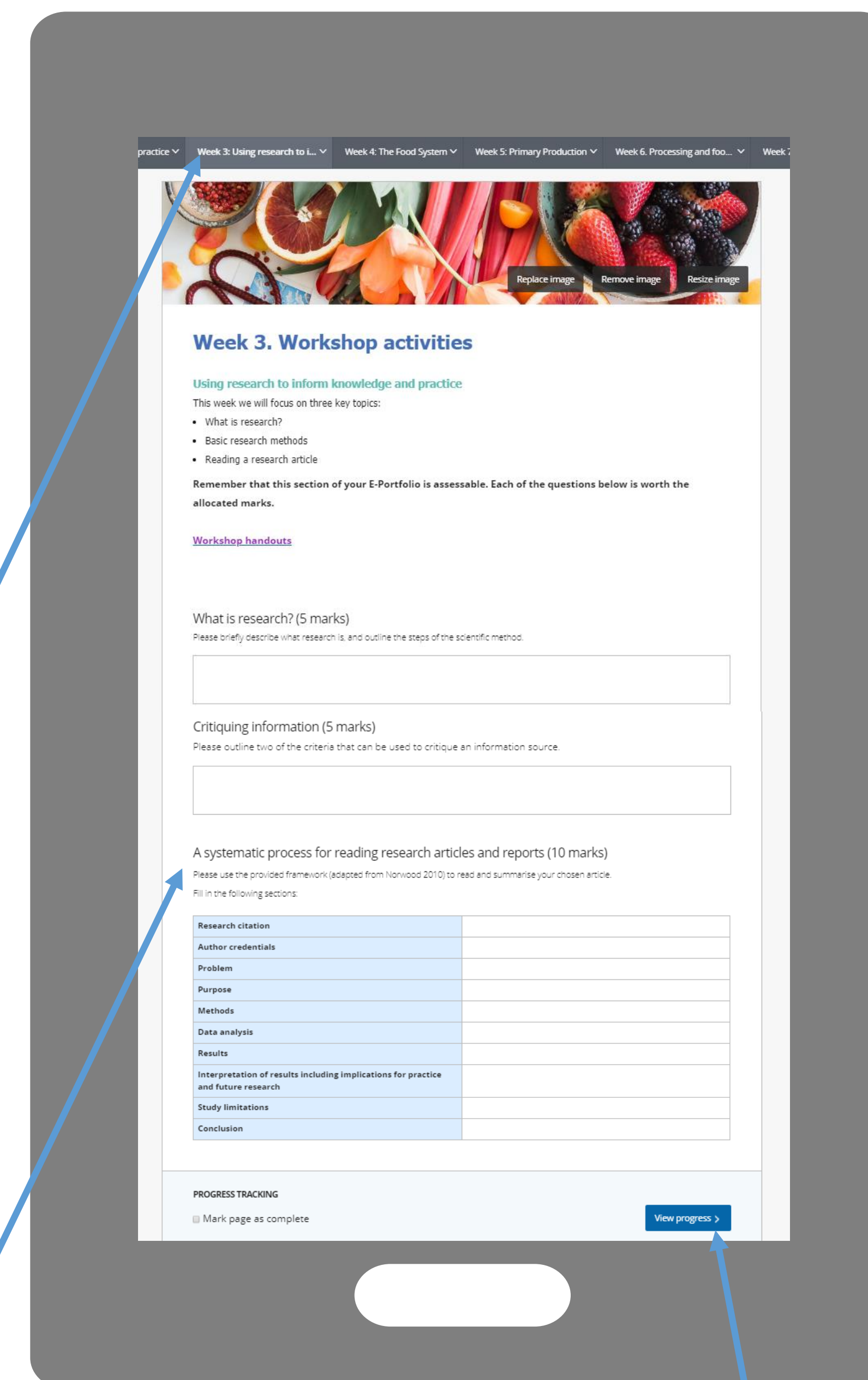
- A home 'landing page'
- A contents menu
- Weekly workbook tabs, each containing a drop down menu for prepare, participate and recap phases



Home landing page and contents menu



Drop down menu with tabs for each learning phase



Assessed activities that are either self-directed or facilitated, dependent on the learning phase



Progress tracking for students (and monitoring for academics)

## Results

### Participant characteristics

- 39 students completed the survey (response rate of 24%)
- Mean age = 31 years (range 18 – 64 years), 95% female
- Students enrolled a Bachelor of Nutrition (n=23, 59%) or Bachelor of Dietetics (n=16, 41%). Most full-time enrolment status (81%).
- Previous experience with PebblePad = 66%, previous experience with the FCA = 76%

### Student satisfaction and patterns of use

- 87% (n= 34) were very satisfied or satisfied with their use of the digital workbook
- 59% (n=23) reported using their digital workbook several times a week (Figure 1)

