Developing Assessment and Feedback Processes through Coding

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Abstract

Note: This is added to give context for when viewing slides outwith talk

Since the integration of coding skills across the research methods teaching of the School of Psychology and Neuroscience, University of Glasgow, much has been made about the benefits to student development. On the flip side, the benefits to staff have been less documented. One area in which this integration can benefit staff is in enhancing our approach to assignment and feedback practices. Over the past decade we have been working on using code to help build feedback sheets to be more informative and usable by students, be it for data skills, exam essays or critical reviews. Beyond that we have been working on techniques to rapidly extract and summarise the comments given by staff on assignments to allow them to shape their teaching in future iterations of their modules, based on common issues and misunderstandings across student submissions. Key to this approach is seeing feedback to students as a form of data, and through the use of freely available packages in R for working with Microsoft office software I will show some of the techniques we use. Feedback is a crucial part of skill development and with these approaches I hope to show that the process can be both efficient for staff and, ultimately, effective for students.

Goal

- Make assignment feedback more effective for student development
    - where does their grade come from
    - how can they improve in their next assignment
- Make the process of assignment feedback more efficient for staff
    - reduce the number of documents people are working with, giving more time to write the actual feedback
    - improve consistency across students
    - allow space for deeper reflection on the feedback, by markers, to help develop future iterations of our teaching.
- In short, making the feedback process more efficient for staff will increase the effectiveness for students based on the benefits said efficiency brings.
- **Note:** For simplicity, "feedback" in this talk refers to both feedback and feedforward.

Defining Philosophy

Feedback is Data; what you can do with Data you can do with Feedback.

- the hard part is getting the feedback in a shape to do something with it.

Motivation

- Rapid development in Feedback of Data Skills teaching

The file you submitted was a well-formed RMarkdown file. Well done!

task	is_correct?
t2	FALSE
t3	TRUE
t4	TRUE
t5	TRUE
t6	TRUE
t7	TRUE
t8	TRUE
t9	TRUE

- Feedback for the first lab of Level 2 under the PsyTeachR initiative in 2017 was somewhat limited
  - That said, the task was less structured than future tasks so marking became harder to do on a large scale.

Motivation

- Rapid development in Feedback of Data Skills teaching

Task 1

Replace NULL in the code chunk below for the ID Number of the oldest particpant

Your code and feedback

```
oldest_participant <- 3
```

- write *code* to generate the solution; writing the answer will be wrong if underlying data changes

Solution

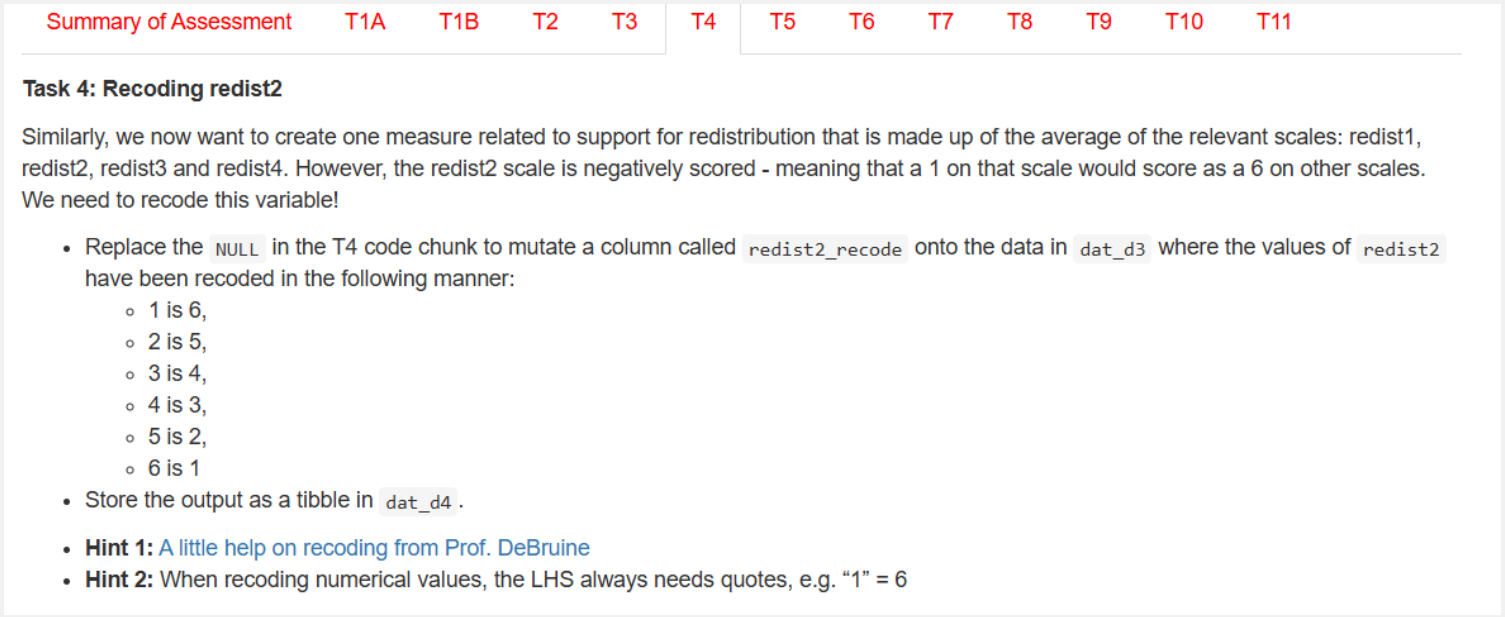
```
oldest_participant <- screening %>%
  filter(AGE == max(AGE)) %>%
  slice(1L) %>% ## in case there is a tie, just get the first row
  pull(ID) ## get the ID number
```

NOTE: was marked as correct if you just set `oldest_participant <- 3` (the correct answer)

- Second lab of same year introduced much more information for students and included both individual and general feedback
  - Students however felt the long list of tasks in one doc was a bit hard to follow.

