

Writing seminar 1: Managing the writing process of a long-term project

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Today's schedule (Approx. timing in minutes)

Start 8:30 / 13:00

- Introduction (10)
- Writing to learn + Problem solving (50)

Break 9:30 / 14:00 (15 minutes approx.)

- Paragraphing (20)
- Writing resources + sv agreement + article usage (25)

Break 10:30 / 15:00 (15 minutes approx.)

- Data commentary + qualifiers (60)
- Discussion / questions (15)

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This morning's ILOs!

- After this workshop the successful student will be able to
 - Develop his/her software engineering problems solving skills via shared activities towards a more informed and deliberately articulated critical commentary about peers' projects
 - Recognise effective sentence, paragraph, and section structures, as well data commentary in technical reporting and read these with greater critical awareness
 - Use multiple writing strategies to inform the project's documentation and prepare the written presentation

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Writing seminar 2

- Much focus on peer review:
 - You pre-read another and take notes before the seminar
 - You share your feedback and discuss through both your texts
 - **You can sign up with a pre-established peer review grouping**
- Read the instructions on canvas carefully:
 - Note: You should only sign up for seminar 2 once you have written a fair portion of your thesis.

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Writing to learn + problem solving exercise

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Learning to Write

Reporting: **PRODUCT**

Learning to write

- The aim is to produce the text (report, article, etc.).
 - The text you produce goes straight into your desired product.
- Exams
 - Reports
 - Essays
 - Posters
 - Articles

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Writing to Learn

Studying / learning: **PROCESS**

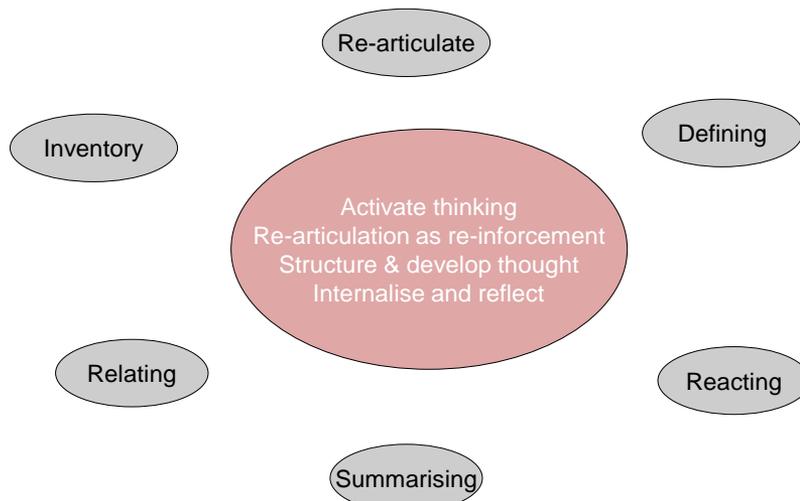
Writing for the purpose of 'learning'

- Planning and using writing activities for the purpose of generating/refining knowledge (for learning purposes)
 - Text written for a specific learning purpose.
 - May or may not be used in a product later but *will likely* inform your product later.
- (b)logs, Journals, in-text (e.g. commenting in an article)
 - Notes, summaries, questions
 - Wikis
 - e-mail
 - To-do lists
 - Definitions, conceptual clarifications
 - Initial reflections / findings. Working with data

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We already do it a lot...



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What writing will you do during the process? 3 questions

One overwhelming piece of feedback from past students is “I should have started writing earlier”

Turn to the person / people next to you and discuss the following 3 questions:

1. What ‘writing to learn’ activities will be meaningful to you during the writing process? When? How?
2. What writing activities will you prioritize and when?
3. With that in mind, what will your writing process look like and how might you avoid falling into the ‘last-minute’ writing trap?

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What writing will you do during the process?

Recommendations: Consider...

- ...how you document your thinking process along the way
 - How/what/why will you write in connection to reading? If working in a pair, how will you share your thinking?
- ...your actual writing process itself
 - When do you write best? Under what conditions? Who will do it and when? How will you coordinate?
- ...how you will plan your writing time, and how will you prioritize?
 - Keep in mind that plans never go perfectly, and many students run out of time towards the end, which clearly impacts communication
 - Keep in mind to give yourself buffers and some flexibility, as it's impossible to plan perfectly from the beginning

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Problem solving inventory 1 (15 + 15 min)

Group discussion:

Work in groups of two projects (15 minutes max/project)

- Group 1: Quickly describe your intended audience (1 minute max)
- Group 1: Offer a 2-3 minutes presentation of your project, in English, as accurately and concisely as you can.
- Do a 'think-aloud' problem solving session for the remaining time.
- Swap. Group 2 repeats the process.

