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Minding summaries: The development of a summary map rubric for an academic literacy intervention

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ABSTRACT

Mind mapping or summary mapping has proved to be an effective and powerful tool for meaningful visual summarising in a structured way. However, to determine whether students have reached the set outcomes for summarising in this way, an objective measuring instrument is required. The assessment of summary maps is known to be a problematic activity: (i) students have difficulty to differentiate between essential and non-essential information; (ii) lecturers tend to rely too heavily on rewarding content and not the structure in which the content is presented; (iii) as a result of the interpretative nature of summary maps, there are many levels of subjectivity imbedded in the drawing, teaching and assessment process; (iv) the nature of the summarising activity calls for a need to improve inter-marker reliability; and (v) current assessment practices may result in a wasted opportunity for constructive feedback. In search of a suitable marking rubric, several examples are available in the literature to assess summary mapping. These, however, proved to still have a high level of subjectivity and are not appropriate for North-West University's foundational academic literacy module. Consequently, an assessment tool for summary maps (the Summary Mapping Assessment Rubric Tool—SMART) was developed that addresses typical difficulties that markers experience. The newly developed tool proves to fulfil our most important and immediate needs with regard to the fair and effective assessment of summary maps.

Keywords: academic literacy, summary maps, assessment, rubric, scoring consistency, feedback.

1. Introduction

At North-West University (NWU), first-year students who have been identified as 'at-risk' of not completing their studies successfully because of inadequate academic literacy (AL) levels, receive relevant academic support in the form of academic literacy modules. These modules aim to equip students with the abilities they need to access information, process information, and then produce information effectively and appropriately in the tertiary academic environment. In the first-semester's AL support module, Academic Literacy Development (ALDE111), summary mapping – a mapping strategy closely related to mind mapping and concept mapping – is taught as a summarising strategy. The reasons for including summary mapping as part of the curriculum for ALDE111 are twofold: (a) the skill of summarising incorporates all three overarching aspects of AL (i.e. accessing, processing and producing information) in an integrated manner; and (b) numerous studies have established the effectiveness and versatility of techniques such as mind maps and concept maps in successfully dealing with large quantities of information at university level. Over several decades insightful research by, for example, Novak (1977), Beyerbach and Smith (1990), And et al. (1990), Horton et al. (1993), Farrand et al. (2002), Chiou (2008), Wickramasinghe et al. (2011) and Abdel-Hamid (2017), has highlighted ways in which mapping techniques can be used as instructional tools for effective teaching and meaningful learning in various fields of study.

In the context of an AL intervention, it is important to determine whether students have reached the set outcomes (i.e. that students are able to use the mapping techniques that are taught in the module productively). In order to determine how efficiently students are using mapping techniques, one needs to be able to measure fairly the varying and personalised maps with objective measuring instruments (this is further elaborated in Section 2 below).

The assessment of concept or mind maps is notoriously problematic, as has frequently been pointed out over the years (see Ruiz-Primo & Shavelson 1996; Wright 2006; D'Antoni et al. 2009; Abdel-Hamid 2017; Evrekli et al. 2010) and attempts at standardised marking approaches (see Ruiz-Primo & Shavelson 1996; West et al. 2000; West et al. 2002; D'Antoni et al. 2009; Evrekli et al. 2010) have been found wanting for different reasons: (i) concept mapping or mind mapping tasks vary greatly in the type of information they expect of students and (ii) it is a personalised representation that needs to be assessed accurately and consistently. In order to address the need for an appropriate measuring instrument for the summary maps produced by students in the first-year AL module, we developed and tested a new instrument for assessing specifically the content and structure of summary maps in a way that not only improves inter-marker reliability, but also has the further benefit of providing a basis for constructive feedback to the students.

2. Background and literature review

The main focus of this article is to illustrate the worth of our newly-designed marking rubric in the accurate and fair assessment of summary maps as a specific task in a foundational AL course. In this section, we need to take a step back and shortly discuss different mapping techniques and how they differ in order to situate our need for the development of a new assessment tool.

Various mapping techniques are referred to by a number of different names, including graphic organisers (Estes et al. 1969), mind maps (Buzan 1974), concept maps (Novak 1990), knowledge maps (O'donnell et al. 2002), and node link diagrams (Dansereau 2005). Because of the general similar purpose of any mapping technique where information is presented in a visual or diagrammatical way for study purposes, for example, it is understandable that these different mapping names are often used interchangeably. But they are in fact different, defined in different ways and as Davies (2011:280) puts it, "there are differences in their application". The two most widely used terminologies in the teaching and learning context are mind maps and concept maps that would need further distinction.

Mind maps generally contain more loosely structured ideas that branch out from a central topic and that flow organically. The use of colour and pictures (or drawings) and varying thickness of lines are characteristic of mind maps (also see Buzan & Buzan 2000, Davies 2011:281). Because of the less structured nature of mind maps, this type of map is often used in creative thinking, planning a piece of writing, or brainstorming ideas.

Concept maps, on the other hand, are more formal and more structured than mind maps with a stronger focus on the relationship between ideas, rather than the generation of ideas (Davies 2011:282-286). Concept maps typically require the inclusion of the concepts as well as the relationships between such concepts where these relationships concepts often straddle different texts. The concepts are normally presented in text boxes with arrows or lines, which are referred to as cross links, connecting them. Sometimes, the lines are labelled with phrases that explain the relationship between the concept boxes. The main goal of a concept map is to represent a student's knowledge about a certain field or topic.