Motivation

- Rapid development in Feedback of Data Skills teaching



Summary of Assessment | T1A | T1B | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 | T11

Task 4: Recoding redist2

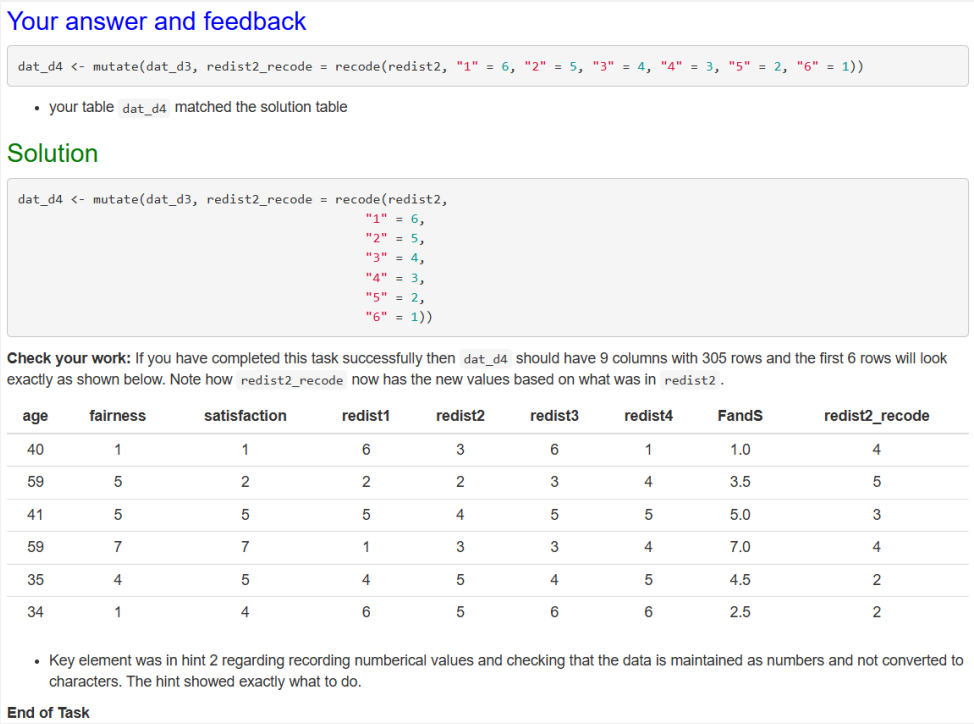
Similarly, we now want to create one measure related to support for redistribution that is made up of the average of the relevant scales: redist1, redist2, redist3 and redist4. However, the redist2 scale is negatively scored - meaning that a 1 on that scale would score as a 6 on other scales. We need to recode this variable!

- Replace the `NULL` in the T4 code chunk to mutate a column called `redist2_recode` onto the data in `dat_d3` where the values of `redist2` have been recoded in the following manner:
  - 1 is 6,
  - 2 is 5,
  - 3 is 4,
  - 4 is 3,
  - 5 is 2,
  - 6 is 1
- Store the output as a tibble in `dat_d4`.
- **Hint 1:** A little help on recoding from Prof. DeBruine
- **Hint 2:** When recoding numerical values, the LHS always needs quotes, e.g. “1” = 6

- By Year 2 we have really detailed feedback sheets for Level 2, showing each question in a separate tab.

Motivation

- Rapid development in Feedback of Data Skills teaching



Your answer and feedback

```
dat_d4 <- mutate(dat_d3, redist2_recode = recode(redist2, "1" = 6, "2" = 5, "3" = 4, "4" = 3, "5" = 2, "6" = 1))
```

- your table `dat_d4` matched the solution table

Solution

```
dat_d4 <- mutate(dat_d3, redist2_recode = recode(redist2,
                                                 "1" = 6,
                                                 "2" = 5,
                                                 "3" = 4,
                                                 "4" = 3,
                                                 "5" = 2,
                                                 "6" = 1))
```

Check your work: If you have completed this task successfully then `dat_d4` should have 9 columns with 305 rows and the first 6 rows will look exactly as shown below. Note how `redist2_recode` now has the new values based on what was in `redist2`.

age	fairness	satisfaction	redist1	redist2	redist3	redist4	FandS	redist2_recode
40	1	1	6	3	6	1	1.0	4
59	5	2	2	2	3	4	3.5	5
41	5	5	5	4	5	5	5.0	3
59	7	7	1	3	3	4	7.0	4
35	4	5	4	5	4	5	4.5	2
34	1	4	6	5	6	6	2.5	2

- Key element was in hint 2 regarding recording numberical values and checking that the data is maintained as numbers and not converted to characters. The hint showed exactly what to do.

End of Task

- As well as more detailed general and individual feedback for each student.

AssessR Approach

sub_id	task	vars	fig	forbid	fbk	err	code	filename
1	T101	*2 variables*		FALSE	* you have successfully loaded the `tidyverse`. Well done!	FALSE	library(tidyverse)	assign_1/Participant_107737
2	T102	*1 variable*		FALSE	* well done! Your table `demogs` matched the solution table...	FALSE	c("demogs <- read_csv(\"participant_demogs.csv\")" [...]	assign_1/Participant_107737
3	T103	*2 variables*		FALSE	* well done! Your table `demogs_sort` matched the solution ...	FALSE	c("demogs_sort <- demogs %>% ", " arrange(desc(HA [...]	assign_1/Participant_107737
4	T104	*1 variable*		FALSE	* your values matched the solution. Well done!	FALSE	young_left <- 11	assign_1/Participant_107737
5	T105	*2 variables*		FALSE	* well done! Your table `demog_filt` matched the solution ta...	FALSE	c("demog_filt <- demogs %>% ", " filter(AGE > 59) [...]	assign_1/Participant_107737
6	T106	*2 variables*		FALSE	* well done! Your table `music_desc` matched the solution ta...	FALSE	c("music_groups <- group_by(demog_filt, MUSICAL)", [...]	assign_1/Participant_107737
7	T107	*2 variables*		FALSE	* well done! Your table `demog_red` matched the solution t...	FALSE	c("demog_red <- demog_filt %>% ", " select(-EDUCA [...]	assign_1/Participant_107737
8	T108	*2 variables*		FALSE	* well done! Your table `resp_long` matched the solution table	FALSE	c("resp_long <- responses %>% ", " pivot_longer(c [...]	assign_1/Participant_107737
9	T109	*2 variables*		FALSE	* well done! Your table `resp_scores` matched the solution t...	FALSE	resp_scores <- left_join(resp_long, scoring, by = [...]	assign_1/Participant_107737
10	T110	*2 variables*		FALSE	* well done! Your table `median_lang` matched the solution ...	FALSE	c("median_lang <- group_by(resp_scores, PID) %>% " [...]	assign_1/Participant_107737
11	T111	*1 variable*		FALSE	* your values matched the solution. Well done!	FALSE	answer_TA111 <- 2	assign_1/Participant_107737
12	T101	*2 variables*		FALSE	* you have successfully loaded the `tidyverse`. Well done!	FALSE	library(tidyverse)	assign_1/Participant_107737
13	T102	*1 variable*		FALSE	* well done! Your table `demogs` matched the solution table...	FALSE	c("demogs <- read_csv(\"participant_demogs.csv\")" [...]	assign_1/Participant_107737
14	T103	*2 variables*		FALSE	* well done! Your table `demogs_sort` matched the solution ...	FALSE	c("demogs_sort <- demogs %>% ", " arrange(desc(HA [...]	assign_1/Participant_107737
15	T104	*1 variable*		FALSE	* your values matched the solution. Well done!	FALSE	young_left <- 11	assign_1/Participant_107737
16	T105	*2 variables*		FALSE	* well done! Your table `demog_filt` matched the solution ta...	FALSE	c("demog_filt <- demogs %>% ", " filter(AGE > 59) [...]	assign_1/Participant_107737