IMPORTANT: The other group acts as 'listener' and **only asks questions.**

- No comments, asides, reflections. Purely questions

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Problem-solving structure

Overall problem

- What is **unknown** or to be determined?
- What are the **data** that you may have or will have?
- What are the **conditions** or **relations** between the **data** and the **unknown**?
- Why is it (still) a problem?
- Why is it of interest?
- Explore it!
 - What theories, methods, and tools?
- Express the problem as an 'aim'

Plan the solution

- Identify tasks and milestones
- Plan solution of each task (cf. questions for 'overall')
- Sequence the tasks and milestones
- Re-assess the tasks and milestones in view of the 'aim' and the planned solutions
- The 'listener' asks questions to prompt this but allow for some process and hesitation

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Based on Stice, 1996

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Paragraphing

Quick re-cap from the videos
Paragraphing exercise

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Paragraphing: key points

- A paragraph is a thought unit with a topic sentence
 - One idea and its supporting arguments = one paragraph.
- Paragraphs can develop topic sentences in many ways.
 - Exemplify, specify, concretise, modify, define, describe, answer, object to
- We have different ways of structuring information (e.g. in a paragraph or elsewhere)
 - E.g. Deduction – from general to specific; Induction – from the specific to the general.
 - E.g. cause and effect, Problem – Solution, SPSE (Situation, Problem, Solution, Evaluation), chronological, comparison and/or contrast, advantages and disadvantages.

See, e.g., <https://awelu.srv.lu.se/the-writing-process/drafting/paragraphing/paragraph-patterns/>
 See, e.g., <https://www.mpc.edu/home/showdocument?id=12632>

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Paragraphing exercise

- | |
|---|
| 1) In this paper, we present two most applicable ones to embedded automotive software systems – one based on modules' complexity and one based on modules' coupling. |
| 2) Finally, we suggest how to interpret their results in order to come to the correct conclusion which should imply the future steps towards securing the desired quality. |
| 3) Several metrics able to provide useful results based on the structural system requirements can be applied before sending change requests to suppliers. |
| 4) Since our metrics should be applied in the early stages of the development process (before sending change requests to suppliers) where not many behavioral properties of the system are known, they are mostly focused on structural system properties such as inter-module communication [4]. |
| 5) Still, they can identify early which parts of the system will be affected by changes which can significantly reduce the production cost as well [4]. |
| 6) We also explain that the measurement results should be compared through different system releases (with focus on the difference between the current and future release) in order to be able to capture the size and potential impact of changes. |

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Paragraphing takeaways

- We naturally look for certain things in a topic sentence (intro of topic; treatment/approach in paragraph; the argument)
 - Most scientific writing follows a deductive pattern and has a topic sentence early on. It tends to avoid inductive paragraphs.
- Connecting words need to make sense linguistically.
 - This, it, that, these. All of these kinds of references need to be understandable for the text to make sense.
- Connecting words need to make sense logically
 - Conjunctive adverbs (e.g. however, therefore, moreover, etc.) and other kinds of words which imply/carry argument need to make logical sense
- Information might be structured according to a different unit than 'the' paragraph.
 - For example, the text (1, 6, 2) whose function was to describe *what was done* (the method/approach)

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Paragraphing: The original paragraph

3) Several metrics able to provide useful results based on the structural system requirements can be applied before sending change requests to suppliers. **1)** In this paper, we present two most applicable ones to embedded automotive software systems – one based on modules' complexity and one based on modules' coupling. **6)** We also explain that the measurement results should be compared through different system releases (with focus on the difference between the current and future release) in order to be able to capture the size and potential impact of changes. **2)** Finally, we suggest how to interpret their results in order to come to the correct conclusion which should imply the future steps towards securing the desired quality. **4)** Since our metrics should be applied in the early stages of the development process (before sending change requests to suppliers) where not many behavioral properties of the system are known, they are mostly focused on structural system properties such as inter-module communication [4]. **5)** Still, they can identify early which parts of the system will be affected by changes which can significantly reduce the production cost as well [4].

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Information structure principles: reminder

- **Known/given info first – unknown/new info last**
 - Helps guide sequencing. Which information needs to be introduced more carefully (e.g. the 1st time), and which information can be assumed as known, and hence referred to in more concise ways?
- **Principle of end weight (i.e. not placing the subject and verb too late):**
 - What is the subject what is my subject [topic position] and what is the action [stress position]?
 - Heavy subject noun phrases are placed later in the clause
 - Helps reading, for example:

A very relevant and interesting issue that **needs** attention is unemployment.

Unemployment is a very relevant and interesting issue that needs attention.