In the AL modules at the NWU, mapping is used as a summarising strategy of a specific text. We refer to this mapping technique as summary mapping: it differs from the free-flowing, unstructured, idea-generating characteristic of a mind map and it is text-bound – students further do not have to illustrate any relationship between concepts that are not contained in the text itself. Students are, therefore, in essence required to summarise the structure of the main ideas of a text in a visual way (see Section 2.2.1 for a discussion of the task), a very simple but necessary first step in a foundational AL module where students are exposed to the skill of mapping.

The summary map takes the form of a hierarchical, graphic presentation of the most important ideas in a text. Students are guided to present the important information in a manner that allows for the illustration of a next level of information branching out from the previous level. First, the links or the placement of ideas are important, and second, it is important how well the essential information is summarised, paraphrased or captured in the summary map. The result is a visual diagram or summary map of a longer text that should enable students to utilise such a map in their studies to summarise information in a visual way and to retain the core information. Figure 1 illustrates a typical summary map from a longer text (about 400 words) used in the AL module (see Addendum A for the text, "Dreams" on which the summary map is based).

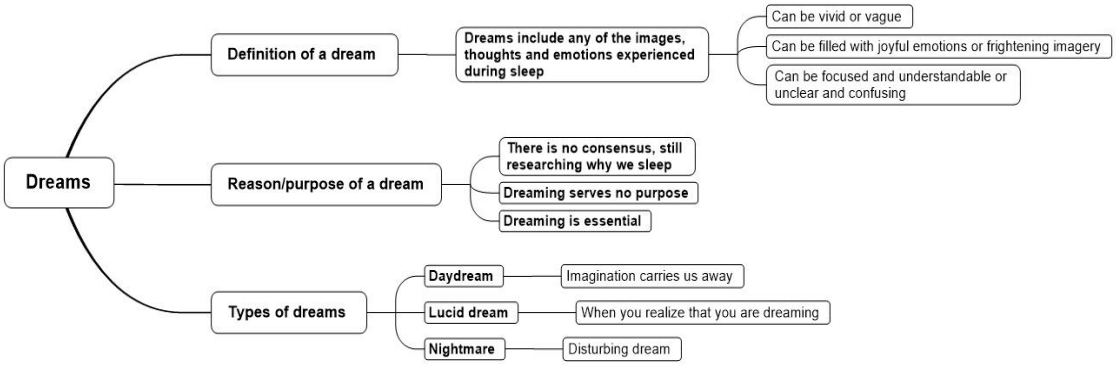

Figure 1: Summary map of the text "Dreams"

Although the various uses and efficacies of mapping techniques have been widely reported, researchers still mention the lack of adequate research on the effectiveness of existing instruments for the assessment of the summaries created by mapping techniques (Wright 2006; D'Antoni et al. 2009; Evrekli et al. 2010). Hua and Wind (2019: 4) further highlight the absence of appropriate assessment instruments: "Currently, there is a lack of psychometrically sound assessment tools that researchers and practitioners can use to evaluate the quality of mind maps." Ruiz-Primo and Shavelson (1996) state that there is great variation in the types of concept mapping techniques used for assessment and their accompanying scoring systems and that "little attention has been paid to the reliability and validity of these variations" (Ruiz-Primo & Shavelson, 1996:569). An instrument specifically aimed at assessing summary maps becomes necessary as this technique is usually a highly personal representation of very specific information. The students' summary maps need to be assessed fairly to ascertain whether their summary maps (i) illustrate an appropriate level of understanding of the text; and (ii) organise the most important information in a logically structured way.

2.1 Existing assessment instruments for mapping

Despite consensus in the literature that further research is needed into mapping assessment instruments, some researchers have proposed assessment rubrics for both concept maps and mind maps. In terms of concept maps, Novak and Gowin (1984) provided a comprehensive scoring system, but concept mapping is different to summary mapping and therefore a scoring system designed for concept mapping is not sufficient in assessing a summary map. Furthermore, many of the scoring systems for concept mapping were not tested for inter-marker reliability. Subsequently, D'Antoni et al. (2009) used existing concept map assessment instruments to develop one for mind maps, the 'Mind Map Assessment Rubric' (MMAR). Although a mind map is also different from a summary map, this scoring system provided a good point of departure for developing a scoring system that could possibly work for summary maps. The scoring system included marks for colour and pictures, something that was not useful considering our needs. However, it also included weighted scores based on hierarchical structure, an idea that was considered more relevant for our needs). The scoring system comprised: concept links (2 marks each), cross links (10 marks each), hierarchies (5 marks each), examples (1 mark each), invalid components (0 marks), pictures (5 marks each), and colours (5 marks each). Drawing on this proposed instrument, which proved to offer high inter-marker reliability, Evrekli et al. in 2010 tested the effectiveness of the following scoring system specifically with regard to inter-marker reliability:

- First level concept links (2 marks each if valid)
- Second level concept links (4 marks each if valid)
- Third level concept links (6 marks each if valid)
- Fourth level concept links (8 marks each if valid)
- Cross links (10 marks each if valid)
- Examples (1 mark each if valid)
- Relationships (3 marks if valid)
- Picture, image and figure (3 marks if valid)
- Invalid component (0 marks)

However, the scoring system used by Evrekli et al. (2010) presents a number of difficulties. Firstly, it is not clear what is regarded as 'valid content'. The scoring system also seems to focus heavily on the structure of the mind map, but it is not clear exactly how the content is assessed. Because summary maps are taught as a summarising tool in AL, focus on both content and structure is required, rather than emphasising the one or the other. In addition, the scoring system used by Evrekli et al. (2010) awards higher marks for lower-level concept links, which is problematic for summarising purposes since higher-level concepts are usually valued more when you summarise. Furthermore, marks are awarded for cross links, examples, relationships and pictures or images, without explaining the difference between the two types of links. If, as one assumes, these elements refer to the ability to identify relationships among concepts across separate texts and sections of content (which can be considered the ultimate goal of a complete

knowledge map – a mapping technique that not only requires content from the text, but also accepts content from the student's own background knowledge), this scoring method is also not appropriate for the assessment of the foundational summarising ability that forms part of an AL module such as ours.