- This works for Data Skills thanks to the assessr package by Dale Barr
  - Each row is single task for a single student and contains their answer and their feedback for that task
  - Combining `assessr::feedback_report` (for producing feedback reports) and `purrr::pwalk` (for iteration) you create a feedback file (html, word, pdf, etc) for each individual student from one template `.Rmd` file.

AssessR Approach

```
### <span style = "color:blue">Your answer and individual feedback</span>

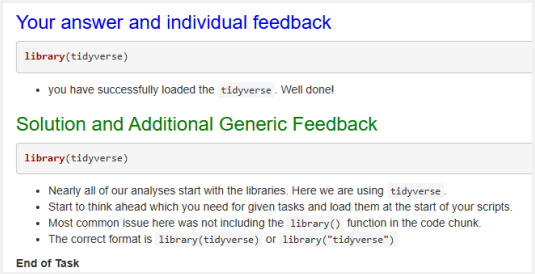
```{r T01_sub, eval = FALSE, code = params$code$TA101}
```

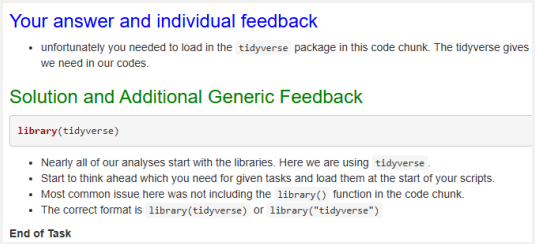
```{r T01_fbk, results = 'asis', echo = FALSE}
cat(params$fbk$TA101)
```

Solution and Additional Generic Feedback

```{r T01_sol, message =FALSE, warning=FALSE}
library(tidyverse)
```

* Nearly all of our analyses start with the libraries. Here we are using `tidyverse`.
* Start to think ahead which you need for given tasks and load them at the start of
```





- `.Rmd` file (left) is the basis for the individual feedback sheets (right).
- Each student (top and bottom right) gets individual feedback as well as the class generic feedback written after all marking is complete
  - a more flexible approach leads to a more holistic perspective.
  - both top and bottom grades benefit from the general feedback

Issue

- Doesn't work so well for assignments based in Word where the feedback is in separate documents for each student or through on-script comments.
- Common practice is to write one feedback sheet (e.g. a Word docx) for each student, adding:
    - the marker name,
    - the student ID,
    - verbal descriptors (Excellent, Very Good) against the marking criteria,
    - some open ended comments about improvement
    - and fill in an excel sheet with the grade
- When N is large, the actual process takes time away from generating feedback.

Solution

- Why don't we just get everyone to do their feedback in an excel sheet and generate the feedback from that?

Excel Approach

GUID	MoodleID	Group	Research	Evaluation	Communication	ForNextTime	Grade
1	GRP1	Monday1	need to have more recent ones. R2 is an example of where you could place your source better to include	report. While you report a number of studies, you do not link them clearly to your research goals. It is not clear what your research question is or what the task is that your participants did. E2 is an example of some flawed	work on the structure of your introduction and also need to follow the structure of an APA report. In this case you presented procedure before materials and this made it difficult to	which ideas are appropriate to support the development of your research question and then relate the methods	C2
2	GRP2	Monday1	sources to discuss and cited them well. However, it is not completely clear how they lead to the research	research question and this was very good. E2 is an example where you evaluated a study well in terms of justifying your research question. However, because of the writing style, it was difficult see how your evaluation	and hence this was satisfactory, however, you need to write more professionally. This was more a diary-like report of your group's thinking. Instead the report should be more	which ideas are appropriate to support the development of your research question and then relate the methods	D2
3	GRP3	Monday1	and use them well with R1 being an example of this. Sources are all over the place, however, in terms of	research question and this was very good. E2 is an example where you evaluated a study well in terms of justifying your research question. However you need to evaluate ideas more consistently in terms of supporting	work on the structure of your introduction and also need to follow the structure of an APA report. For instance add the headings for sections in the methods and attend to logical	which ideas are appropriate to support the development of your research question and then relate the methods	C2

- Same premise as in Data Skills; each row is a student (or group) and each cell relates to a different aspect of the feedback.
- Here each column is one of our marking criteria:
    - Research and Knowledge,
    - Critical Evaluation,
    - Academic Communication,
    - Feedforward
- This is the markr package by Lisa DeBruine, Helena Paterson and myself
    - **to create individual feedback documents and marking summaries from flexibly organised spreadsheets and other types of input.**

Excel Approach

```
### Research and Comprehension

`r paste0(ind_fb$starter, ind_fb$RESEARCH)`

### Evaluation

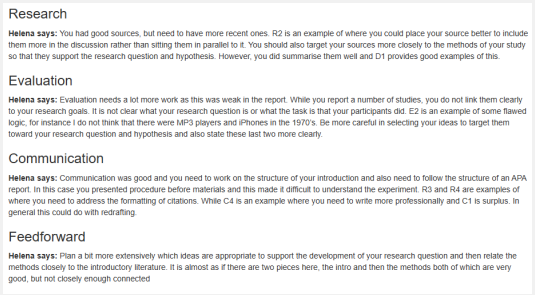
`r paste0(ind_fb$starter, ind_fb$EVAL)`

### Communication

`r paste0(ind_fb$starter, ind_fb$COMM)`

### Feedforward

`r paste0(ind_fb$starter,
ind_fb$FEEDFORWARD)`
```



Research

Helena says: You had good sources, but need to have more recent ones. R2 is an example of where you could place your source better to include them more in the discussion rather than sitting them in parallel to it. You should also target your sources more closely to the methods of your study so that they support the research question and hypothesis. However, you did summarise them well and D1 provides good examples of this.

