

Exploring the Dynamics of Concept Maps in ESL Phonetic and Phonology: The Nigerian Case

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Abstract

The traditional teaching strategies adopted by many phonology teachers in Nigeria are teacher-centric; students in this mode scarcely get the main idea, rarely interact with the supporting ideas, and seldom grasp the general message of the lesson. Consequently, the average Nigerian student studying English is scared of phonetics and phonology, such that it appears he or she necessarily have to divide his or her attention between the content of the lecture and interest cultivation. Thus, he or she finds it difficult to flow with the lesson as understanding is often sacrificed. It is for this reason that attention must be shifted to searching innovative approach to creating and sustaining learners' interest in phonology. This paper, therefore aims to foreground the use of concept maps as alternative phonology teaching strategy. Based on reflective practice, the paper experiments with six concept maps, namely: the big question map, Venn diagram, web and details, equation block, segmented hierarchy, and sequence flow chart; with each tested against a specific phonetic and phonology topic as a way illustration. The paper concludes that concept maps are capable of stimulating students' desire to learn phonetics and phonology.

Keywords: concept maps; reflective teaching; ESL; phonetics and phonology

Introduction

'If we teach today's students as we taught yesterday's, we *rob our children* of tomorrow' (Dewey, 1916, emphasis added). This statement is apt now as it was a century ago. Phonology students in tertiary institutions in Nigeria (and other ESL contexts, perhaps) lack the required skills for 'higher-order' thinking that can enable them independently navigate through concepts within and outside phonology classrooms. This is partly attributed to the insipidly routinized method of lecture delivery instructors develop over time. Consequently, learners see phonology and phonetics as an academic journey into the abstract: they hate the subject with a passion. Therefore, one huge challenge teachers of phonetics and phonology in Nigeria have is how to cultivate and sustain their students' interest to learning. To achieve this, phonology teachers should move from the top-down, mechanistic, teacher-based and externally-imposed (Kennedy and Edwards, 1998) technique to bottom-up, interactive, classroom-based and organic approach to teaching phonology. Put another way, in order to achieve optimal learning in phonology classrooms, instructors must elicit learners' interests with a reinforcing activity that makes every learner to be successful (Sam D and Rajan, 2013: 156), at least, through taking charge of the learning process.

Whereas a teacher's style of delivering lecture is his or her prerogative way of handling the variegated challenges of teaching; sticking to routinized methods does not often yield the desired responses from the learners. A good teacher must diversify his or her approaches to teaching. Often, the nature of instructional decisions made by teachers, at whatever level of learning, determines how interesting a particular lesson will be. One way of doing this, is by employing the use of concept maps (CMs henceforth).

Teachers of phonology and phonetics in any tertiary institution in Nigeria may be aware of this scenario: a teacher tells students that a phoneme is a distinctive sound in a language, the combination of which builds a syllable or a word. As simplistic as this concrete view of phoneme is, students find it difficult to interpret. Ask them to say what a phoneme is and they will quickly recite the definition, but when asked to bring out the phonemes in a word like *arrow*; different responses emerge, ranging from three or four, to five phonemes. This kind of response is expected when teaching is routinized and learning takes place mechanically. Furthermore, it is a clear testimony that they have not internalised the concept *phoneme*, for instance; although they have been taught. On the other hand, when a lesson is made interesting to the learner, he or she participates actively in the learning process and the learning outcome becomes functional. Students take charge when a lesson is interactively organic. Therefore, this paper introduces the use of CMs in phonology classroom as an

alternative approach to teaching and learning phonetics and phonology.

Again, if understanding the structure and organisation of texts is very vital to learning process (Trabasso and Bouchard, 2002), then, teachers at whatever level of learning should strive to introduce techniques that will enhance the understanding of the texts. One such technique is the use of CMs. No doubt, there should be a pedagogical stimulus in phonology classroom (as in other classrooms) to help create spatio-visual image of concept in the mind of the learner. Thus, for effective learning to take place in phonology classrooms, instructors should endeavour to support content stimuli with maximum visual representation of the concept. This visual representation can be done with the help the CMs.

1.1 Meaning of Concept Maps

Also known as graphic organiser or cognitive map, a CM 'is a visual and graphic display that depicts the relationship between facts, terms, or ideas within a learning task' (Pullupaxi, 2012, p. 10). To Hall and Strangman (2008), a CM is 'visual and spatial display designed to facilitate the teaching and learning of textual material.' Similarly, to Bromley, DeVitis and Modlo (1999), CMs are visual representation of knowledge that structure information by arranging important aspects of a concept into a pattern using labels. In CM, ideas and concepts are put in diagram revealing a process or showing a sequence or structure of concepts or elements of a topic.