The instruments developed by D'Antoni et al. (2009) and Evrekli et al. (2010) were to a large extent designed to investigate inter-marker reliability for their specific contexts. Apart from this, their assessment instruments also include aspects of mapping that are either too advanced (including relationship links outside the text) or inappropriate (colours and pictures) for an academic support module where it is important that students are supported to identify the important information in a text and where students are able to summarise the important information succinctly, ideally in their own words.

2.2 The development of an appropriate assessment instrument

The assessment framework developed by Ruiz-Primo and Shavelson (1996) developed from their reviews of different concept map tasks and the assessment tools used for the tasks, seemed a valid point of departure for developing our own summary map assessment instrument. Their research emphasises the importance of the following core components of a mapping assessment: (a) the task that the student receives; (b) the format for the student's response; and (c) the scoring system by which the map can be accurately and consistently evaluated. Ruiz-Primo (2000: 34) further stresses that "Without these three components, a concept map cannot be considered as a measurement tool". Using these three components as the starting point for developing a new way of approaching and assessing summary maps meant analysing each component in terms of how best to apply the principles for our context.

2.2.1 The task

If one truly wants to assess if students can summarise a text for study purposes, students need to demonstrate that they fully understand what they read. To ask students to summarise long and complete texts might seem like a sensible task at first because mastering the ability of summarising longer texts is essential for tertiary studies. Therefore, we initially designed mapping activities where students had to summarise complete texts in the form of a summary map. However, we anticipated potential problems and realised that we should perhaps revisit the scope of our task. Concerns were raised that summarising complete, extensive texts could be frustrating to students who had not yet fully acquired the ability to do so. We did not want our students to become demotivated and disengaged from the task itself. Another concern raised was that the use of longer texts could result in very complex summary maps due to the length and complexity of the text that would furthermore complicate the marking issue. To address these anticipated problems, it was agreed to make use of a shorter text (around 400 words) for the summarising task that students were requested to complete. A text of this length is equivalent to one section of a longer, more complicated text normally used for

comprehension assessments (around 1500-1800 words). This would allow students to master the ability on a smaller scale before attempting to summarise longer texts.

2.2.2 The format

A logical first step in the process of teaching summary maps is to assist students in a scaffolded way by giving them a fill-in (also known as a high-directed) map template to complete. Figure 2 shows the same *Dreams* text (as in Figure 1) in the format of a fill-in task. Although summary maps that students complete and submit in this format are more straightforward to assess in that the lecturer marks only the content of the empty blocks or empty spaces, these tasks are more challenging to develop and to set up properly. The imposed structure of a fill-in summary map is ultimately the lecturer's interpretation and structuring of the information, and although academic texts ought generally to offer little room for interpretation, there may be more than one way to structure information logically. The possibility of different interpretations in terms of sorting or categorizing the information in a text could potentially make the imposed structure too difficult for students to understand and, moreover, if they make a mistake in one block, this could have a cumulative negative effect.

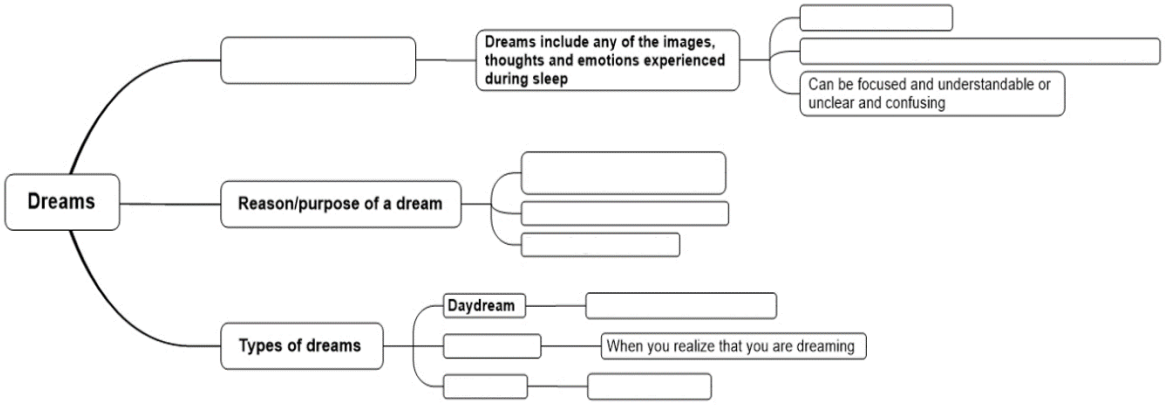

Figure 2: Example of a fill-in summary map

More importantly, this method is not the most accurate way to assess whether the students can structure information logically and hierarchically themselves and will therefore not give an accurate account of the students' own abilities to understand and organise information. In a comparative study, Ruiz-Primo et al. (1998) determined that maps that students create themselves (low-directed maps) without an imposed structure more accurately reflected differences across students' knowledge structures than fill-in (high-directed) maps. The study therefore argues for the use of low-directed summary maps in contexts such as academic literacy support modules where one would be able to determine if students really understood the text.