Evaluation

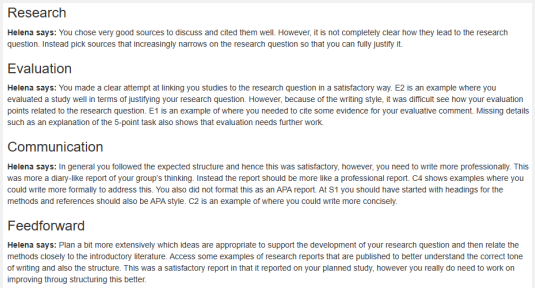
Helena says: Evaluation needs a lot more work as this was weak in the report. While you report a number of studies, you do not link them clearly to your research goals. It is not clear what your research question is or what the task is that your participants did. E2 is an example of some flawed logic, for instance I do not think that there were MP3 players and iPhones in the 1970's. Be more careful in selecting your ideas to target them toward your research question and hypothesis and also state these last two more clearly.

Communication

Helena says: Communication was good and you need to work on the structure of your introduction and also need to follow the structure of an APA report. In this case you presented procedure before materials and this made it difficult to understand the experiment. R3 and R4 are examples of where you need to address the formatting of citations. While C4 is an example where you need to write more professionally and C1 is surplus. In general this could do with redrafting.

Feedforward

Helena says: Plan a bit more extensively which ideas are appropriate to support the development of your research question and then relate the methods closely to the introductory literature. It is almost as if there are two pieces here, the intro and then the methods both of which are very good, but not closely enough connected



Research

Helena says: You chose very good sources to discuss and cited them well. However, it is not completely clear how they lead to the research question. Instead pick sources that increasingly narrows on the research question so that you can fully justify it.

Evaluation

Helena says: You made a clear attempt at linking you studies to the research question in a satisfactory way. E2 is an example where you evaluated a study well in terms of justifying your research question. However, because of the writing style, it was difficult see how your evaluation points related to the research question. E1 is an example of where you needed to cite some evidence for your evaluative comment. Missing details such as an explanation of the 5-point task also shows that evaluation needs further work.

Communication

Helena says: In general you followed the expected structure and hence this was satisfactory; however, you need to write more professionally. This was more a diary-like report of your group's thinking. Instead the report should be more like a professional report. C4 shows examples where you could write more formally to address this. You also did not format this as an APA report. At S1 you should have started with headings for the methods and references should also be APA style. C2 is an example of where you could write more concisely.

Feedforward

Helena says: Plan a bit more extensively which ideas are appropriate to support the development of your research question and then relate the methods closely to the introductory literature. Access some examples of research reports that are published to better understand the correct tone of writing and also the structure. This was a satisfactory report in that it reported on your planned study, however you really do need to work on improving throug structuring this better.

- Again, `.Rmd` file (left) is the basis for the individual feedback sheets (right), generated once all the marking is complete
  - Each feedback sheet on the right is an individual student, each receiving feedback specific to their work, generated from the one `.Rmd` template file

Excel Approach

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1	GRP1	Monday1	need to have more recent ones. R2 is an example of where you could place your source better to include	report. While you report a number of studies, you do not link them clearly to your research goals. It is not clear what your research question is or what the task is that your participants did. E2 is an example of some flawed	work on the structure of your introduction and also need to follow the structure of an APA report. In this case you presented procedure before materials and this made it difficult to	which ideas are appropriate to support the development of your research question and then relate the methods	C2
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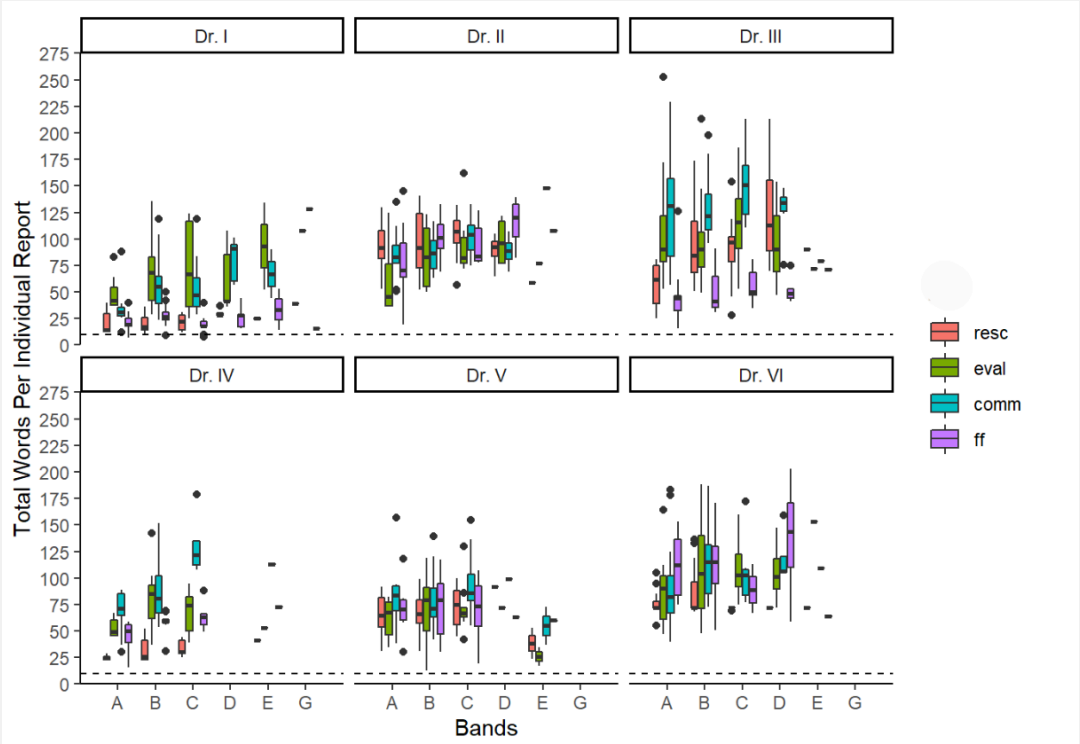
3	GRP3	Monday1	and use them well with R1 being an example of this. Sources are all over the place, however, in terms of	research question and this was very good. E2 is an example where you evaluated a study well in terms of justifying your research question. However you need to evaluate ideas more consistently in terms of supporting	work on the structure of your introduction and also need to follow the structure of an APA report. For instance add the headings for sections in the methods and attend to logical	which ideas are appropriate to support the development of your research question and then relate the methods	C2