- **Cohesion i.e. textual markers:** hold the text together, highlight logical organization, guide the reader's attention)
- **Coherence:** the logical organisation of a text given a particular reader)

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Grammar and grammar resources + Briefly on Subject-verb agreement and article usage

Activity about grammar resources
 Quick run through of main challenges

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Grammar: Diagnostic test + resources

Examiners and supervisors:

- stress the importance of clear and precise communication in theses.
 - this includes clean and correct language (but is not limited to *only* this)
- Purpose of diagnostic test is to self-evaluate to help you plan your writing process from today, in order to anticipate potential language issues.
- How to work with grammar?
 - In isolation? (e.g. grammar exercises, workbooks)
 - With broad patterns of grammar errors early? (e.g. you identify a problematic area, and spend time on that specific problem during, for example, early editing?.
 - Plan time for later in the process to look specifically at certain aspects of language?
 - Planning for certain kinds or proof-reading?

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Activity: Group discussion about writing resources

- What resources are there?
 - Look at the Writing resources page on canvas
 - Share any other useful resources you know of
- Which of these resources might be helpful to you?
 - How will you use these resources?
- Be prepared to share a quick summary with the rest of the class

Link to Writing resources on Canvas:
<https://chalmers.instructure.com/courses/232/modules/items/400261>

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Resources

- Canvas: Writing resources
- EngOnline
- Other resources?

Link to Writing resources on Canvas:

<https://chalmers.instructure.com/courses/232/modules/items/400261>

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Subject-verb agreement: what to look out for

- Noun phrases and singular/plural
 - The head in the noun phrase decides whether it is singular or plural (with some exceptions)
- Parallel structures
 - Keep similar format
- Concise writing: good but might make it harder to see some types of grammar errors
- Errors affecting meaning
 - Sometimes grammar errors are simply mechanical errors (readers still understand the text) but sometimes errors affect meaning-making significantly
- Keep subject near verb
 - Can be harder to spot grammar error if subject + verb are far apart
- Long noun phrases as subjects
 - Can be correct but still make reading more difficult!

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Subject-verb agreement: common issues

Noun phrases and singular/plural

“An example of this have been presented in [4] using a car’s headlights: the initial software version controlling this unit in a car was implemented just to turn the lights on and off ...”

The head in the noun phrase decides whether it is singular or plural

An **example** of this **has** been presented ...

Examples of this **have** been presented ...

An **example** of these **has** been presented ...

Note:

Collective nouns can complicate matters.

Some nouns can function either as singular or plural, depending on context.

See e.g. <https://webapps.towson.edu/ows/moduleSVAGR.htm>

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Subject-verb agreement: common issues

Parallel structures and concise writing

“For this reason, and implied by low production cost demand, one system platform should be designed to endure all changes and has a satisfying quality for at least 5-6 years.”

Parallelism and language economy can complicate matters.

“... x should be designed to endure all changes *and*”

“... x should be designed **to has** a satisfying quality”

Easier to see the error now: infinitive verb form “to have”

1. We need to keep parallel structures in similar format, to help readability. For example “I like running, swimming, and playing football” is preferred to “I like to run, swimming, and play football”

2. Writing concise, but might make it harder to see some types of grammar errors

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Subject-verb agreement: common issues

Correct version:

“For this reason, and implied by low production cost demand, one system platform should be designed to endure all changes and **have** a satisfying quality for at least 5-6 years.”

On parallelism:

https://owl.purdue.edu/owl/general_writing/mechanics/parallel_structure.html

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Subject-verb agreement: common issues

Errors affecting meaning

“First, integration and regression testing are very hard since most of the software components are developed by different suppliers.”

What is the grammatical error here?

What is the difference between:

“integration and regression testing **are**”

“integration and regression testing **is**”

Grammar errors are sometimes simply mechanical errors (readers still understand the text)

Grammar errors might affect meaning-making, sometimes significantly (e.g. a grammar error in a research question might lead to misinterpretation which can impact significantly, not just in that isolated section)

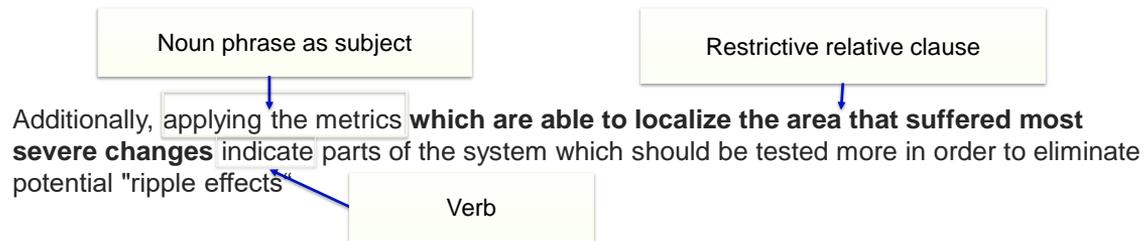
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Subject-verb agreement: common issues

Separating the subject and verb by e.g. a relative clause

Additionally, applying the metrics which are able to localize the area that suffered most severe changes indicate parts of the system which should be tested more in order to eliminate potential "ripple effects"



Applying the metrics ... **indicates** ...