Interestingly, Waters and English (1995) argue that both visual and spatial reasoning are equally essential to students when analysing ideas or concepts. Clarke (1991) recounts that visual aids in the form of CMs, ‘affect patterns of thinking about contents knowledge; they allow teachers to focus student attention on higher order thinking skills without shifting attention from subject area content.’ (p. 526). In sum, according to Loshier (2003), the use of CMs is important because:

1. Information presented in CMs is easier to understand than paragraphs;
2. They can be deployed at the beginning of a lesson to get students prepared;
3. They help learners structure and visualise information to improve understanding;
4. They help summarise large chunks of information in an interesting and innovative way.

CMs help learners identify textual relations (Claggett, 1992) which, in turn, will assist them understand the idea before them.

For effective application of CMs, it is important that instructors master different CMs, explain to their students what they are, illustrate their use to them, constantly review students’ work, endeavour to familiarise themselves with the nature of the concept to be presented, and clearly map out the objectives of the chosen topic and structure the CMs towards achieving them.

CMs are viable educational instruments designed to help students develop critical thinking skills (Bromley,

DeVitis and Modlo, 1995; Bromley, Irwin-DeVitis, & Modlo, 1995), understand relationships among concepts (Vygotsky, 1962), and organise information for independent reasoning (Ausubel, 1968; Dunston, 1992). However, the type of CM to be configured for use is usually determined by the information structure and the objectives of the target lesson, the composition of the class, and the instructor’s previous experience(s). This means that a particular CM that is meant for a specific class may not be considered good for another class.

Commenting on the universality of CMs as viable educational instruments, Masterminds (2001) argues that they ‘can be used to improve learning and performance of a wide array of students, ranging from those who may be intellectually gifted to those with mild learning problems...’ and they can be used to enhance learning not only in literacy circle, but also in content areas like phonology.

2. The place of concept maps in reflective practice, teaching and learning

The triad – reflective practice, reflective teaching, and reflective learning – has a common modifier: reflective. The term reflection means different thing to different people; however, in education, it is associated with retro-analysis that aims at improving teaching and learning process. Thus, according to Jenny Moon, reflection is:

... a form of mental processing that we use to fulfil a purpose or to achieve some anticipated outcome. It is applied to gain a better understanding of

relatively complicated or unstructured ideas and is largely based on the reprocessing of knowledge, understanding and, possibly, emotions that we already possess. (Moon, 2005, p. 1)

Incidentally, the *anticipated outcome* referred to in the above quote is simply the betterment of teaching and learning.

Reflective practice became an important educational instrument following Schon's (1983) work titled *the reflective practitioner: how professionals think in action*. The author proposes two types of reflection: reflection on action and reflection in action. Whereas the latter emphasises thinking while doing something, the former focuses on thinking after doing something -- what Finlay (2008, p. 3) terms 'after-the-event thinking'. What these two processes signify is that instructors should be able to draw experience during a teaching process and also synthesise their knowledge after classroom experience(s). However, a third reflection is needed to complete the process. Grushka, Hinde-McLeod and Reynolds (2005) provide the missing reflection: reflection for action. They argue that in reflection for action an instructor considers his/her selection and application of the resources, the reason for the lesson and the practicality of the relevant resources. This simply centres on thinking before engaging in the act of teaching. For the learners, it implies thinking before engaging in the learning process.

On the other hand, Smith (2016) sees reflective teaching as 'a process whereby teachers critically think about and analyse

the way they teach and the effects this has on their students' learning, and how this might be improved or changed for better classroom outcomes. Similarly, according to Richards (1990), reflective teaching is a metacognition of how teaching takes place, which involves both the teacher and learner in the process of observing, assessing teaching for the benefit of both. To Gatumu (n.d.), reflective teaching means 'looking at what you do (as a teacher) in the classroom and giving it a meaning by attaching the *why* question to what you go through' (p. 14, parenthesis added). The author adds that in doing so 'you also empower your students to ask these *why* questions to their classroom experiences. You start by recognising that you and your students are key persons in learning environment. Your being in the classroom must make sense to you and your students.'