Benefits

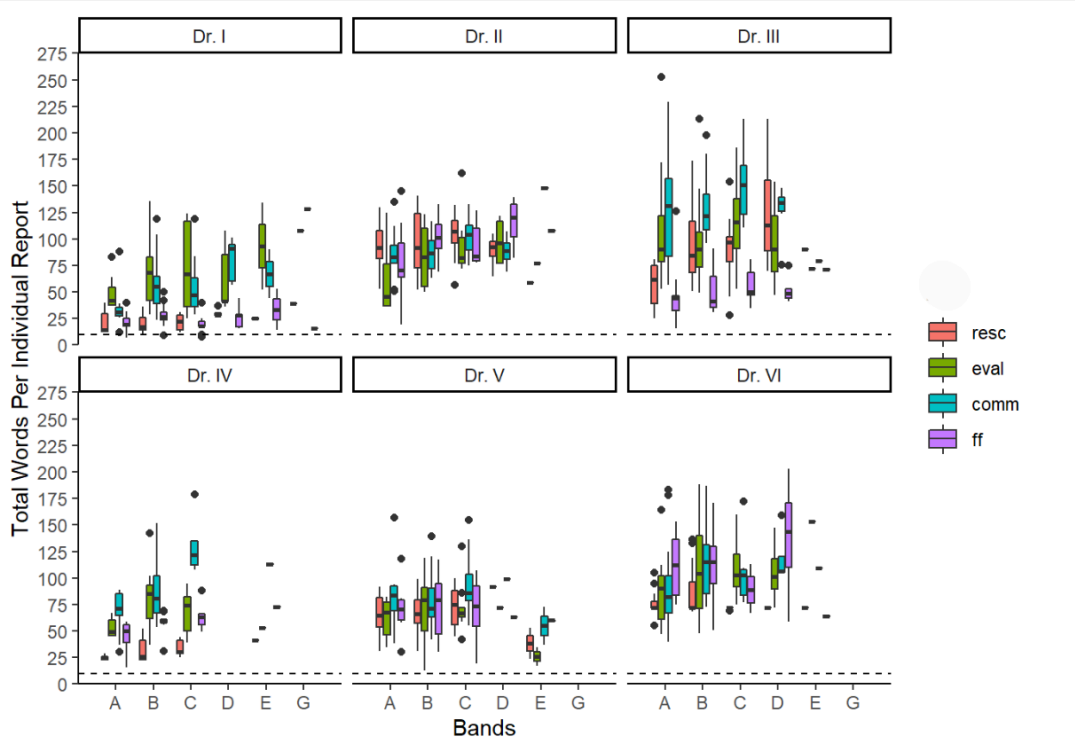
- All your feedback is in one place and so:
  - Marker can have greater reflection as you go along
  - Similar issues can receive similar feedback without backtracking through numerous files
  - Spelling and grammar mistakes in feedback, missed input, etc, can be remedied quickly without finding individual feedback documents
  - Post moderation changes can be actioned relatively easily
  - General whole class feedback can be added to every student's report after marking is complete because the feedback documents don't exist until after marking.
  - Carry out feedback analytics!

Feedback Analytics



- Along with distributions you can explore aspects such as (shown above) the number of words each marker gives (y-axis) to different marking criteria (colors: research, evaluation, communication, feedforward) and to each grade band (x-axis).
  - dashed line is 10 words; an arbitrary lower bound

Feedback Analytics



- For example, a common issue within feedback is A band students receive less feedback than lower bands
  - whilst quantity is not directly correlated with quality, it does give you something to consider and discuss within the marking team.