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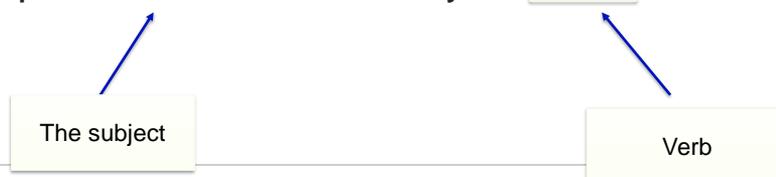
Subject-verb agreement: common issues

Long noun phrases as subjects

"This is why the presentation of complexity and coupling change through different releases compared with other modules in the system could be much more useful."

What is the grammatical error here?

... **the presentation of complexity and coupling change through different releases compared with other modules in the system** could be much more useful



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Subject-verb agreement: common issues

“This is why ...the presentation ... could be much more useful.”

Correct!

Easy to read? Perhaps not!

Principle: Keep subjects near verbs.

<https://cgi.duke.edu/web/sciwriting/index.php?action=lesson1>

Principle: Avoid over-using expletive constructions.

https://owl.purdue.edu/owl/general_writing/academic_writing/conciseness/avoid_common_pitfalls.html

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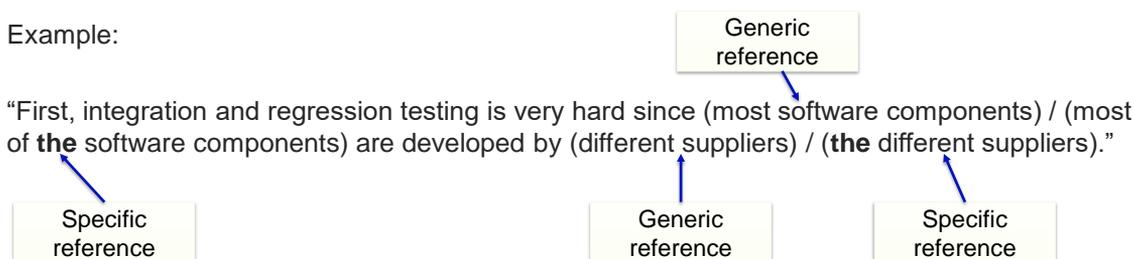
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Article usage: Summary

A core issue: generic reference or specific reference?

Example:

“First, integration and regression testing is very hard since (most software components) / (most of **the** software components) are developed by (different suppliers) / (**the** different suppliers).”



See EngOnline + video and resources on Canvas

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Storyboarding and data commentary

Storyboarding
Results commentary
Qualifiers

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Markel's graphics sales talk

Graphics...

- ...are indispensable in demonstrating logical, numerical and sequential relationships
- ...can communicate spatial information and steps in a process more effectively than words alone
- ...can save space
- ...can reduce the cost of translation

AND

- ...can help structure your paper!

Markel chapter 13;
 Anderson chapter 12

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Markel's four basics - PAIP

- The first things to think about for designing graphics:
 - Purpose:** What's the point you need to make?
 - Audience:** Who needs to be convinced?
 - Information:** What type of information is it?
 - Physical conditions:** How will readers read it?

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Markel's characteristics of graphics

Purpose: What's the point you need to make?

- Graphics should serve a purpose
 - common to start with a logical intention or purpose, but things may change so the graphic is no longer fulfilling that purpose.
 - What happens, for example, if a picture is moved from one section to another?

Audience: Who needs to be convinced?

- Graphics should be oriented towards the reader and meet their format expectations

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Markel's characteristics of graphics

Information: What type of information is it?

- Graphics should be simple and uncluttered
 - What are you trying to show. What might distract readers? What might lead to mis-interpretation? What type of information is it?
- They should present a manageable amount of information
 - What is manageable? Which information is new/old? (for example, is the format 'new'?)

Physical conditions: How will readers read it?

- Graphics should be clearly labelled
 - Includes obvious things such as title, figure name, key ... but could also be other things. If you have a description in the text, do you need a label in the visual? Caption headings?

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Storyboarding

- Storyline / storyboard
 - Storyline: The overall narrative communicated by looking at visuals and broad structures. The plot.
 - Story board e.g. in movie-making might be a visualization of all the scenes in order (a visual representation of the narrative)
- Headings (section / figure), visuals, ordering all communicate something.
- Texts with a logical storyline tend to be easier to follow and understand
 - Be careful! Structural elements communicate, and can be misinterpreted by readers

The visual on the next slide is an example of where a reader might be misled.