2.2.3 The scoring system

The final component required for a mapping assessment, as stipulated by Ruiz-Primo and Shavelson (1996), is "a scoring system by which concepts maps can be evaluated accurately and consistently". Previously, the marking of students' summary maps entailed that AL lecturers used an idealised memorandum that focused heavily on content in order to minimise inconsistency among markers. However, the strong focus on content presented a risk in the sense that students could achieve a higher mark than they deserved for the task if lecturers would award marks for the presence of specific content, but not necessarily for whether such content was presented in a logical way. Not only would such scores give a potentially skewed impression of students' summarising ability, but the scores were also meaningless in terms of feedback.

For students to understand what they can do to improve their summaries, a lecturer would need to spend valuable teaching time to give detailed feedback. We believe that the new assessment tool would also add value in terms of feedback to the students. The following section elaborates on the newly developed summary map assessment rubric that was designed, with an explanation of how it was implemented.

3. The summary map assessment rubric

The newly designed Summary Map Assessment Rubric Tool, or SMART, caters for the assessment of what students need to achieve with mapping as a strategy for summarising a text, namely: (i) to distinguish between essential and non-essential information – in other words, whether students can identify and then summarise meaningful phrases as main ideas; and (ii) to recognise meaning that is conveyed by the argument structure and logical flow of the text, and then reproduce it in the form of a summary map that hierarchically links and groups the information correctly. SMART, therefore, not only focuses on the content that is summarised, but also on the logical flow of information in the way the student expressed or visually illustrated the summary.

SMART also allows for a scaled mark assessing the content (the meaningfulness of the phrase or chunk of information) as well as the logical link (how well it reflects the structure of the text) for each level of information (main ideas, supporting ideas, lower-level examples). Each main idea is scored out of a maximum of 5 and a minimum of 2 marks, each supporting idea is scored out of a maximum of 4 and a minimum of 1 mark, and if there is any third level information or examples, they are scored out of a maximum of 3 marks and a minimum of zero (see Table 1). A further advantage of the scaled marks for each level of information on the rubric is that the rubric itself becomes feedback to the student. If a student, for example, received a score of 3 out of 4 for a supporting idea, the student could see that the supporting idea is placed on the correct level (branching from a main idea) but that the wording is either too cryptic and meaningless or that too much information is copied and not summarised.

Table 1: SMART – The Summary Map Assessment Rubric Tool

Structure	Logical link	Content (meaning)	Score
Main ideas	Correct level/link	Sensible phrase	5
	Correct level/link	Too cryptic/ Too much information	4
	Wrong level/link	Sensible phrase	3
	Wrong level/link	Too cryptic/ Too much information	2
Supporting ideas	Correct level/link	Sensible phrase	4
	Correct level/link	Too cryptic/ Too much information	3
	Wrong level/link	Sensible phrase	2
	Wrong level/link	Too cryptic/ Too much information	1
3rd level/examples	Correct level/link	Sensible phrase	3
	Correct level/link	Too cryptic/ Too much information	2
	Wrong level/link	Sensible phrase	1
	Wrong level/link	Too cryptic/ Too much information	0

A memorandum of the summary map of the "Dreams" text (see Addendum A) is provided in Figure 3. The memorandum shows that there should be three clear main ideas summarised as a first level of ideas. Each of these three chunks of information would be awarded a maximum of 5 marks. The second level or supporting ideas branching out from the main ideas would be awarded a maximum of 4 marks each and the third level of information or examples given would be awarded a maximum of 3 marks each.

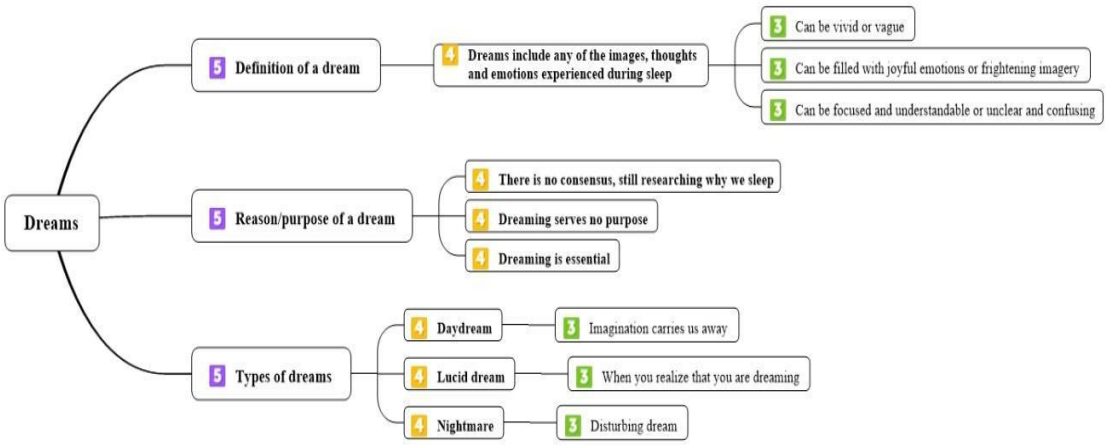

Figure 3: Example of a memorandum of "Dreams" with the maximum scores indicated

The overall total for this particular summary map would be calculated as a total of all the levels of information. Each memorandum or ideal summary map for different texts would, therefore, have a different overall total that could be easily converted to a percentage. Table 2 shows the calculation of the total for the Dreams text (Figure 3).

