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Developing animal science and veterinary science students' communication skills using a multimodal brochure assignment

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This paper describes a multimodal brochure assignment in an undergraduate animal science subject with a mixed cohort of animal science and veterinary science students. The assignment involved group work and peer feedback that allowed students to improve their brochures prior to submission. Support for the communication aspects of the assignment was developed by a teaching team consisting of the subject lecturer and two lecturers with a specialisation in academic language and learning. This support consisted of a rubric containing detailed communication rows, and annotated brochures illustrating written and visual features of this unfamiliar assignment genre. At the end of the subject, students were surveyed to seek their feedback on the usefulness of the assignment, the rubric (especially the detailed communication rows), the annotated brochures, and the peer review process. Results were highly positive, with students seeing value in this type of assignment for developing their communication skills. Students reported benefits in both giving and receiving (and using) peer feedback to improve their brochures. While giving feedback was considered to be helpful for enhancing both communication and understanding of the rubric, receiving feedback was mostly seen as beneficial for the purposes of editing and proofreading. Students reported that the main challenges of the assignment were in being concise and tailoring the language of the brochure to the target audience. The results suggest that while the support was viewed as very helpful, students may need more explicit and scaffolded guidance in tailoring their communication for a non-academic audience in a multimodal genre.

Key Words: multimodal communication, brochure, assessment, academic literacy, veterinary science, animal science.

1. Introduction

This paper describes the language and learning support provided for a group assignment in a second-year animal science subject that included students enrolled in animal science and veterinary science degrees. The assignment required students to produce a brochure written for an audience of farmers, with formative peer feedback on the written and visual communication aspects of the brochure a key feature of the assignment. A teaching team consisting of the subject lecturer and two academic language and learning (ALL) specialists provided additional support for students, with the ALL teachers having input into the development of detailed communication rows in the marking rubric. The ALL teachers also developed a resource for students that included

annotated brochure exemplars illustrating the written and visual communication features of the genre. This type of assignment has features that make it potentially engaging but also challenging for students—not only is it multimodal in design, but it requires students to write for a non-academic 'real-world' audience in an assignment genre not traditionally used in the sciences (Dorner, 2015). This study contributes to the scant published literature describing the use of multimodal assignments such as brochures in various academic disciplines, and in particular, in animal science and veterinary science (Dorman et al., 2013). A major contribution to the literature is the exploration of students' perceptions of the brochure assignment, notably, the value of a peer feedback process that was aimed at improving students' understanding of the rubric and the quality of their assignment prior to submission.

2. Communication in veterinary science

Veterinary accrediting bodies around the world have identified communication as a crucial generic skill for veterinary science graduates (Dorman et al., 2013; Jaarsma, Dolmans, Sherpbier, & Van Beukelen, 2009; Lewis & Klausner, 2003; Sharkey, Overmann, & Flash, 2007). In the Australian context, the Australasian Veterinary Boards Council standards include two "communication related general professional skills and attributes" which emphasise oral, visual and written communication skills and an understanding of the needs of diverse audiences (Australasian Veterinary Boards Council, 2016, p. 98). These audiences range from "highly skilled veterinary professionals to lay clientele" and can include "other veterinarians, veterinary technicians, other health professionals, staff, clients, and external agencies (such as insurance agencies)" (Hendrix, Thompson, & Mann, 2001). A recent Australian study (Haldane, Hinchcliff, Mansell, & Baik, 2017) surveyed registered veterinarians and students enrolled in a veterinary science degree to identify those skills considered the most important for entry-level veterinarians. Of the set of six skills[1], verbal communication and interpersonal skills were perceived to be the most important, perhaps reflecting the emphasis on practitioner-client communication in the veterinary science curriculum (Mills et al., 2006; Shaw & Ihle, 2006). In contrast, written communication skills were viewed, for the most part, as the least important of the six skills. Even though written communication was seen as less important, it is in fact essential in veterinary science, as evidenced by the wide range of written communications required of professional veterinarians: patient records, referral letters, inquiry responses, emails, financial forms, billings, academic publications, newspaper or newsletter articles, client instructions, health certificates, preventive medicine reports, prescriptions, client educational materials, social media for communication with clients and community, Internet postings and brochures (Dorman et al., 2013; Hendrix et al., 2001; Kedrowitz, Hammond, & Dorman, 2017).

2.1. Challenges in veterinary science students' written communication

Dorman et al. (2013) have observed that the development of written communication skills is not often addressed in the veterinary curriculum, which may be one reason why a group of Deans of Veterinary Medical Schools in the US and Canada described writing as "the most problematic area" in veterinary students' communication (Hendrix et al., 2001, p. 39). The most challenging areas for students were reported to be: the organisation and development of ideas; the level of detail provided and the use of examples; and grammar. More recently, and in the Australian context, Haldane et al. (2017) also reported written communication challenges for veterinary students, such as an inability to write clearly and succinctly, and difficulty in communicating complex medical processes to non-medical audiences. They argue that these issues are compounded because written communication skills are "rarely assessed directly within the veterinary curriculum,

[1]These were: knowledge base; critical thinking and problem-solving; medical and technical; surgical; verbal communication and interpersonal skills; and written communication.

although they are an intrinsic factor in the grading of written assignments" (Haldane et al., 2017, p. 275).