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Information Structure: Storyline

Identifying Friction between Large-scale Agile Software Development and Plan-based Business Processes

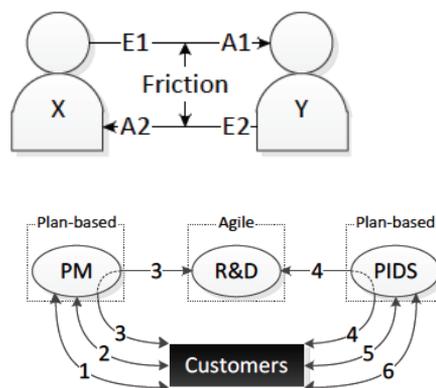


Fig. 2 An overview of the organization and its relation to customers

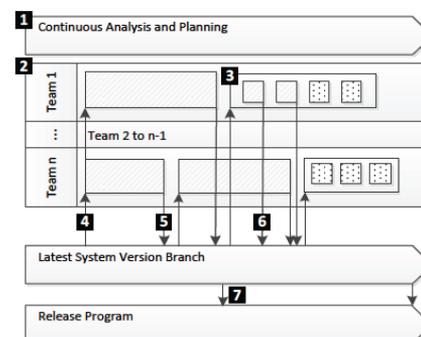


Fig. 3 Overview of the Streamline Development process

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Information Structure: Storyline example

Metacognitive illusion or self-regulated learning? Assessing engineering students' learning strategies against the backdrop of recent advances in cognitive science

Maria Cervin-Ellqvist¹, Daniel Larsson¹, Tom Adawi¹, Christian Stöhr¹, Raffaella Negretti²

Abstract
Keywords: Learning strategies, Self-regulated learning, Metacognitive illusion, Metacognition, Engineering education, Learning context

Introduction
 Inspired through a questionnaire, this study is guided by the following research questions:
 RQ1: What learning strategies do engineering students report for studying outside the classroom?
 RQ2: How do the learning strategies that students apply outside the classroom differ between engineering programs and types of courses?
 RQ3: How aware are students of the effectiveness of their learning strategies?
 RQ4: Why do students use their specific learning strategies?
 By addressing these questions, we advance the understanding of what strategies engi-

Theoretical and empirical framework
Self-regulated learning and learning strategies
 Table 1: Relative effectiveness of six common learning strategies

Learning strategy	Effectiveness	Effectiveness
Learning strategy	High	Self-reading or looking practice was seen to be the least useful
Spaced practice	High	A checklist of practice that spends not only activities over time
Elaborative interrogation	Medium	Generating perspective for why an explicitly stated fact or concept is true
Self-explanation	Medium	Explaining how one's information is related to known information or explaining steps taken during problem solving
Interleaved practice	Medium	A number of practice that mixes different kinds of problems for study of different kinds of material
Summarization	Low	Writing a summary of the main topics of the text or material
Rehearsal	Low	Repeating text material again after an initial reading
Reciprocal teaching	Low	Using text material and several questions to ensure an initial reading
Rehearsal for test	Low	Attempting to learn content through rote reading or listening
Highlighting/underlining	Low	Marking important or important portions of the material, sometimes with meaning

Note: Adapted from Dunlosky & Williford (2009). The sources of evidence for the relative effectiveness have been modified to emphasize the relative effectiveness.

Method
Setting and participants
 Table 2: Participant distribution over course/program and program size

Type of course	Program	Program size, (no. of students)	Program size, students from other programs
Course 1	Calculus	Biomechanics (75/15)	6/6
Course 2	Conceptual Biomechanics	30/27 (45/15)	6/6
Course 3	Calculus	5/12/20 (20/15)	27/14/6 (31/15)
Course 4	Conceptual Civil Engineering	10/10/10 (15/15)	10/10 (15/15)
Total		127/150 (164/45)	45/247 (64/15)

Study design and data collection
Data analysis
Results
Overall use of learning strategies (RQ1)
 Table 3: The ten most used strategies overall and the additional 'number one' strategy

Strategy	Percent who used that strategy	%	Percent who rank it as #1 strategy	%
1. Study self notes	83.2	340	38.5	100
2. Read course materials	63.0	262	22.1	62
3. Do practice problems	46.6	194	20.0	83
4. Summarize	35.3	128	11.8	40
5. Search for information through alternative resources	19.5	81	1.4	6
6. Discuss with others	17.5	73	3.1	13
7. Flashcards/notes	11.8	49	1.4	6
8. Study things one finds hard/less interesting	11.1	46	1.2	9
9. Re-read/rewatch	9.4	39	1.0	4
10. Study in a group	8.2	34	2.2	9

Comparing the use of learning strategies between programs/courses (RQ2)
 Table 4: The ten most used strategies in different program settings