The concept of reflective teaching is indeed complex in nature because it is an integration of the teacher, the learner, the learning environment and the society or community. Each of these levels of integration is laden with peculiarities. Every teaching and learning system is characterised by some form of complexities; therefore, any approach to deflate tension and apprehension is very important and should be encouraged. One basic requirement in reflective teaching is to look for specific aid to instruction such as 'work sheets, note-taking, web quests, PowerPoint, or graphic map' Gatumu (n.d.). According to Mastermind (2001), CMs make contents easier to understand and learn and enable students become more strategic learners. Thus, with CMs, students become analytical,

critical and creative in thinking. This is the explicit connection between CMs and reflective teaching.

An essential aspect of reflective teaching and learning that is of interest in the current study is the action research. According to Gregory (1988), action research is instructor-controlled examination that enhances teacher's awareness of the teaching and learning situation in the classroom. However, unlike the five stages (planning, action, observation and reflection, replanning, and implementation) of action research proposed by Richards (1990) and Richards & Lockhart (1996), with graphics/concept maps, three phases are involved, these are:

Planning: (selecting the concept to present to the learner and mapping out the procedures to choosing the appropriate concept map to use);

Action: (arranging the concepts and corresponding details in a specific concept map and presenting it to the learners at appropriate time);

Observation and Reflection: (examining the presentation and analysing its effects on learners) (slightly adapted from Richards and Lockhart, 1996 & Smith, 2016).

It is in line with the dictates of reflective practice and teaching that a teacher should look inward to reflect on the approaches used so far in teaching and see how they can be improved upon for the benefit of the learner. The essence of every teaching experience is the desired change in the learner's behaviours.

3. Concept maps in understanding phonetics and phonology

Available literature on CM indicates that they are usually designed and used to enhance reading-related activities (e.g. Witherell, & Mc Mackin, 2009; Scaper & Scaper, 2006; Simmons, Griffin, & Kameenui, 1988; Doyle, 1999; Jiang, & Grabe, 2007; Jiang, 2012; Manoli, and Papadopoulou, 2012; Pullupaxi, 2012; Sam D, and Rajan, 2013; Uba, Oteiku, and Abiodun-Eniayekan, 2016); literature on the use of CMs to improve teaching and learning of phonology is arguably scarce. Interestingly, CMs have been deployed to improve reading in mathematics (Braserton and Decker, 1994), and Alshatti (2012) investigates how relevant CMs are in family and consumer science education in Kuwait. The fact that CMs have been propagated as viable educational tools for cognitive and schematic analysis of information (Dye, 2000), and facilitation of critical thinking skills by both students and teachers (Bellanca, 2007) indicates that they can be used in any teaching and learning experience. It is therefore important to see how CMs can be relevant in phonetics and phonology teaching, especially in relation to promoting information processing. If the claim by researchers such as Alshatti (2012) and Sam and Rajan (2013) that CMs are proficient reading pedagogy, then, deploying them to teaching phonetics and phonology will be a beneficial instructional tool. This is so because comprehending textual concepts is paramount in phonetics and phonology as literature-base course.

CMs can enhance teaching and learning of phonology in many ways. Some of these include:

- a. CMs equip teachers of phonology with a cocktail of activities to use in classrooms that are capable of enhancing students' spatio-visual capability;
- b. With their ability to bring out the differences and/or similarities among concepts, CMs are a veritable tool to use to easily establish relationships between different phonological concepts and ideas within and beyond classrooms activities;
- c. If properly structured and constructed, CMs enable learners to quickly spot the structure of phonological or phonetic concept or idea by understanding the atomic parts alongside the whole;
- d. Phonetics and phonology, being a course (or courses) with disparate components, CMs will help facilitate learners' ability to negotiate for meaningful patterns in order to categorise the concepts for understanding; and
- e. CMs have various shapes to match specific information needed to be communicated to the learners.

The remaining part of this section examines different CMs and how they can be used to facilitate the desired student-oriented knowledge that is the essence of active, constructive, intentional, authentic, and cooperative (Jonassen, Howland, Moore, and Marra, 2003) learning process. This study experiments with six types of CMs, namely: the big question map, segmented pyramid, web and details, Venn diagram, the equation block, and sequence flow chart, with each tested for its

use in teaching different phonological topics.

3.1 The Equation Block (EB)

As the name implies, this kind of CM is in the form of a mathematical equation, i.e. expressions containing terms and/or variables. The equation block assists students grasp the possible situation involving two or more variables. It is used to illustrate the relationship between the terms in expression. Like in other mathematical expressions, equation block concept map helps hone the analytical prowess of learners, as they are expected to first identify the coefficient(s), variables and the constant(s), and, then, work out the relationship binding them together. It is the form indicated in Figure 1.