Table 2: Calculating different totals using SMART

Level	Maximum score	Number of instances on map	Total for level
Main ideas	5	3	15
Supporting ideas	4	7	28
3rd level information	3	6	18
Total			**61**

The awarding of marks would depend on the specific information students include in the information chunks as well as where the chunks are placed in the map.

As mentioned previously, the development of SMART was based on what was lacking in existing assessment instruments and what could work theoretically. It was therefore essential for the instrument to be tested and used in a real situation to determine whether it in fact caters for all our specific needs. In the subject group AL we then put SMART to the test to measure its effectiveness.

4. The rubric in action

One of the outcomes in the first-semester AL support module (ALDE111) is for students to be able to identify main ideas in a text. In order to identify main ideas, one should be able to distinguish between essential and non-essential information in a text. At the NWU we find that asking students to summarise a text in the form of a summary map is a very efficient way of not only assessing whether students are able to identify the main ideas, but also whether they can see the logical structure of the main ideas and the supporting ideas in a text.

It is usually easy to mark summary maps where the students ordered the chunks of information in a logical way. The marking becomes more challenging (i) where students wrote too little in a chunk of information to make sense or if they did not summarise and copied or wrote too much information; or (ii) where students link chunks of information to an incorrect main or sub-heading. The development of the SMART instrument assisted the lecturers to deal with these difficulties: assessing the content of the summary map (see Section 4.1) and assessing the structure of the summary map (see Section 4.2). We piloted the marking rubric and also

gauged our inter-marker reliability during our usual memorandum discussion meeting that took the form of a training session (see Section 4.3).

4.1 How SMART helps to score the content that is summarised

The new rubric was designed so that it would enable lecturers to assess the amount of information given on a continuum between being too cryptic (in other words, too short and general to be used for effective study purposes) and not summarised at all, thus, essentially being a copy of the original text. Below we discuss some typical mistakes on summary maps to illustrate how SMART is used to score summary maps.

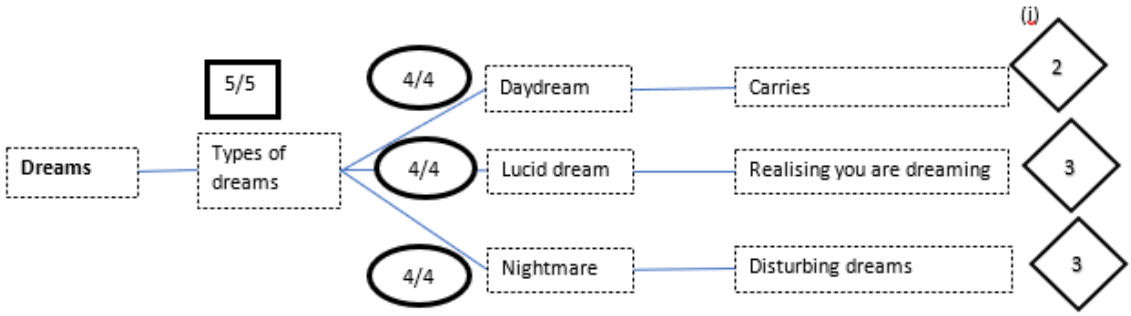

Figure 4: Scoring a chunk of information that is meaningless and too cryptic

The example at (i) in Figure 4 focuses only on the third main idea, 'Types of dreams'. It often happens that students are too cryptic when they summarise. The scoring at (i) shows a typical occurrence of how a third-level example is too cryptic and is therefore awarded 2 out of a possible 3 marks (because the link is correct) according to SMART (see Table 1 again for the rubric). The more sensible explanation of the subheading 'Daydream' would be to state that 'it carries us away' or that 'one drifts away', but this example only includes 'carries' that is meaningless as a chunk of summarised information.

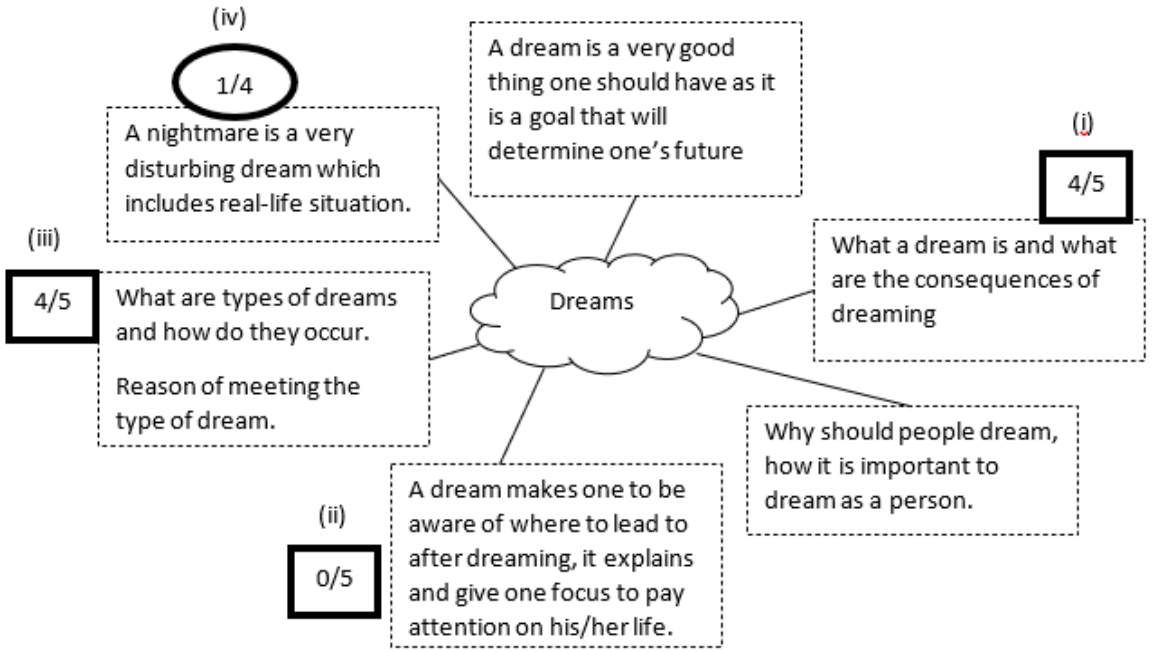

Figure 5: Scoring a chunk that is not summarised, containing too much information