Program/course setting	Strategy	Mean rank (SD)	Percent who rank it as #1 strategy
Program/course setting (RQ2)	1. Do practice problems	41.1	41
	2. Read course materials	51.1	31
	3. Study self notes	51.1	31
	4. Search for information through alternative resources	51.1	31
	5. Summarize	51.1	31
	6. Discuss with others	51.1	31
	7. Flashcards/notes	51.1	31
	8. Study things one finds hard/less interesting	51.1	31
	9. Re-read/rewatch	51.1	31
	10. Study in a group	51.1	31
Course/program setting (RQ2)	1. Do practice problems	41.1	41
	2. Read course materials	51.1	31
	3. Study self notes	51.1	31
	4. Search for information through alternative resources	51.1	31
	5. Summarize	51.1	31
	6. Discuss with others	51.1	31
	7. Flashcards/notes	51.1	31
	8. Study things one finds hard/less interesting	51.1	31
	9. Re-read/rewatch	51.1	31
	10. Study in a group	51.1	31

Students' awareness of the effectiveness of their strategies (RQ3)
 Table 5: Student rating of the effectiveness of their learning strategies in comparison with strategies in a 2013 survey

Strategy	M	SD	Students in a 2013 survey
Practice/looking	3.12	0.99	361
Self-explanation	4.36	0.97	217
Elaborative interrogation	4.30	1.01	196
Summarization	4.44	1.10	211
Rehearsal for test	4.01	1.14	191
Rehearsal	4.20	1.00	191
Highlighting/underlining	3.60	1.00	191

Why students use their learning strategies (RQ4)
 Table 6: Other reasons for using strategies

Strategy	Other reasons for using strategies
1. Do practice problems	100%
2. Read course materials	100%
3. Study self notes	100%
4. Search for information through alternative resources	100%
5. Summarize	100%
6. Discuss with others	100%
7. Flashcards/notes	100%
8. Study things one finds hard/less interesting	100%
9. Re-read/rewatch	100%
10. Study in a group	100%

Strategies used for mostly cognitive and metacognitive purposes
Strategies tied to the self-regulation of motivation, behaviour and context
Discussion
Metacognitive illusion or self-regulated learning?
Limitations and future research
Implications for theory and practice
Conclusions

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Activity (approx 5+5 min)

Have a closer look at your article for storylines and / or storyboards

- Why did you chose this article?
- Is there, in your quick glance, a visual argument?
 - I.e. can you see the storyline without much reading?
 - Or: can you see the point, the main result, or finding

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Data commentary

Data commentary:

- In-text commentaries
- Supports visual representations (e.g. tables, figures, graphs, etc.)

See e.g. Swales and Feak, 2012

An 'argument' often moves between text and visual (e.g. data).

A visual representation can be a point of departure for building an argument/

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From Swales and Feak

“**Data commentaries are exercises in positioning yourself.** There are, as a result, both dangers and opportunities. One danger is to simply repeat in words what the data have expressed in nonverbal form – in other words, **to offer description rather than commentary.** An opposite danger is to **read too much into the data and draw unjustified conclusions.** The art of the matter is to **find the right strength of claim for the data and then order your statements in some appropriate way** (such as from the more significant to the less significant). In most cases, this means moving in a general to specific direction.”

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Structure of data commentary

1. Location and summary
2. Highlight(s)
3. Discussions of implications, problems, exceptions, recommendations, etc.
 - explanations and/or implications of the data (usually required)
 - explanation of the reasoning process that led to the conclusions (if appropriate)
 - unexpected results or unsatisfactory data (if necessary)
 - possible further research or possible future predictions (if appropriate)

Don't patronise your reader but make reading faster

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Information transfer...

Table 1
Means, standard deviations, and correlations

Variable	Mean	S.D.	Correlation with CSE
1. Computer self-efficacy (CSE)	58.27	18.45	–
2. Word processing experience	6.61	3.14	0.50
3. Spreadsheet experience	4.19	3.23	0.47
4. Database experience	2.89	2.61	0.34
5. Operating systems experience	5.68	3.35	0.51
6. Graphics experience	3.08	2.84	0.49
7. Games experience	6.22	3.52	0.45
8. Telecommunications experience	4.20	3.43	0.45
9. Programming experience	1.78	1.60	0.38

All correlations are significant at 0.001

Table 1 presents the means, standard deviations, and correlations among the independent variables and CSE. Subjects reported the highest levels of computer experience in word processing applications (M=6.61, S.D. =3.14) and computer games (M=6.22, S.D. =3.52). Conversely, the lowest levels of computer experience were reported in computer programming (M=1.78, S.D.=1.62). Correlation co-efficients among the independent variables ranged from 0.30 to 0.57 (P<0.001). Additionally, as can be seen in Table 1, all independent variables had positive and significant correlation with CSE beliefs.

Comments

- Reader-orientation is important
 - What do they need help with? (likely don't need help reading the table, but might need help understanding which results are important)
- Commentary must be unambiguous
 - Be careful with naming
E.g. "Additionally, as can be seen in Table 1, all independent variables had positive and significant correlation with CSE beliefs." Are independent variables the same as 'variables' in the table column?