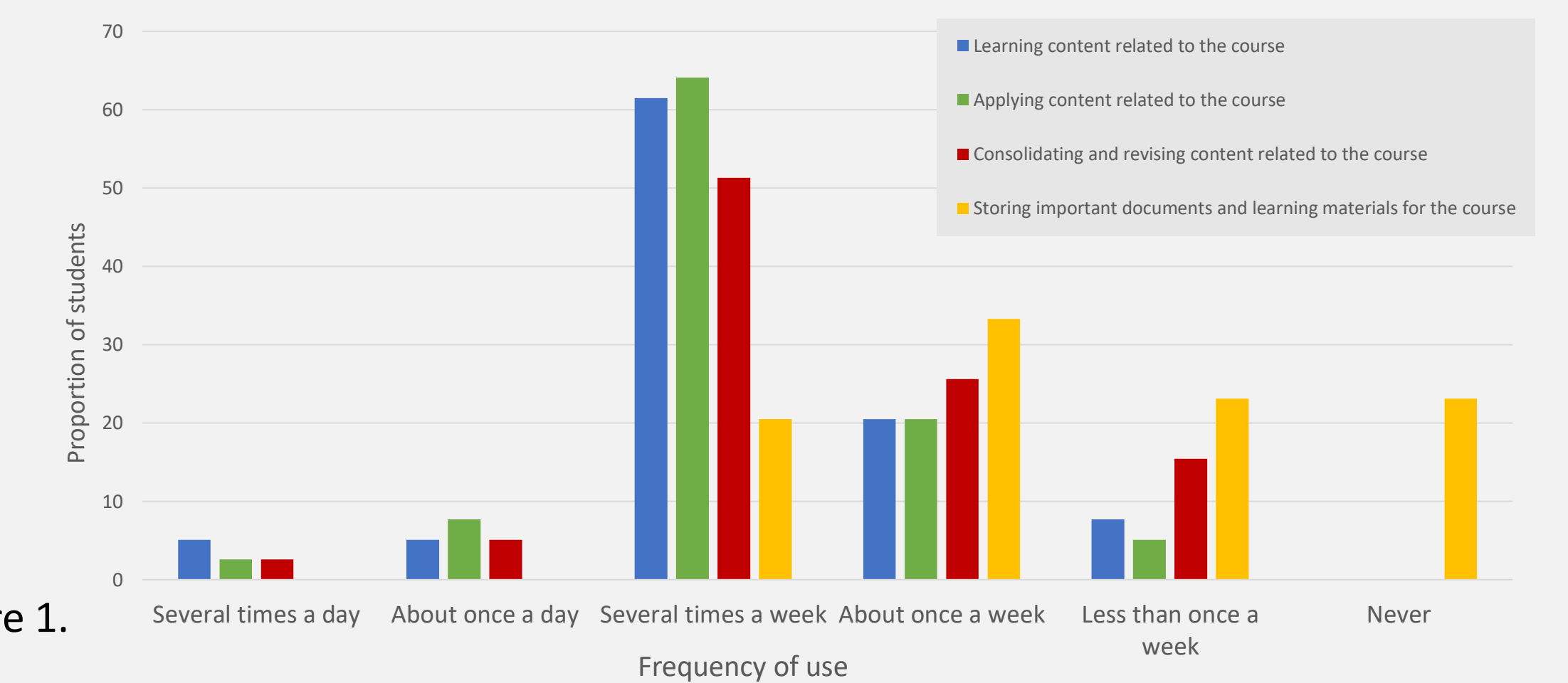


Figure 1.

### Perceptions of engagement with, and usefulness of the digital workbook

- 95% rated the digital workbook as engaging
- Most useful aspects related to workbook structure, development of a learning artefact, self-directed aspects and convenience
- Least useful aspects related to technology issues, feedback and preference for paper

### Suggested improvements for assessment and learning

ASSESSMENT	LEARNING
<ul style="list-style-type: none"> <li>Assistance with saving work</li> <li>Increased speed of service</li> <li>More training</li> </ul> <p><i>'I would like to attend a workshop to explore the full functionality of the platform i.e. blogging and how to manage and utilise content as evidence of study'</i></p> <ul style="list-style-type: none"> <li>Include all content in workbook</li> </ul>	<ul style="list-style-type: none"> <li>Include embedded quizzes</li> <li><i>'...would love to see a revision section for each topic of MCQ. Potentially as an ungraded section that gives instant feedback'</i></li> <li>Provide exemplars/more feedback</li> <li>More interactive training and explanation of functionalities</li> </ul>

**Conclusion** Well-structured digital workbooks can support FCA delivery in nutrition education. Further exploration of feedback integration and student technology support mechanisms would be useful for educators using the FCA.

REFERENCES: <sup>1</sup>Burkhart, S.J.; Taylor, J.A.; Kynn, M.; Craven, D.L.; Swanepoel, L.C. Undergraduate students experience of nutrition education using the flipped classroom approach: A descriptive cohort study. *J. Nutr. Educ. Behav.* 2019. <sup>2</sup>Gilboy, M.B.; Heinerichs, S.; Pazzaglia, G. Enhancing student engagement using the flipped classroom. *J. Nutr. Educ. Behav.* 2015, 47, 109–114. <sup>3</sup>PebblePad v5, Pebble Learning Ltd, Telford, UK, 2016.

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