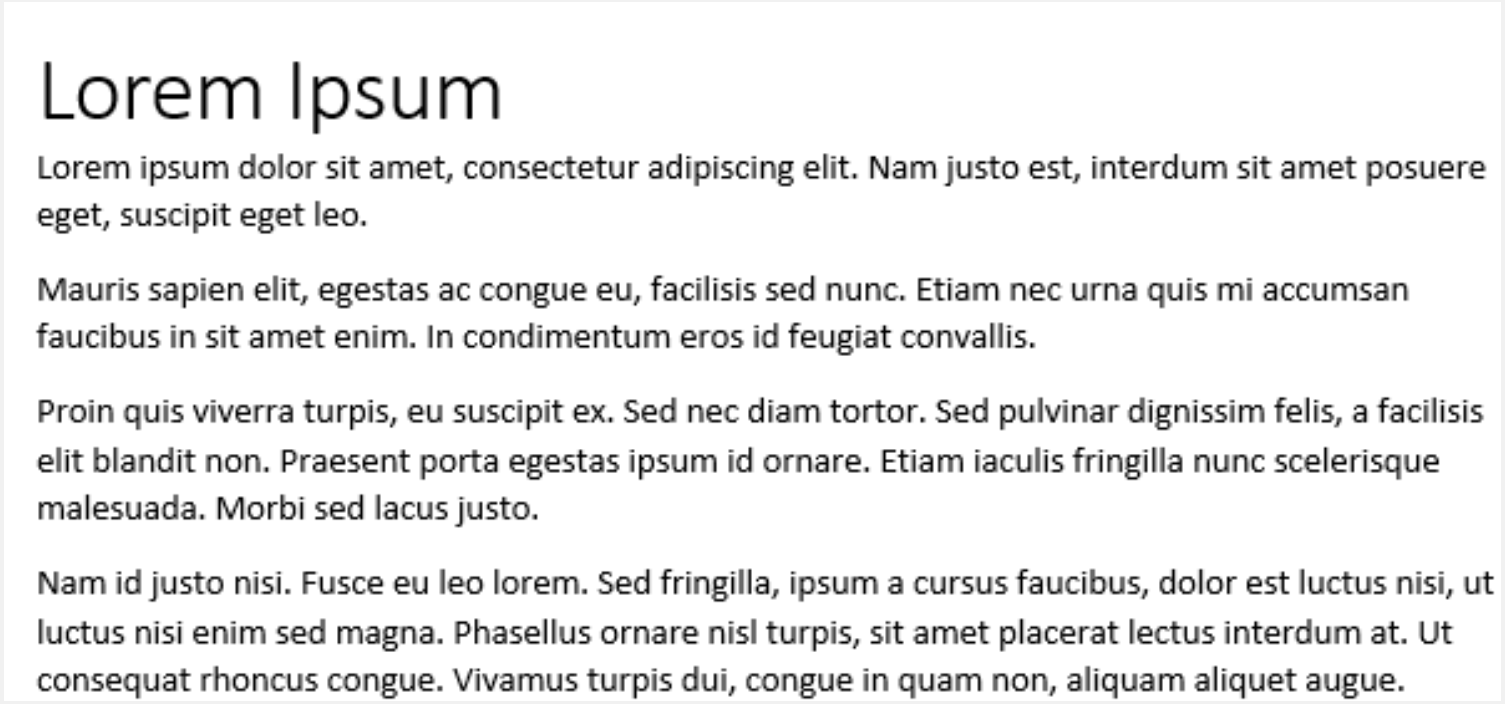
Issue with Excel Approach

- People don't like typing feedback in Excel
    - Excel was never designed to be a word processing tool

Solution

- Use a word processing tool for the feedback and extract the feedback from that.
    - Could use a basic text editor, .Rmd file, .csv file, etc, but again people not really that comfortable with them
    - People are really comfortable with Word.
    - **Problem:** How do you extract information from Word documents but still keep the same benefits associated with the Excel approach such as having all the feedback in one place.

Word Approach



Lorem Ipsum

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam justo est, interdum sit amet posuere eget, suscipit eget leo.

Mauris sapien elit, egestas ac congue eu, facilisis sed nunc. Etiam nec urna quis mi accumsan faucibus in sit amet enim. In condimentum eros id feugiat convallis.

Proin quis viverra turpis, eu suscipit ex. Sed nec diam tortor. Sed pulvinar dignissim felis, a facilisis elit blandit non. Praesent porta egestas ipsum id ornare. Etiam iaculis fringilla nunc scelerisque malesuada. Morbi sed lacus justo.

Nam id justo nisi. Fusce eu leo lorem. Sed fringilla, ipsum a cursus faucibus, dolor est luctus nisi, ut luctus nisi enim sed magna. Phasellus ornare nisl turpis, sit amet placerat lectus interdum at. Ut consequat rhoncus congue. Vivamus turpis dui, congue in quam non, aliquam aliquet augue.

- Here is a basic Word document (.docx) with title, paragraphs, sentences, etc.

Word Approach

```
library(officer)
library(tidyverse)
```

- The officer package by Gohel, Moog and Heckman

```
doc <- officer::read_docx("TestDoc.docx")
```

- Produces list with various information but fairly unreadable

```
## rdocx document with 10 element(s)
##
## * styles:
##                  Normal Default Paragraph Font           Normal Table
##             "paragraph"             "character"                "table"
##                 No List                   Title              Title Char
##             "numbering"             "paragraph"              "character"
##   annotation reference        annotation text      Comment Text Char
##             "character"             "paragraph"              "character"
##     annotation subject   Comment Subject Char
##             "paragraph"             "character"
##
## * Content at cursor location:
```

Word Approach

```
doct <- doc %>%
  officer::docx_summary(preserve = FALSE) %>%
  as_tibble()
```

doc_index	content_type	style_name	text	level	num_id
1	paragraph	Title	Lorem Ipsum	NA	NA
2	paragraph	NA	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam justo est, interdum sit amet posuere eget, suscipit eget leo.	NA	NA

- `docx_summary()` turns the list into workable dataframe

Word Approach

```
doct <- doc %>%
  officer::docx_summary(preserve = FALSE) %>%
  as_tibble()
```

doc_index	content_type	style_name	text	level	num_id
1	paragraph	Title	Lorem Ipsum	NA	NA
2	paragraph	NA	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam justo est, interdum sit amet posuere eget, suscipit eget leo.	NA	NA

- Can start to "ask questions" of the words/data!

```
cat("- **What was the title?**", doct$text[1])
```

- **What was the title?** Lorem Ipsum

Word Approach

- Need some constraints on the structure of the Word doc to make finding relevant information easy.
  - Constraints are anchors you tell the code to search for - if they are consistent then things are easy to find; if not, then they are not!
  - Analogy: searching for parts of the face/voice in face/voice research.

Marker: **Write your name here**

Student ID: **Write the Student ID here**

Knowledge and Research Rating: **Put Verbal Descriptor Here**

Critical Evaluation Rating: **Put Verbal Descriptor Here**

Academic Communication Rating: **Put Verbal Descriptor Here**

FeedForward Comment 1: **Write your first feedforward comment here**

FeedForward Comment 2: **Write your second feedforward comment here**

FeedForward Comment 3: **Write your third feedforward comment here**

- Marker edits the parts in bold and replaces them with appropriate info
  - Can be pre-populated with Student/Group IDs, Marker name, etc.
  - Can be structured in any way to help give the feedback you want to give.

Word Approach

Marker: Helena

Student ID: **1010112**

Knowledge and Research Rating: Excellent

Critical Evaluation Rating: Excellent

Academic Communication Rating: Excellent

FeedForward Comment 1: lorum ipsum

FeedForward Comment 2: est test

FeedForward Comment 3: Romani ite domum

Student ID: **1010121**

Knowledge and Research Rating: Excellent

Critical Evaluation Rating: Very Good

student_id	marker	category	text
1010112	Helena	Knowledge and Research Rating	Excellent
1010112	Helena	Critical Evaluation Rating	Excellent
1010112	Helena	Academic Communication Rating	Excellent
1010112	Helena	FeedForward Comment 1	lorum ipsum
1010112	Helena	FeedForward Comment 2	est test
1010112	Helena	FeedForward Comment 3	asfasgasgasgsag
1010121	Helena	Knowledge and Research Rating	Excellent
1010121	Helena	Critical Evaluation Rating	Very Good
1010121	Helena	Academic Communication Rating	Poor
1010121	Helena	FeedForward Comment 1	aasf asf sda
1010121	Helena	FeedForward Comment 2	asd awas as as
1010121	Helena	FeedForward Comment 3	asdq asda qweqe

- On the left is a completed Marker's feedback and on the right is the data read into a table structure.
- Now we are back to where we need to be to be able to generate feedback sheets and do feedback analytics.
  - e.g. generate all class feedback and check for consistency
- Can produce feedback for individuals, groups, or a mix.