Some of the written professional veterinary communication practices listed above (e.g. client educational materials, social media for communication with clients and community, Internet postings, and brochures) can incorporate multimodal aspects such as graphs, diagrams and images alongside written text. Multimodality refers to "approaches that understand communication and representation to be more than about language, and which attend to the full range of communicational forms people use – image, gesture, gaze, posture, and so on – and the relationships between them" (Jewitt, 2009, p. 14). In recognition of the increasing importance of multimodal texts in professional and everyday communicative practices, assignments incorporating multimodality are becoming more common at university (Bhusal, 2019). Assignment types can include poster presentations (Billington, 1997; Dorner, 2015; Mulnix & Penhale, 1997), mock conferences (Clarke, Schull, Coleman, Pitt, & Manathunga, 2013), PowerPoint presentations (Chan, 2011) and brochures (Craciun & Corrigan, 2010; Dorman et al., 2013; Graves, 2001; Lauer, 2013). Multimodal assignments have the benefit of encouraging students to conceptualise, organise and express their ideas in different ways, offering more opportunities for learners with a preference for visual communication to demonstrate their abilities (Dorner, 2015). They can also enhance students' engagement with their learning and improve their capacity to remember and apply technical knowledge (Dorman et al., 2013; Haldane et al., 2017). Some multimodal assignments are also aimed at imagined 'real-world' audiences, and in some cases involve service learning that provides practical benefits to actual clients (Craciun & Corrigan, 2010; Graves, 2001; Hilosky et al., 1999; Lauer, 2013; McGreevy, Costa, Della Torre, Thomson, & Nicholas, 2005). However, as it is likely that many students will not be familiar with multimodal and client-facing assignment genres, additional guidance may need to be offered to students to help them develop the required communication skills (Dorner, 2015).

2.2. Curriculum embedded support in veterinary science

As noted by Hendrix et al. (2001), although veterinary science teachers tend to be aware that their students need to develop their written communication skills, these skills are not specifically addressed. This can be because space has not been provided within the curriculum to help students develop these skills, or subject teachers lack the confidence or expertise to deal with students' written communication problems (Dorman et al., 2013; Haldane et al., 2017; Kurtz, 2006). Further, some subject teachers believe it is not their responsibility to explicitly teach students communication skills (Lane & Bogue, 2010), especially if this is seen as "remedial" (Hendrix et al., 2001, p. 36). As Wingate argues:

> In the current system, subject lecturers, who are experts in the community's discourses and communication, are not obliged to engage with students' academic literacy development. Although many lecturers may do this to some extent, and I assume rather implicitly, there is no systematic and consistent support. By contrast, academics tend to reject engagement with what they perceive as students' language problems, either because they believe that students should learn 'writing' before they come to university, or because they have themselves only a 'tacit' knowledge of their discipline's discourse conventions. (Wingate, 2018, p. 351; see also Jacobs, 2005, p. 447)

In recognition of this dilemma, some veterinary science teachers have recommended that subject teachers collaborate with communication specialists to help their students develop writing skills (Sharkey et al., 2007). For instance, Clarke et al. (2013) have argued that "writing programmes which foster the development of writing skills within a disciplinary context are more likely to succeed" (p. 275). A Dean in Hendrix et al.'s communication survey recommended students be offered "more opportunities to practice and develop these skills as integrated activities in the

curriculum rather than extracurricular support services" (2001, p. 36) while other veterinary science teachers have proposed a scaffolded approach to communication development in the curriculum (Stevens & Kedrowicz, 2018).

The effectiveness of curriculum embedded, discipline-specific communication support that is closely integrated with course content has been well-documented in the ALL field (Harris & Ashton, 2011; Jones et al., 2002; Purser, 2011; Thies, 2012). In this approach, support is provided to all students and closely related to their course content rather than offered only to those viewed as in need of "remediation", as is the case in generic adjunct workshops (Jones et al., 2002). Given the apparently widespread issues in veterinary science students' writing, as noted above, the embedded approach may therefore be the most suitable for successfully addressing these issues. Furthermore, for science subjects, more generally, it has been argued that "[integration] with the discipline material and structure is an essential component of the learning process such that writing also helps to develop analytical abilities, scientific knowledge construction and retention" (Taylor & Drury, 2007, p. 117).

2.3. The use of brochures in university assignments

In professional practice, brochures (and related texts such as pamphlets) are used to communicate ideas to non-specialist audiences and encourage readers to take specific courses of action. In the university context, brochures have been used as assessment tasks in a variety of disciplines, namely health (Michielutte, Bahnson, Dignan, & Schroeder, 1992), marketing (Craciun & Corrigan, 2010), technical communication (Graves, 2001; Lauer, 2013) and veterinary science (Dorman et al., 2013).