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SE example

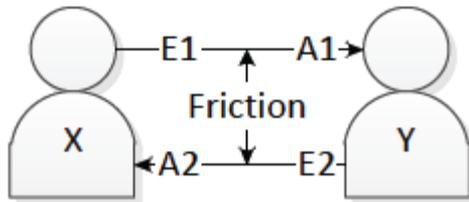


Fig. 1 Friction is defined as the gap between roles' or individuals' expectations and actual observations of each others' actions

For example, individual X in Figure 1 observes friction in the personal or professional relationship toward individual Y if the expectation (E1) on how individual Y should act does not correlate with how X observes that Y actually acts (A1). Simultaneously, individual Y can expect (E2) and observe actual behavior (A2) of individual X, resulting in additional friction if a mismatch exists.

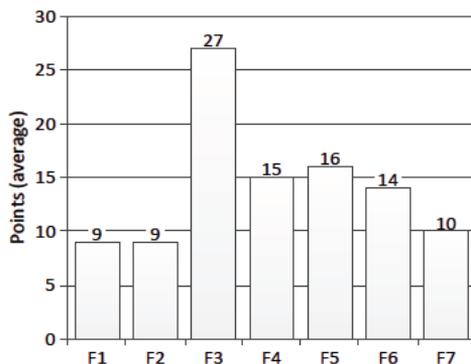
Comments

- A conceptual and introductory figure
 - Consider carefully 'why' you want to include a visual (purpose) and 'when' in the narrative
 - Does your visual fulfill the intended purpose?
- Will readers understand 'friction'
- "The gap between roles' or individuals' expectations and actual observations of each others' actions"
 - Is it between E1 and A1, or between the E1A1 line and E2A2 line?

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SE Example



From Figure 7 it is clear that the prioritization made by respondents correlates to the results of Table 4, i.e. F3 is the friction that affect the interviewees the most as well as the friction most urgent to resolve.

Furthermore, respondents distributed a total of 100 points between the seven frictions, assigning most points to the friction they felt **most urgent to minimize** in order to achieve higher speed end-to-end in the organization. The average distribution from the 100 points ranking is illustrated in Figure 7.

Comment

Language is a bit problematic (not only for the grammar);
 it assumes we can see some things which in fact are implications / interpretations / assumptions ...

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Extended data commentary

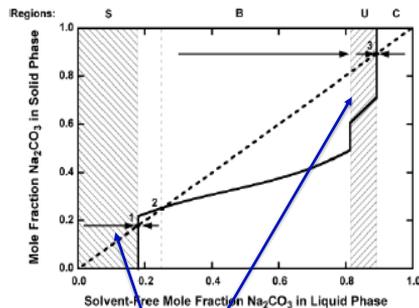


Figure 7. Relationship between solution composition and the composition of crystals formed.

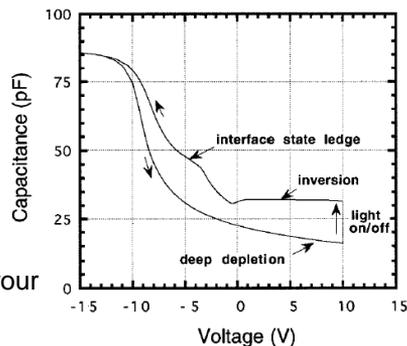
Specific highlighting in visual and in text

Figure 7 contains a smoothed representation of the data from Figure 1, and it shows how the direction of composition change with crystallization depends on the prevailing solution composition. ... **The composition range along the horizontal axis of Figure 7 is divided into regions corresponding to the four species that can be formed by crystallization:** sodium sulfate, burkeite, dicarbonate, and sodium carbonate. ... **However, shown in Figure 7 are three labeled points (1, 2, or 3)** at the intersections of vertical lines with the diagonal and which are called invariant points ... **The second invariant point (Point 2)** is located at a carbonate-to-sulfate mole ratio around 1:3 ($x_{\text{Na}_2\text{CO}_3} \approx 0.25$), and the vertical line through this point in Figure 7 divides the burkeite region into two parts. Because crystallizations from solutions on either side of this line result in their compositions moving away from Point 2, the point is referred to as a metastable condition.

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Data commentary and audience?



Common in your field? Why?

Fig. 2. Photo-CV curves on a p-type 6H-SiC MOS capacitor at room temperature. The sample is swept from accumulation to deep depletion in the dark, held at +10 V and illuminated to form an inversion layer, then swept back to accumulation in the dark. The hysteresis can be used to estimate density of interface states across the bandgap N_{IT} and the density of border traps N_{OT} .

This technique is illustrated in Fig. 2, where a p-type 6H-SiC MOS capacitor is measured at 1 MHz in the dark [4, 5]. Voltage is first swept from accumulation to deep depletion (-15 to +10 V), producing the lower curve. **At about -1 V the capacitance begins to rise, paralleling the original left-to-right sweep. The voltage shift is caused by electrons trapped in interface states, and the density can be estimated from ... At about -3,5 V, the capacitance exhibits a second ledge, the so called "interface state ledge" [6]. At this point the band banding is reduced enough that... Notice that a residual hysteresis is present below -7 V ...**

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Let's have a look at your texts!