Figure 5 shows an example of a summary map that is poorly summarised without a proper structure. With SMART one would be able to deal with such cases. The explanations below follow the labels (i) to (iv) annotated on Figure 5.

i. The first main idea, '*Definition of a dream*', flows from the centre and therefore the link is correct, but the chunk is not expressed in a sensible phrase. The chunk is scored 4 out of 5 marks. No further detail is given for the subsequent levels of information resulting in no further marks for the other levels.
ii. The second main idea, '*Reasons or the purpose of dreams*', is missing on the summary map. No mark would, therefore, be awarded.
iii. The third main idea, '*Types of dreams*', is identified and also flows from the centre, meaning the link is correct, but again too much is copied from the text and not summarised. The score is 4 marks out of a possible 5.
iv. A nightmare is a type of dream and this chunk of information should flow from the chunk containing the main idea, 'types of dreams'. In this case, however, it is also linked to the centre of the summary map. Too much of the information is copied from the text and not summarised. Under *supporting ideas* on SMART the link is incorrect and too much information is provided which would result in a score of 1 out of 4 marks.

In large groups of students, one can usually anticipate typical instances that would result in marking difficulties. In Table 4 (Section 5) we provide an example of a protocol document that was compiled to help us deal with problematic maps that result in difficult marking. The next section will focus more on the logical links of the summary maps.

4.2 How SMART helps to score the logical order or structure of the summary

SMART not only focuses on the presence of content in the summary, but also on the way it is presented, i.e. whether the structure is logical. At label (iv) in Figure 5, the chunk containing the information about nightmares would be penalised for both hierarchy and meaning because the information is not structured in a logical way nor was it summarised sufficiently. Figure 6 further illustrates the scoring of a problematic structure.

i. The link of the second main idea, '*Reasons or the purpose of dreams*', is incorrect. Instead of flowing from the central topic or theme, the chunk is structured as if it is a supporting idea of the first main idea. Following SMART the link is incorrect, but the phrase is sensible. The SMART result would be a score of 3 out of 5.

ii. Although the ordering or the structural link of the second main idea is incorrect, two of the supporting ideas flowing from this second main idea are correct. A student would be penalised at the main idea level and will not be penalised again. The links for the two supporting ideas flow from the main idea (regardless of the main idea's incorrect link) and the chunks are sensible. Therefore, full marks would be awarded for the two supporting ideas under the second main idea.

iii. However, the third supporting idea, '*Dreaming serves no purpose*', of the second main idea is missing under '*Reasons or the purpose of dreams*'. The third supporting idea is indeed present in the summary map, but incorrectly linked to the third main idea, '*Types of dreams*'. According to SMART this is a case of providing an incorrect link but a sensible phrase which would result in a score of 2 out of 4 for this supporting idea.