The most commonly cited marking criteria used to evaluate written communication in brochure assignments, apart from content, are clarity and conciseness of expression, appropriateness of the language for the target audience (e.g. the use of lay vocabulary rather than technical terminology) and readability (Dorman et al., 2013; Graves, 2001; Michielutte et al., 1992). Criteria related to visual communication include the overall layout of the brochure; the use of figures, images and graphics; the use of colour, font type and size; and aesthetics (Dorman et al., 2013; Lauer, 2013). In some cases, marking criteria include how well the brochure meets specified branding requirements (Craciun & Corrigan, 2010). Rubrics are commonly provided to students prior to submission of the assignment to enhance their understanding of the marking criteria and standards of performance (Dorman et al., 2013; Hendry, White, & Herbert, 2016; Lauer, 2013; see also Colvin, Bacchus, Knight, & Ritter, 2016). Guest lectures and tutorials conducted by outside specialists (Craciun & Corrigan, 2010; Graves, 2001) and exemplars illustrating requirements around content, language and design (Graves, 2001) can also be provided to offer students more guidance. Formative feedback can be provided either by the subject teacher (Lauer, 2013), outside specialists (Graves, 2001), student peers (Buchner, Nawrocik, & Burger, 2018; Clarke et al., 2013; Hilosky et al., 1999), or sometimes a combination of these. It has been argued that brochure assignments produced through group work can also offer students a broader range of experience and skills upon which to draw than individual assignments and can provide opportunities for them to enhance their interpersonal skills (Clarke et al., 2013; Mills, 2003).

2.3.1. The use of multimodal and/or client-facing assignments in veterinary and animal science subjects

To date, there have been only two published reports on the use of client-facing multimodal assignments in veterinary science (and none to our knowledge in animal science). The first paper describes a brochure assignment in a third year veterinary science subject in a US university (Dorman et al., 2013), the aim of which was to develop students' capacity to communicate relevant information about veterinary toxicology and poisonous plants to owners of "small animals, pet birds or other exotic species, horses, or food animals" (p. 20). Students' work in this assignment

was evaluated by professional veterinary toxicologists. With respect to support for the assignment, the authors state that a grading rubric was provided to students before the project submission date along with examples of "student-generated toxicology brochures … to further assist them in meeting the objectives of this writing assignment" (p. 25). Moreover, students were directed to computer-based readability indexes to guide them in the style of language required; readability being one of the main aspects of the brochure evaluated by the course instructor, professionals and the general public. Other than the readability indexes, no additional communication support was provided for this assignment, and the authors noted that:

> Our results also highlighted the need for student instruction on the strengths and limitations of computer-based readability tools. It is also important to instruct students that readability calculations work best on complete sentences, whereas brochures often have very few complete sentences. Students using the formulas to improve brochure comprehensibility must consider the reading level and vocabulary of their intended client audience. Long words and sentences drive readability scores, but short words and short sentences may be just as important to failed understanding. (Dorman et al., 2013, pp. 25-26)

The second assignment reported in the literature was a library-based task in a first year undergraduate veterinary science subject in an Australian university (McGreevy et al., 2005), in which students were required to write contributions for two databases (the Canine Inherited Disorders Database (Canada) and the Inherited Diseases in Dogs Database (UK). The aim of this database assignment was for students to develop their understanding of congenital and inherited disorders in domestic dogs, as well as to appreciate how to write in "clear plain English" (p. 551). Of the nine database fields students were required to fill out, two are especially relevant to our own study: the Brief Description of Inherited Disorders ("One sentence describing the disorder") and Presenting Signs ("Up to 250 words describing in lay terms the ways in which the disorder affects dogs"). Both these fields required students to write concisely and to translate academic / specialist language into language appropriate for a non-specialist audience. With respect to additional support for this assignment, students were offered a tutorial on the use of the databases and shown how to search for relevant information. However, students were not given any specific guidance on how to write the textual descriptions; the focus was more on ensuring the quality of the students' entries for ultimate inclusion in the databases:

> The disorder descriptions were assessed and then edited by a veterinary practitioner and professional scientific editor, who moderated the terms and language used to ensure accessibility for the target audience, namely breeders and owners. Written permission for inclusion in the database was obtained from all students contributing intellectual property to the database. Student authors were credited individually for each piece of work in the database. (McGreevy et al., 2005, p. 552)

Neither of these two assignments incorporated group work or peer feedback into their assessment design.

2.3.2. Challenges and students' perceptions of the use of brochure assignments

While the veterinary science study described in the previous section (Dorman et al., 2013) did not seek feedback from students about the brochure assignment, they identified this as a future aim. They also noted that "[completion] of this project could … lead to the identification of students with underdeveloped writing skills who could then be directed by a faculty mentor to the appropriate assistance program" (Dorman et al., 2013, p. 25). The second veterinary science study (McGreevy et al., 2005), however, did seek student feedback about their database assignment. The students reported that ensuring the brochure's language was appropriate and accessible for their target audience was one of the most challenging aspects of the task (McGreevy et al., 2005).

This resonates with reports from the ALL literature that the ability to "repackage" academic terminology for non-academic and non-specialist audiences is one of the more difficult skills for science students to master (Feez & Quinn, 2017).