Issue

- Feedback sheets can vary across modules
- Some markers want to use code and some don't

Solution

- Be able to generate any possible feedback sheet and approach people use to give markers the option of approach, even within one module.
- However, making tables in Word from an `.Rmd` file is clunky
- Learn a little about flextable package by David Gohel et al.
    - **Note 1:** I once said I would give a presentation on tables and never did. This is not that presentation; this is just a tribute!
    - **Note 2:** Other table packages, e.g. gt, exist and may work better depending on what you need.

Flextable

- Designed around producing tables and the one I have found to be best for creating tables in Word that look like someone has used Word to create them
    - i.e. matches formatting of Word
- Key is to have a template document where the styles of "body", "Title", "Paragraph", "Heading 1" etc match what you want the output to have.
    - e.g. flextable uses the base Word template (e.g. Times New Roman) unless you give it a new template (e.g. Arial)
- Works by building the table you want as a dataframe, including merging cells vertically or horizontally, through the `flextable()` function and calling it with `myft()`
    - easily integrates with tidyverse
- Really good manual: Using the flextable R package by developers

Flextable

- **The Input**

GUID	KR	CE	AC	FF1	FF2	FF3
9804672	Excellent	Very Good	Satisfactory	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...	Duis aute irure dolor in reprehenderit in voluptate velit esse ...
1010110	Excellent	Good	Good	Excepteur sint occaecat cupidatat non proident, sunt in culp...	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...
9804123	Excellent	Very Good	Satisfactory	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...	Duis aute irure dolor in reprehenderit in voluptate velit esse ...
9804412	Excellent	Very Good	Satisfactory	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...	Duis aute irure dolor in reprehenderit in voluptate velit esse ...
1010112	Excellent	Good	Good	Excepteur sint occaecat cupidatat non proident, sunt in culp...	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...
1010121	Excellent	Good	Good	Excepteur sint occaecat cupidatat non proident, sunt in culp...	Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed ...	Ut enim ad minim veniam, quis nostrud exercitation ullamco...

- our now standard dataframe of information
    - worth noting that in this stage of using a dataframe approach you can add any information you want to appear on each student's feedback - even if that information changes per student
    - e.g. a link to the marker's "student office hours" time-slot!

Flextable

- **The Output**

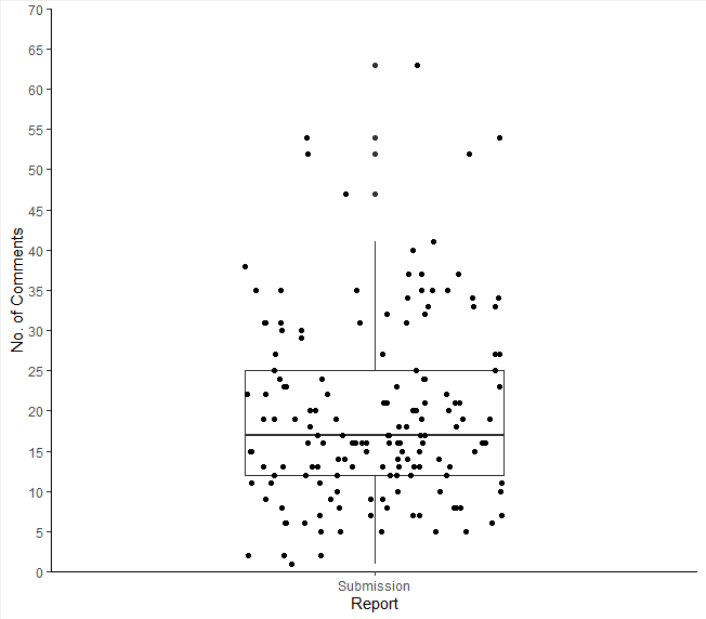
Knowledge and Research						
Excellent	Very Good	Good	Satisfactory	Weak	Poor	Very Poor
Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.						
Critical Evaluation						
Excellent	Very Good	Good	Satisfactory	Weak	Poor	Very Poor
Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.						
Academic Communication						
Excellent	Very Good	Good	Satisfactory	Weak	Poor	Very Poor
Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur.						

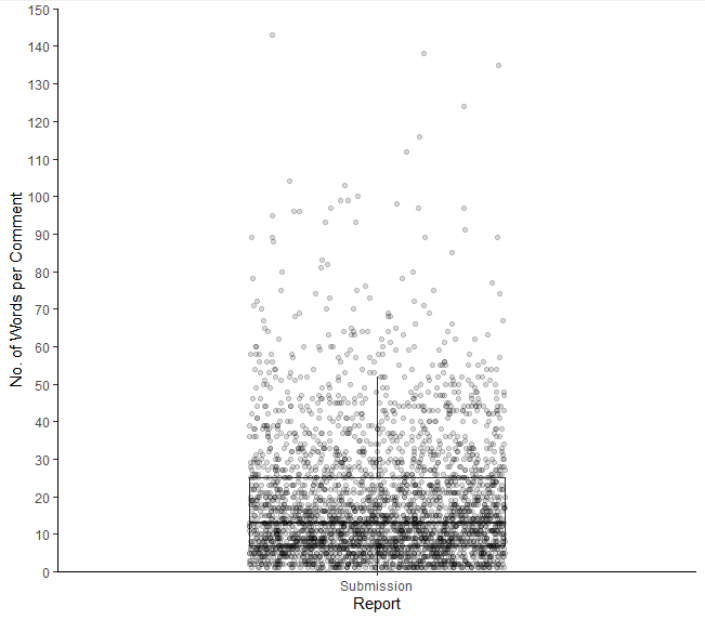
- In this feedback, markers are asked to highlight the verbal descriptor (color, bold, etc) and then add comments into the box below the verbal descriptors for each marking criteria
    - involves continually switching actions on keyboard and mouse, slowing down the process
    - code saves switching between highlighting and typing, as all that information is in the dataframe, and can be coded into the feedback sheet, giving more time for writing and thinking.