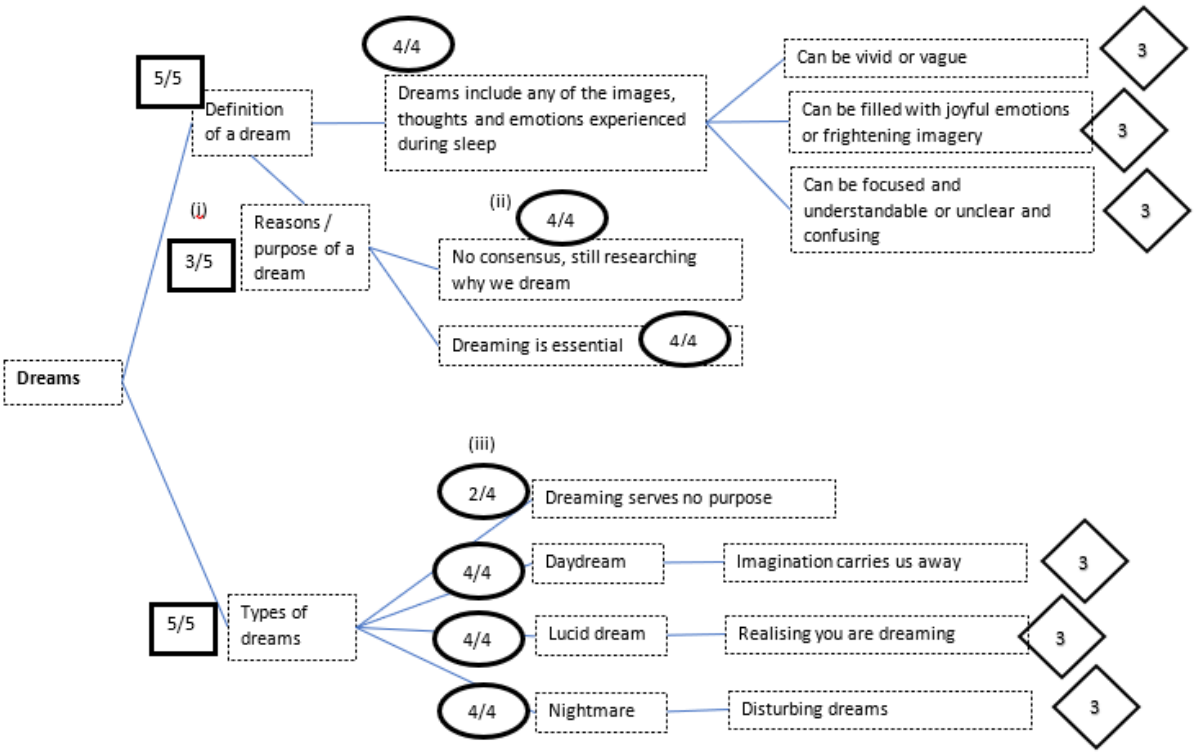

Figure 6: Scoring a chunk of information with an incorrect link

Further possible problem cases which arose after implementing this instrument, and ways of dealing with them, are discussed in Section 5, Table 4.

4.3 How SMART became an integral part of feedback

During lectures on summarising skills, the SMART instrument is explained in detail to the students so that they are aware of how they are going to be assessed. The students also have access to SMART in their workbooks as well as on the online student platform. A crucial aspect of the marking is that the scores for the different levels should be clear to the students. As indicated in Figures 4-6, the scores for the different levels of ideas are clearly indicated as feedback to the students.

Students can, therefore, clearly see the scores for each chunk of information on the different levels (see Figures 3-6 that illustrate typical student submissions). The SMART scoring rubric is then stapled to their marked summary maps with the total scores for each level at the bottom of the rubric. Without the lecturer having to repeat written comments on all the individual summary maps, the rubric enables students to discern immediately what they did wrong by referring only to the scores they have received for all the chunks on the different levels. If they, for example, look at their scores out of 5 marks for the main ideas, each score includes the following message:

- If you have received a score of 5/5, well done! Your link is correct and you have summarised the information well.
- If you have received a score of 4/5, then your link is correct but you have too much (not summarised at all) or too little (too cryptic) information.
- If you have received a score of 3/5, then you have summarised the information well but there is a problem with the structure – your link is wrong, not logical.
- If you have received a score of 2/5, then there is a problem with the structure (your link is wrong, not logical) and you have too much (not summarised at all) or too little (too cryptic) information.

SMART not only saves marking time, but it also gives individualised feedback with little extra effort on the side of the lecturer. When the lecturer gives general feedback to the class, explaining the model answer, students use their own "feedback" scores to make the lecturer's general feedback applicable to their summaries. For example, if a student had a problem with a specific link, the student can pay particular attention to the feedback of the lecturer on that particular link.

5. Scoring consistency using SMART

In the subject group AL lecturers usually mark a limited number of the same sample tests, tasks or papers (randomly chosen, copied and then distributed to all) before any memorandum or rating discussion. This way uncertainties are addressed, and problematic issues are discussed in the memorandum discussion before staff continue with their actual marking. In addition, this approach serves as continuous training opportunities where staff not only reach consensus on the memorandum or rubric, but where a specific norm and standard is established in order to achieve higher inter-marker reliability. Meadows and Billington (2005:14) summarise inter-marker reliability as the "variation in the marks assigned to an examination script by different markers". The lower the differences in the scoring between markers, the higher the inter-marker reliability.

The same approach was followed for the marking of the summary maps using SMART. Seven lecturers each marked the same three summary maps before we met to compare and discuss our scoring. For SMART to be utilised effectively in the context of AL which is a large subject group with multiple lecturers teaching the same module, inter-marker reliability is important. Upon comparing the results of the seven markers (see Table 3), it was clear that SMART ensured relatively high inter-marker reliability for Students 2 and 3. There were, however, some anomalies regarding Student 1. These variations are discussed below.

Table 3: Comparison of different markers' scores

Marker	Student	Main ideas	Supporting ideas	3rd level / examples	Total out of 61
	Student 1				
Marker 1		3	13	3	19
Marker 2		3	12	4	19
Marker 3		4	12	3	19
Marker 4		12	3	7	22
Marker 5		3	6	0	9
Marker 6		3	10	2	25
Marker 7		0	8	7	14
	Student 2				
Marker 1		15	18	0	33
Marker 2		15	19	0	34
Marker 3		15	18	0	33
Marker 4		15	19	0	34
Marker 5		15	20	0	35
Marker 6		15	18	0	33
Marker 7		15	18	0	33
	Student 3				
Marker 1		15	11	0	26
Marker 2		15	11	0	26
Marker 3		15	11	0	26
Marker 4		15	11	0	26
Marker 5		16	8	0	24
Marker 6		15	16	0	31
Marker 7		15	11	0	26

The first interesting observation was that in some cases the separate marks for the three different levels of information differed substantially, but still added up to a total mark that was similar among the markers (compare the scores of Student 1 by Marker 3 and Marker 4 to see that different interpretations of awarding scores balanced out over the levels to result in fairly similar final marks). In other words, if markers are strict with the first-level scoring they compensated for it with the second-level scoring, or vice versa.

After observing the variations of especially Student 1, the marking of the summary maps was again discussed with the lecturers. This resulted in the development of a protocol document (see Table 4) that serves as an exemplar to refer to when dealing with problematic cases. Such

a protocol document is what the literature refers to as 'consensus estimates' of inter-marker reliability. Meadows and Billington (2005:14) explain that "consensus estimates of interrater reliability assume that observers should be able to come to exact agreement about how to apply the various levels of a scoring rubric".