More discussion of students' perceptions of the value of brochure assignments can be found for other disciplines. For instance, students in a marketing subject viewed their group brochure assignment quite positively (a mean score of 3.67 on a five-point Likert scale in response to the question "In my opinion, the project provided me with a high level of ability to enhance my written communication skills", which was one of 25 questions about the project) (Craciun & Corrigan, 2010, p. 123). The aim of this team-based brochure assignment was for students to apply their understanding of branding to a "real-life" project in which the client (the university itself) identified the aims of the project ("a cover page and a course description for one of the marketing classes", p. 119) as well as what they expected from the brochure. The project was well scaffolded and staged, with ample opportunity for formative feedback to enhance the quality of the students' work pre-submission. The university's director of public relations gave a lecture on branding and evaluated students' "mock-up" brochures and students presented their final product in a PowerPoint presentation at the end of the subject and this was evaluated by the marketing faculty. Marking rubrics were provided to students "as a project assessment tool and [ ] a way to provide feedback and suggestions for project improvement" (p. 119), as well as a means of clarifying the clients' requirements for the brochure. With respect to students' feedback collected at the end of the course, students noted that,

> as a learning experience, the brochure project was more applied and interesting than listening to a lecture. They agreed that the project provided them with both analytical skills (e.g., building consumer surveys, analyzing consumer data) and communication skills. They also believed that the project helped them understand the importance of a consistent brand image in an organization's overall marketing strategy. (Craciun & Corrigan, 2010, p. 122)

In another brochure assignment in a technical writing subject, students likewise rated quite highly what they had learnt about "service learning" (a mean score of 3.96 on a five-point Likert scale), specifically, how to write with the requirements of specific clients in mind (Graves, 2001). Feedback on their drafts came from the class instructor and professionals rather than student peers, with the focus of the professionals' feedback more on the content and appearance of the document than on written communication and grammatical errors. The students valued the opportunity to produce work that they saw as having real value and benefits to a 'real-world' client.

In general, more data is needed to understand what undergraduate students view as the learning opportunities and challenges of brochure assignments across disciplines, and in veterinary science and animal science in particular. Supporting this view, Haldane et al. (2017) have called for more understanding of students' perceptions of written communication in the veterinary science curriculum, especially early in their degrees. Given the communication challenges of multimodal and client-facing brochure assignments, it is important to identify what learning support students might require and whether a group-based assignment involving peer feedback can actively support their learning. This paper addresses these issues by:

1. Exploring students' perceptions of the value of a brochure assignment for written and visual communication skills development in veterinary science and animal science
2. Assessing students' perceptions of the usefulness of communication and learning support resources tailored to the subject content and assignment requirements
3. Evaluating students' perceptions of their group work and peer feedback learning experiences.

3. The brochure assignment: "Animal Structure and Function A"

3.1. Description

The brochure assignment described here was the second of two assignments designed to explicitly develop second year undergraduate veterinary science and animal science students' academic and professional writing skills.[2] The unit "Animal Structure and Function A" covers the study of animal anatomy and physiology in the context of managing animals in domestic and captive situations. The veterinary science student group within the cohort included a higher number/ratio of international students and had higher entry requirements than the animal science student group.

Assignment 1 was a short individual written assignment (500 words) that required students to define thermoregulation as it relates to homeostasis. The aim of the assignment was to ensure students acquire requisite content knowledge and to scaffold their learning in preparation for the following brochure assignment (Assignment 2). The rubric for Assignment 1 was designed by a team that included the subject lecturer, an academic developer and two lecturers with a specialisation in ALL. These two lecturers provided input into the communication rows (criteria and descriptors) in the rubric and designed learning activities for a two-hour workshop held in Week 2 of the semester, the aim of which was to enhance students' understanding of the rubric's communication rows. The first activity in the workshop elicited students' perceptions of what might constitute an effective response to a sample assignment question on the topic of biosecurity. They were then asked to refer to two sample responses of differing standards to identify criteria that could be included in the communication rows in the rubric and to identify different standards (pass, credit, distinction, high distinction) for one of these criteria. A third activity asked students to analyse subject expert comments on these same sample responses (but with no standard indicated) and to revisit their own criteria and standards developed in activities 1 and 2 to supplement or adjust these if required. Students' ideas were then used by the subject lecturer to develop the final version of the rubric.

The aim of Assignment 2, which is the focus of the present study, was for students to transfer their knowledge about thermoregulation into a brochure providing advice for farmers. The rubric for this second assignment contained seven marking criteria: Criteria 1 and 2 related to the content while Criteria 3 to 7 related to the brochure's communication aspects: structure, style, use of source material, grammar, and visuals (Figure 1). The level of detail provided in the rubric was designed to provide formative guidance to students for these communication aspects in the brochure. Different standards were also provided in the rubric; examples of two of these (for Criteria 4) are also shown in Figure 1.

While there were no in-class activities associated with the brochure assignment (as compared with Assignment 1), the ALL teachers provided annotations for two publicly available brochures (of differing quality) that dealt with biosecurity advice for farmers with goats and sheep. The aim was to illustrate the features of the genre and differences in the quality of communication (written and visual) in the two examples, and to clarify the communication criteria provided in the rubric.