Issue

- People really like giving on-script comments!
- **Problem 1:** Research on on-script comments is variable with some suggestion that having no on-script comments is better than negative on-script comments.
    - In addition, too many comments can be seen as nit-picking or just off-putting to students
    - Shameless plug alert: Paterson & McAleer, (2022). Sharing practice on framing feedback around student development. Open Scholarship of Teaching and Learning. 2, 1 (Oct. 2022), 123–134.
- **Problem 2:** On-script comments produce high variability in feedback when unconstrained in some fashion.
    - Analysis of ~175 submissions on one module with an individual report submission up to 3000 words

Issue





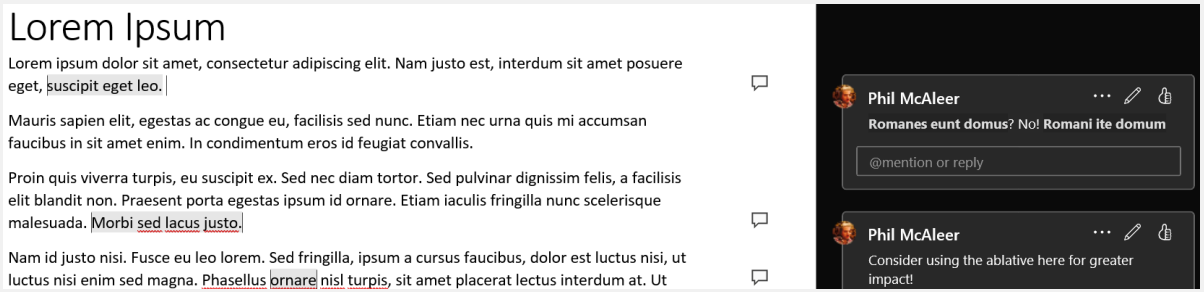
- Left figure shows the number of comments per submission; each dot is one submission
- Right figure shows the number of words per comment across all submissions; each dot is the number of words per comment.
  - High variability with how on-script comments are used.

Issue

- **Problem 2:** On-script comments produce high variability in feedback when unconstrained in some fashion.
    - Analysis of ~175 submissions on one module:
        - 94% received on-script comments; 6% received no on-script comments (~10 students)
        - No. of comments ranged from 1 to 63 per report; an upper bound of 1 comment every 40-45 words.
        - No. of words per comment ranged from 1 to 143 per comment
        - 1 word comment such as "?" is not particularly helpful to students.
        - Correlation between number of comments and grades suggested a weak negative relationship, $r = -.234$, $p = .012$
        - Parity across students is not maintained and perhaps effectiveness reduces with inefficiency.

Solution

- Rapidly extract and check all comments from reports, after giving feedback.
- The docxtractr package by Bob Rudis (hrbmstr)
    - combine with data wrangling approaches to achieve this goal



- Word doc with comments
    - Reviewing these manually on one or two documents is not too labor intensive but it quickly escalates as the number of students and/or the number of comments increase, as well as the position of the comments varying.

Comment Extraction from Word

```
library(docxtractr)
library(tidyverse)
```

```
doc <- docxtractr::read_docx("TestDoc.docx")
```

```
## No tables in document

## Word document [TestDoc.docx]
##
## Found 3 comments.
##          author # Comments
## 1 Phil McAleer           3
```

- Shows the number of comments within each document.

Comment Extraction from Word

```
doc <- docxtractr::read_docx("TestDoc.docx") %>%
  docx_extract_all_cmnts() %>%
  as_tibble()
```

```
## # A tibble: 3 x 5
##   id    author       date                 initials comment_text
##   <chr> <chr>        <chr>                <chr>    <chr>
## 1 0     Phil McAleer 2024-11-26T12:46:00Z PM       "Romanes eunt domus? No
## 2 1     Phil McAleer 2024-11-26T12:46:00Z PM       "Consider using the abl
## 3 2     Phil McAleer 2024-11-26T12:47:00Z PM       "This is the correct us
```

- `docx_extract_all_cmnts()` allows you to pull all of the comments from the document for comparison and analysis.
    - e.g. whether comments will actually mean anything to a reader or not
    - e.g. whether you have left something in by mistake
- Could check all comments manually if you have time to develop further feedback or use some level of AI to assist.

Comment Extraction from Word

```
doc <- docxtractr::read_docx("TestDoc.docx") %>%
  docx_extract_all_cmnts() %>%
  as_tibble()
```

```
## # A tibble: 3 x 5
##   id    author       date                 initials comment_text
##   <chr> <chr>        <chr>                <chr>    <chr>
## 1 0     Phil McAleer 2024-11-26T12:46:00Z PM       "Romanes eunt domus? No
## 2 1     Phil McAleer 2024-11-26T12:46:00Z PM       "Consider using the abl
## 3 2     Phil McAleer 2024-11-26T12:47:00Z PM       "This is the correct us
```

```
cat(doc$comment_text[1])
```

- A scan of the comments helps determine how informative they are!

```
## Romanes eunt domus? No! Romani ite domum

## Consider using the ablative here for greater impact!

## This is the correct use of a fourth declension noun
```

Additional work

- The codes can work forward and backwards
  - If you have old feedback sheets, it is possible to extract the information from those
  - I use this process to check feedback sheets before they go to students to try to reduce issues such as missing names, typos, etc.
  - Incredibly useful to see common mistakes from previous years to help develop future iterations our teaching
  - If you are writing the same comment each year, you maybe need to change some part of the teaching.

- The codes can work without anchors in the text but it is harder
  - People tend to take quite different approaches to the same task, no matter how clear you think your instructions are.
  - "Generative AI Declaration" in Appendix A had about 10 different approaches in 35 submissions
  - Not impossible but the extraction code will only get you so far and the rest becomes about wrangling
  - If possible, set some restrictions/guidance on the location of the information you want to extract

Conclusions

- Feedback is Data for both staff and students
    - It helps students develop their knowledge and skills, and it helps staff develop their teaching
- Having all feedback in one location can be really effective for staff efficiency
    - It reduces the number of documents being dealt with, improves parity in feedback across submissions, and allows greater reflection in terms of what students are and are not understanding
- Coding allows a flexible approach to feedback and feedforward generation
    - Instead of our approach being dictated by the feedback sheet, the feedback sheet becomes dictated by our approach to feedback

Acknowledgements

- Lisa DeBruine for help with looping and iteration (my nemesis) and for markR
- Dale Barr for help with data skills assessments and assessR
- Helena Paterson for continual numerous discussions on "feedback as data" and for being a pedagogical superstaR

Here to help!

- Happy to share working versions of all codes mentioned, including the functions that allow the iteration across students.
    - They will one day be on an open source repository but still got a few bits to tidy up.
- If you would like to use this approach or something based around this approach, please just ask.
    - more than happy to support you generate the most effective feedback for your students in the most efficient way for you.
- Slides will be available from github soon but please just ask if you want a copy

Defining Philosophy

Feedback is Data; what you can do with Data you can do with Feedback.

- It is no longer that hard to collate feedback and treat it as data!

Contact

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