It is recommended that, at least for the first attempts at using SMART, the marking team should negotiate a relevant protocol for their context. In general, with the extreme cases set out in the protocol, we tried to penalise students as little as possible while still offering a learning opportunity to the students. Table 4 sets out our protocol document that serves as guideline for scoring problematic summary maps using SMART.

Table 4: Protocol document – guidelines for scoring problematic summary maps using SMART

Protocol: guidelines for scoring problematic summary maps using SMART	
Description of student work	**Guideline**
Information from different levels is put into one block, but there is an attempt to differentiate between the levels by either underlining headings, making bulleted lists, or using colour.	Award marks as normal but deduct for "content' on both the two lower levels: • Level 1 = 5 marks • Level 2 = 3 marks • Level 3 = 2 marks
Information from all three levels is put into one block without attempting to differentiate between levels.	Award a mark for Level 1's 'link' but penalise for 'content'. Levels 2 and 3 are penalised for 'level' and 'content' because there is too much information in the block: • Level 1 = 4 marks • Level 2 = 1 marks • Level 3 = 0 marks
Information from levels one and two are put into one block without attempting to differentiate between levels.	Award marks for both levels but penalise the supporting idea level ('link') because it is on the wrong level: • Level 1 = 5 marks • Level 2 = 2 marks
The supporting ideas are put on the first level (flowing from the topic).	Accept that the student did not include the first level idea, no marks awarded. Student is already penalised on Level 1 for 'link', award full marks for the second level if the phrase is sensible. • Level 1 = 0 marks • Level 2 = 4 marks
Content for Level 1 and Level 2 are put in one block on the first level without any attempt to differentiate between them.	Accept that the student did not include the first level idea, no marks awarded. Student is already penalised on Level 1 for 'link'. Award marks for the 'link' for Level 2 but penalise for 'content'. Level 3 has a problem with 'link' and 'content'. • Level 1 = 0 marks • Level 2 = 3 marks • Level 3 = 0 marks
Content for Level 1 and Level 2 are put in one block on the first level, but there is an attempt to differentiate between the levels by either underlining headings, making bulleted lists, or using colour.	Accept that the student did not include the first level idea, no marks awarded. Student is already penalised on Level 1 for 'link'. Award full marks for Level 2 and penalise Level 3 for 'content'. • Level 1 = 0 marks • Level 2 = 4 marks • Level 3 = 2 marks

6. Conclusion

Despite the existing literature available on scoring methods and rubrics for concept maps, mind maps and/or summary maps, none of these were really appropriate for our specific context. This article reported on the development of a new rubric for scoring summary maps in a foundational (first-year and first-semester) Academic Literacy module. The development of SMART addressed the need for scoring summary maps not only for content but also for the structure (the logical hierarchical nature) of the map. It furthermore provides a scoring system that is flexible enough to adapt to more than one structure without penalising the student unnecessarily or repeatedly. The guidelines in SMART minimise the discretion markers previously had in scoring summary maps – especially problematic maps with no clear structure – and this resulted in fairly consistent scoring between markers. The small number of instances where more substantial differences in marks were observed, lead to the compilation of an additional protocol document that serves as guidelines for dealing with extreme and problematic cases.

As a result of the clear descriptions for both 'link' and 'content' for all the levels of information on the rubric, an added benefit of SMART is that it serves as meaningful feedback to students, thereby also acting as a teaching-learning tool.

A limitation of the study is that student perceptions about the use of instrument were not investigated. Future research that investigates the usefulness of the rubric as meaningful feedback to students could potentially lead to further refinement that may enhance the use of the rubric even more.

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ADDENDUM A – Dreams

Dreams have fascinated philosophers for thousands of years, but only recently have dreams been subjected to empirical research and concentrated scientific study. Chances are that you have often found yourself contemplating over the mysterious content of a dream, or perhaps you have wondered why you dream at all.

At first we need to understand what a dream is. A dream can include any of the images, thoughts and emotions that are experienced during sleep. Dreams can be extraordinarily vivid or very vague; filled with joyful emotions or frightening imagery; focused and understandable or unclear and confusing.

Another consideration that warrants our attention is why we dream. While many theories have been proposed, no single consensus has emerged. Considering the enormous amount of time we spend in a dreaming state, the fact that researchers do not yet understand the purpose of dreams may seem baffling. However, it is important to consider that science is still unravelling the exact purpose and function of sleep itself.

Some researchers suggest that dreams serve no real purpose, while others believe that dreaming is essential to mental, emotional and physical well-being. Ernest Hoffman, director of the Sleep Disorders Center at Newton Wellesley Hospital in Boston, Mass., suggests that a possible function of a dream is to make sense of all the unprocessed information that your brain took in during the day.

There are many types of dreams that can be distinguished. Studies show that we all have the tendency to daydream an average of 70-120 minutes a day. Day dreaming is classified as a level of consciousness between sleep and wakefulness. It occurs during our waking hours when we let our imagination carry us away. Lucid dreams occur when you realize you are dreaming in the middle of your dream. "Wait a second. This is only a dream!" Most dreamers wake themselves up once they realize that they are only dreaming. Other dreamers have cultivated the skill to remain in the lucid state of dreaming. A nightmare is a disturbing dream that causes the dreamer to wake up feeling anxious and frightened. Nightmares may be a response to real life trauma and situations. Nightmares are an indication of a fear that needs to be acknowledged and confronted. It is a way for our subconscious to make us take notice. "Pay attention!"

Adapted from dreammoods.com

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