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[2] Description of the Animal Health, Disease and Welfare major: "Animals play a significant role in the lives of people and communities, including for food and fibre production and pets for companionship. The Animal Health, Disease and Welfare major integrates the areas of animal biology and ecology with that in comparative and veterinary science. You will learn about the science that underpins the biology of animal health and disease including physiology, molecular biology, infectious agents and animal welfare. An emphasis of this major is the prevention, treatment and understanding of disease in production and companion animals and wildlife. This major will prepare you for a career in animal health sciences including areas of infectious disease control, disease surveillance, animal welfare and animal production industries." (https://www.sydney.edu.au/courses/subject-areas/major/animal-health-disease-and-welfare.html)

(See Hendry et al. (2016) for discussion of rubrics and exemplars in Animal Science.) The annotations drew on multimodal theory (Kress, 2010) and the applied linguistics theory of systemic functional linguistics (Halliday & Matthiessen, 2004; Martin & Rose, 2008). The annotations are shown in Table 1 (the brochures themselves have not been included) and the marking criteria to which they correspond are indicated.[3]

1. Explains thermoregulation as it relates to species anatomy and physiology and how the production system may affect the animals' ability to thermoregulate
2. Explains the adverse effect of the production system on homeostasis and provide recommendations for managing animals to reduce or prevent adverse effects
3. Structure as response to the question
   - Analytical organisation of information / use of headings/ subheadings / logical flow / presentation of ideas in brochure panels and in brochure as a whole
   - Paragraph structure and development / bulleted lists
   - Topic sentences. Logical flow in paragraphs and lists
4. Appropriate style for audience, appropriate use of key terms (technical terms and lay-terms) and language

FAIL (< 50)	**PASS** (50-64)	**CREDIT** (65-74)	**DISTINCTION** (75-84)	**HIGH DISTINCTION** (85-100)
...	Generally accurate and appropriate style, use of language and key terms. Some expression of complex/ abstract ideas using appropriate lay-terms and language but often meanings are unclear.	**...**	Accurate and appropriate style. Use of language and key terms more concise and sophisticated. Expression of complex/ abstract ideas using appropriate lay-terms and language.	**...**

5. Use of source material. Referencing uses Vancouver style.
6. Grammar, spelling and punctuation
7. Appropriate visual communication
   - Layout of content for tri-fold brochure, outside and inside panels
   - Typography
   - Choice and location of visuals
   - Connection between visual and text

Figure 1. Marking criteria in the rubric for the Thermoregulation brochure assignment, with two of the standards shown for Criteria 4.

[3] Criteria 5 (referencing and source material) was not included in the Annotations as the focus in this resource was on the language and visuals. Guidance on Vancouver style referencing was provided in Assignment 1.

Table 1. Annotations on the two brochure examples.

	Brochure 1: Goats and the smallholder. Some biosecurity tips. (Department of Primary Industries, Parks, Water and Environment. Government of Tasmania)	**Brochure 2: Sheep and goats.** (Local Land Services, North Coast, New South Wales Government)
Structure (Criteria 3)	▪ Information organised in panels. ▪ Headings (very general) identify areas relevant to biosecurity developed horizontally in a logical way beginning with introducing goats to a property, their health and farm practices. ▪ Lists under headings generally not organised in a logical way except for 'Introducing goats' which organises information as a process, beginning with buying, then transporting, then isolating etc. ▪ Some bullet points develop into short paragraphs and give more explanation e.g. explaining RAM, or giving reasons for farm practices e.g. reason for checking boundary fences	▪ Information organised within and across panels. ▪ Headings identify areas relevant to biosecurity developed across the 3 panels. ▪ Logical connections among main topics is unclear although the aspects identified may be the most important for biosecurity/ protecting your sheep and goats etc. ▪ Information under main headings organised in a logical way in paragraphs and bulleted lists. e.g. paragraph under 'Are you introducing...' first gives reasons for the recommendations in the bullet points. ▪ Paragraphs developed in a logical way.
Style (Criteria 4)	▪ Appropriate style for addressing audience. ▪ Use of imperatives e.g. 'check', personal style e.g. 'If you buy ...' and informal language, 'keep in good shape' 'Don't assume...' ▪ Use of key lay terms: footrot, drench Technical terms explained e.g. RAM	▪ Appropriate style for addressing audience. ▪ Use of personal style e.g. questions 'Are you ...'' colloquial language 'on the back of a truck' ▪ Use of key lay terms and technical terms. e.g. Enterotoxaemia (Pulpy Kidney)
Grammar (Criteria 6)	▪ Bullet points mostly listed in parallel structure (except under Goat Health)	▪ Bullet points listed in parallel structure
Visuals (Criteria 7)	▪ Bold typography used for headings and to give emphasis to most important parts of text. ▪ Quotation marks used to identify and emphasise technical terms. ▪ Framed text in bold italics emphasises the importance of reporting disease and providing contact details. ▪ Framed text located appropriately at bottom of panel on Goat Health. ▪ Lack of colour and design features to add interest and too much text	▪ Colour used for headings/ parts of headings gives emphasis to most important parts. ▪ Colour used to highlight contact details at appropriate places in the brochure. ▪ Bold used to identify and emphasize technical terms. ▪ Colour panels provide cohesion with rest of brochure. ▪ Sheep and goat visuals link to heading (Are you introducing sheep or goats?) on inside front cover

Students were also provided with explicit instructions on the brochure layout (including how to fold the panels such that they created a tri-fold brochure).