- Review it again and focus on its data commentary and graphics
 - Do you get location statements?
 - Do you get highlights?
 - Do you get comparisons, implications, etc?
 - Is there a clear purpose with each figure?
 - Have figures been adapted to the intended audience?
- What would you change and how?

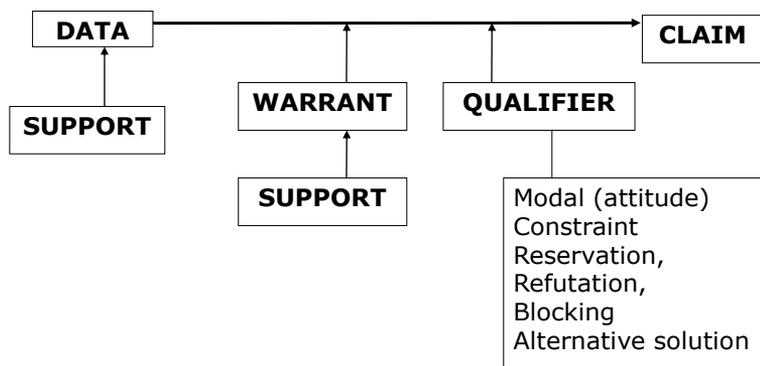


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Results / Discussion and knowledge production

- What can you say?



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Qualifying results / statements

- Probability
 - It is certain / obvious that ...
 - It is possible that ...
 - There is a strong possibility ...
 - There is good possibility ...
- Distance
 - The patient recovered ...
 - The patient seems to have recovered ...
 - Based on our observations, the patient appears to have recovered ...
- Generalisation
 - Cardiopulmonary mortality is high near highways.
 - Cardiopulmonary mortality in old age is / tends to be high near highways in urban areas.
- Weaker verb
 - Red wine consumption reduces coronary artery disease rates.
 - Red wine consumption contributes to the reduction of coronary artery disease rates.
- Combinations!!

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How is qualifying done?

- Lexical verbs (indicate, suggest, appear)
- Adverbs (apparently, probably, essentially, relatively)
- Adjectives (unlikely, possible, most, consistent with)
- Modal verbs (would, may, could)
- Nouns (possibility, assumption)
- Approximators of degree, quantity, frequency and time (roughly, about, often, generally)
- Introductory phrases (I believe, to our knowledge)
- If clauses (If true, if anything..)
- Combinations

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Analysing qualifying statements

- Let's have a look at the text you brought to the workshop
 - Are statements qualified?
 - How are they qualified?
 - Does it work? (Is it any good?)
 - Should some statements be stronger/weaker?



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**Don't worry if you're not clear right now ...
Few people start clear ...
And just about everybody changes their
ideas ...
But get going and revise a lot!**

**And – plan and use writing as a tool for
research ... a tool for generating knowledge**

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Selection of references and recommended reading

- Anderson, Paul V. (2011) *Technical Writing A reader-centered approach*. International student edition. Wadsworth.
http://www.heinle.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=141303036X&d
- Björk, L. & C. Räisänen. 2003. *Academic Writing. A University Writing Course*, 3rd ed. Lund: Studentlitteratur.
- Clarke, Irene, L. (2007) *Writing the successful thesis and dissertation - Entering the Conversation*. Prentice-Hall, Upper Saddle River, NJ.
- Fawcett, S. 2007. *Evergreen. A Guide to Writing with Readings*, 8th ed. Boston: Houghton Mifflin Company.
- Markel, Mike. (2007) *Technical Communication*. Eighth ed. Bedford/St. Martin, Boston, NY.
- Oshima A. & A. Hogue. 1999. *Writing Academic English*, 3rd ed. River, NJ: Pearson Education.
- Swales & Feak. *Academic Writing for Graduate Students*. Second edition. University of Michigan Press, Ann Arbor, 2004.

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Article usage examples:

This way of working increases quality of delivered components

This way of working increases **the quality** of delivered components

- *We're talking about components in general, but the focus is on a **specific** aspect of those components. Which specific aspect? **The** quality.*

Research shows that only 25% of functionalities are, while rest is just integrated after the delivery from the suppliers [3].

Research shows that only 25% of functionalities are ..., while **the** rest is just integrated after **0** delivery from **0** suppliers [3].

- ***The** rest (we're talking about a specific subset of the whole, in this case 75%). Also, "rest" has other potential meanings*
- *Remove **the** as it feels like the author means the claim in a general sense.*
 - *Does the author mean e.g. specific "suppliers" from own research, or from the research in [3]? How can the reader know what's in [3]?*

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