An important aspect of this assignment was the peer review process scheduled two weeks prior to the assignment due date, which allowed student groups the opportunity to improve their brochures prior to submission. Each student was provided with a brochure from a different group to review, resulting in each group (of three to four students) receiving comments on their brochure

from at least three other students. The peer review process was anonymous in all directions. The brochures for review were assigned randomly using the Learning Management System and submitted online. An additional week was provided for students to reflect on their peers' comments and to make any further changes to their brochures before final submission.

3.2. Methodology

At the end of the subject, all enrolled students were surveyed using Survey Monkey to seek their feedback about different aspects of the assignment. Ethics approval was obtained by the University's Ethics Committee.

The survey contained 12 questions (see Table 2). The first seven questions required quantitative responses related to the usefulness of the brochure annotations, the rubric, and the peer review process. These questions used a five-point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree. The final five questions allowed students to provide qualitative feedback about their learning and to identify any challenges associated with the written and visual communication aspects of the brochure, and the peer feedback process. No questions were asked specifically about the group work process, although some students commented on this in their responses.

Table 2. Survey questions.

Quantitative (Q1-7)	**Qualitative (Q8-12)**
Q1 The brochure examples helped me to understand what was expected in the group assignment	**Q8** What did you learn about written communication in Animal Science from doing the brochure assignment
Q2 The annotations on the brochure examples helped me to understand the kind of writing that was expected in the group assignment	**Q9** What did you learn about visual communication in Animal Science from doing the brochure assignment
Q3 The annotations on the brochure examples helped me to understand the visual communication that was expected in the group assignment	**Q10** What did your group find was most difficult about doing the brochure assignment?
Q4 I understood the marking rubric for the brochure	**Q11** What did you and your group learn from giving peer feedback on another group's brochure?
Q5 The marking rubric for the brochure helped me and my group produce the kind of brochure expected in the assignment	**Q12** How did you and your group use the peer feedback on your brochure?
Q6 I / My group used the marking rubric for the brochure to give peer feedback on another group's brochure	
Q7 The feedback on our brochure from my peers helped me and my group to improve our brochure before final submission	

4. Results

Quantitative and qualitative data were collected from 18 students, representing approximately 20% of the cohort. This falls within the expected response rate for an online survey conducted outside of class time (Nulty, 2008).

4.1. Quantitative results

Descriptive statistical analysis yielded the results for Questions 1–7 shown in Table 3. They suggest that the respondents were strongly positive about the brochure assignment overall. Almost

90% of students agreed or strongly agreed that the annotations had helped them understand the written communication requirements of the assignment, although strong agreement was lower for the visual communication aspects (Q1-3). Students rated positively their understanding of the marking rubric (Q4) and how it had helped them understand the expectations of the assignment (Q5), with ratings close to 90% for both Q4 and Q5. The question with the strongest agreement (almost 75%) dealt with how students had used the rubric to give peer feedback (Q6) and almost two thirds of students strongly agreed that the peer feedback process had helped them improve their brochure for final submission (Q7). The question about the usefulness of receiving feedback from peers received the most mixed responses, indicating that this process may not have been helpful for all students.

Table 3. Distribution of Likert responses in percentages (N = 18) and response means.

Answer Options	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Q1. Brochure examples helped me understand what was expected in the group assignment	0	5.6	5.6	44.4	44.4	4.2
Q2. Annotations on brochure examples helped me understand the writing expected in the assignment	5.6	0	11.1	33.3	50	4.2
Q3. Annotations on brochure examples helped me understand the visual communication expected in the assignment	5.6	0	5.6	50	38.8	4.1
Q4. I understood the marking rubric for the brochure	5.6	0	0	55.5	38.9	4.2
Q5. The marking rubric helped me and my group produce the brochure expected in the assignment	5.6	0	5.6	55.5	33.3	4.1
Q6. I/my group used the rubric to give peer feedback on another group's brochure	5.6	0	0	22.2	72.2	4.7
Q7. The feedback from my peers helped me/my group improve our brochure for final submission	5.6	11.1	11.1	11.1	61.1	4.1

4.2. Qualitative results

Overall, there were 73 comments provided by the 18 students over the five qualitative questions (Q8-Q12). Qualitative analysis was performed using inductive thematic coding (Strauss & Corbin, 1990) which yielded 27 instances in total. Comments on the written and visual communication aspects of the assignment were coded into two broad themes—learning and challenges—with six subthemes within these two broader categories (Table 4). Comments on giving feedback

(five sub-themes) and receiving feedback (four sub-themes) were mostly related to aspects of learning from the peer review process rather than any perceived challenges.

4.2.1. Written and visual communication

There were 67 comments (53%) relating to written communication, about double the number for visual communication (27%). The main subthemes in the written communication category, in order of prevalence, were: audience appropriateness, conciseness, and editing/proof-reading. For visual communication, comments were fewer and more evenly spread across the aspects of design, layout and format; images, diagrams and charts; and aesthetics. With respect to the visual communication, one student wryly noted that "you should hire a designer because it is difficult". Sample comments, with frequencies indicated, are shown in Table 4.

Table 4. Selected student comments related to learning and challenges: written and visual communication.

	Example comments	
Written communication (#67)	**Learning**	**Challenges**
Audience appropriateness (#22)	Mostly how to condense large paragraphs so that the audience can easily read the brochure without feeling overwhelmed by the writing. Presenting ideas in an engaging style.	It's a fine line between what might be considered too "sciency" and what's appropriate jargon for a producer/ farmer audience. Trying not to oversimplify language so as not to be condescending to the reader.
Conciseness (#20)	To efficiently send out information in a succinct way. Mostly how to condense large paragraphs so that the audience can easily read the brochure without feeling overwhelmed by the writing.	Just making sure that everything flows and that there aren't too many words. Cutting down was probably one of the harder things to do because it feels like everything we write is important. Fitting all the information we had found, and the refining and culling process … to cover all our main ideas in limited words.
Editing/proof-reading (#14)	The importance of rhetorical questions and topic sentences.	A lot of referencing, grammar and spelling mistakes we had not noticed.
Visual communication (#35)	**Learning**	**Challenges**
Design, layout, format (#7)	The design of a brochure is as important in engaging the audience as the text itself.	The design of the overall layout of the brochure.
Images, diagrams, charts (#7)	Charts and graphs are great ways to condense information and help with the organisation of information.	To fit all the relevant information on the brochure while still making it readable and well-spaced out requires strategically placed images and figures.
Aesthetics (#7)	If not visually pleasing, the brochure will not be effective.	Consideration for font, colour, images and presentation is crucial when designing a brochure.

Students seemed to be well aware of the importance of connecting the written and visual aspects in this genre, and many found dealing with the multimodality challenging. Indicative comments include:

"There should be a clear connection between the text itself and the visual aspects of the brochure otherwise the visual components may distract from rather than support the information presented."

"The text itself was easy enough to source and write, but the brochure format requires a writing style very different from essay writing which is what my group is most familiar with."

"The most difficult part of this assignment was providing information in a succinct, easy-to-understand format that linked text and images into a visually appealing brochure."

4.2.2. Giving and receiving feedback

There were slightly more comments about learning from giving feedback (#28) than for learning from receiving and using feedback (#24). In giving feedback to their peers, students clearly valued the opportunity to compare their work to other groups in terms of both written and visual communication. Some valued the opportunity to learn more about the subject content from other groups' brochures. Most comments concerned their peers' written communication, for example, the cohesion and style of the brochures they reviewed as well as the importance of editing, proofreading and identifying grammatical errors. However, a significant number of comments related to the rubric, with students suggesting that giving feedback increased their own understanding of the assignment requirements. This process also helped some students identify new ideas they could use in their own brochures.

Students' comments related to receiving and using feedback were also positive and only two negative comments were reported (e.g. *"we didn't receive any constructive feedback to use"*). Many student comments referred to the benefits of having other students 'editing' their work, which suggests that the feedback tended to focus on the mechanics of writing (such as correct spelling and grammar) rather than on higher level communication issues (e.g. the level of the whole brochure) or how well they had followed the rubric. Several comments suggested that peer feedback had helped students remove irrelevant or redundant detail and create a more visually pleasing brochure. Sample comments are shown in Table 5.

Table 5. Selected student comments about their experiences of learning from giving and receiving peer feedback on their draft brochure.

Giving feedback (#28)	**Learning**
Written and visual communication (#9)	We got exposure to a variety of ways to communicate both written and visually in the brochure.
	We figured out new ways to present our materials, such as add more charts and graphs.
Understanding the rubric and comparing their work to others (#7)	It showed me the standard of a group that's different to mine and allowed me to apply my scrutiny of their content to my own brochure.
	Using the marking rubric while providing feedback also allowed us to recognise the significance of sticking to the task or question at hand.
Editing/ proofreading/ and grammar (#5)	I learned that it's easy to overlook grammatical errors when you're putting together a brochure, so it is good to have another set of eyes to help find mistakes.
Audience appropriate (#4)	Being aware of your audience is so important when writing, the overuse and lack of explanation of scientific terms made some brochures hard to follow when the rest of it was in very basic explanatory terms.
	Sometimes something may be interpreted differently to how you intended and so you must be very careful with your choice of words, as well as being aware that the reader hasn't necessarily done all the background reading and research you have.

Table 5 continued

Brochure content (#3)	The importance of cross-checking each other's work for factual errors. There were a large range of topics over all the brochures so we got to learn a bit about all animal production systems. How different groups might approach the same question differently.
Receiving and using feedback (#24)	**Learning**
Written and visual communication (#11)	We took most of it into account – cutting stuff down, changing colours, etc. We used the feedback to alter our design and presentation of the brochure to make it more pleasing.
Editing / proof- reading / grammar / formatting (#10)	It really helped us go through and clarify and give direction to our final edit. We made edits where necessary, but did not make incredibly drastic changes.
Understanding the rubric (#1)	The peer feedback pointed out a few key areas for improvement … to better align with the marking rubric.
Audience appropriate (#2)	We corrected all the spellings and grammatical mistakes that we missed, formatted the brochure again to make it more reader friendly.

4.2.3. Group work

Although there were no specific questions about working in groups, some students provided comments about this aspect of the assignment and these tended to be more negative (#7) than positive (#2). The negative comments reflected common challenges reported for group work at university and were related to communication issues and group members' attitudes (Mills, 2003). For example:

> *"Group communication was difficult at times as different members had different ideas about the quality of work that should be done. Two of our members weren't very cooperative and we found it difficult to get them to complete their tasks by the deadline."*
>
> *"We had one group member research and report on each content point, and they ended up all reporting very similar information."*

One student struck a more positive note, observing that, *"We learnt that positive feedback is also as helpful as constructive feedback".*

5. Discussion and conclusion

This study has provided insights into students' perceptions of a brochure assignment in an undergraduate animal science subject with a combined animal science and veterinary science student cohort. The assignment required students to further develop their disciplinary knowledge and communication skills in a multimodal genre aimed at a 'real-world' audience of farmers. Students were provided with detailed communication criteria in the marking rubric as well as annotated brochure examples to offer them guidance on how to produce the written and visual aspects of the assignment. To our knowledge, there have been no previous studies of a group brochure assignment with specialist communication support and a peer feedback process. Moreover, there has been only one brochure assignment reported in veterinary science (and none in animal science) and that study did not seek students' feedback about the assignment and used readability indexes that have limited benefits in developing students' writing skills, especially in the brochure genre.

Our results reveal that students valued this opportunity to demonstrate their learning through this multimodal assignment rather than through a more traditional written academic assignment, reflecting findings reported in the discipline of marketing (Craciun & Corrigan, 2010). While students valued the opportunity to enhance their visual communication skills (e.g. design, images, diagrams and charts), the written communication aspects were more salient. In particular, they reported that they had increased their understanding of how to communicate with a non-specialist audience and how to be more concise in their communication. At the same time, these are the same areas that posed the most challenges, which supports findings in the other study of brochure assignments in veterinary science (McGreevy et al., 2005).

Our findings also indicate that students rated the detailed rubric and annotated brochures very highly. They also valued the peer review process and emphasised the benefits of seeing how other student groups interpreted the rubric and the different standards of work, which provided a lens through which they could improve the quality of their own work. While students valued the feedback they received from other students, this was seen primarily in terms of having someone edit/proof-read their assignment for 'errors' rather than enhancing their own understanding of the rubric or other communication aspects. These results highlight the importance of promoting to students the value of giving feedback to others, not only as a way of helping their peers improve their work but also as a way of reflecting on and improving their own work. This confirms findings by Nicol, Thomson, and Breslin (2014) and Huisman et al. (2018), who have reported that students see more value in providing than in receiving feedback from their peers. As Nicol et al. (2014) have argued,

> producing feedback reviews engages students in multiple acts of evaluative judgement, both about the work of peers, and, through a reflective process, about their own work; that it involves them in both invoking and applying criteria to explain those judgements; and that it shifts control of feedback processes into students' hands, a shift that can reduce their need for external feedback. (p. 102)

Other authors have reported that the value of feedback increases when it comes from multiple peers, as was the case in our brochure assignment (Cho & MacArthur, 2010). Yet, the finding that students tend to view the value of feedback from other students as more a matter of having 'proof-readers' who can check their work for grammatical errors suggests that students might not be best placed to give feedback to their peers about how to address more complex issues, at least not without training. In particular, guidance from communication specialists would be useful in helping students understand how to adapt language for different audiences, across genres (Feez & Quinn, 2017).

While some students reported challenges in the group work aspect of the task, the comments were few, with those that were offered reflecting the types of issues that teachers have previously reported for group work, such as poor interpersonal and communication skills; a lack of clarity around goals and distribution of labour; and social loafing (Shimazoe & Aldrich, 2010). This relatively low level of complaint may be due to the fact that the survey questions did not specifically include a question about group work, although students were free to discuss this under the questions about 'challenges'. It might also reflect the newness of the genre whereby few students saw themselves as more expert than others. While one student commented that they did not learn anything new from the brochure assignment, they did appreciate the opportunity to write in a less familiar genre. Unlike Assignment 1 (which was a more 'traditional' piece of academic writing), students did not receive in-class support for Assignment 2. A future iteration could include in-class activities aimed at helping students tailor the written communication of their brochures to the audience's needs and to write more concisely.

This study has been somewhat limited by the low number of student responses to the survey; however, the rich qualitative data have offered insights into students' perceptions of their learning, the usefulness of the learning resources (the annotated brochures), and the value of the assignment task overall. Research has suggested "close links between students' positive perceptions of a writing task, including a clear understanding of its purpose, and higher standards of writing being attained" (Clarke et al., 2013, p. 283; see also Ellis, Taylor, & Drury, 2007). Overall, this brochure assignment, its design and the inclusion of additional learning support, was successful according to students' perceptions as reflected in the quantitative and qualitative data. Students' engagement could be further enhanced were the subject teacher and ALL teachers to collaborate with professional veterinarians or animal scientists and/or the target audience (farmers) on the design and evaluation of the brochure, possibly in a service-learning project.

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