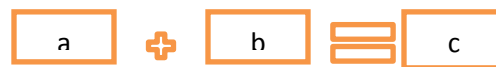


Figure 1: Sample Equation Block

What this is simply saying is that when term *a* is combined with term *b*, term *c* is realised. To use this kind of CM, the instructor should create mathematical expressions that are apt and precise using phonological concepts. Teachers should not be unaware of students' aversion to quantitative reasoning. However, learners are usually attracted to novel ideas; this form of mathematicity is capable of making them want to know what it is doing in a phonology class. The whole essence is to harness their interest. Therefore, a good equation block should be mathematical enough to elicit critical reasoning from students and simple enough to sustain their interest. Thus, the terms of the expressions should be discussed and properly explained.

A good example of phonological concept to illustrate with an EB is phonological rules/processes. This is exemplified in Figure 2 below.

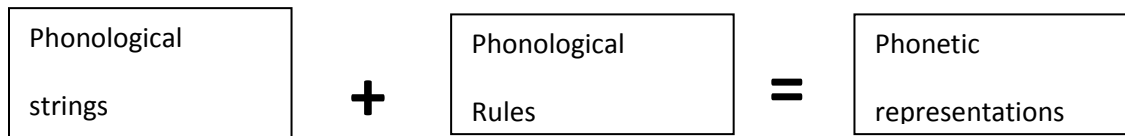


Figure 2: Equation Bank

For example, this equation could be used to explain the aspiration rule in English, where phonological strings represents consonants, phonological rule represents puff of air after voiceless consonants at the beginning of a syllable, and phonetic representation represents aspirated utterance. Other assimilation rules or processes can also be explained using EBs. Empty EBs, like the one in Fig. 1, can be presented to learners to fill in the appropriate terms.

3.2 Segmented Pyramid (SP)

This is the presentation of information in a hierarchical order. The shape of SP concept map could be pyramidal or rectangular, showing relationships among different levels of ideas. SP allows learners see and establish the subordinate, coordinate, and superordinate relationships within and between concepts, while at the same time, enable them to categorise ideas within a concept into different relational levels. To successfully use SP, therefore, teachers should ensure that the topic or concept to be taught must be such that there exists some kind of ranked relationship among disparate but related units. A good example of a phonology topic that can be illustrated with SH is the demonstration of the tiered

relationship among phoneme, mora, syllable, and p-word. A good SH should be able to illustrate both the horizontal and vertical connection of the concepts, as indicated in Figure 3 below.

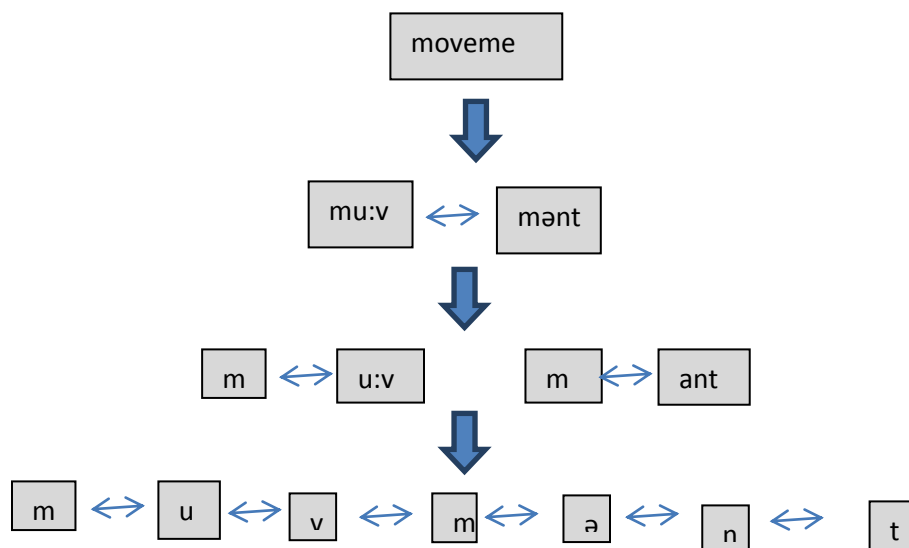


Figure 3: Segmented pyramid

It is important to explain to learners what the different arrows represent in the chart. For example, in Fig. 4, the downward pointing arrows show the vertical relationship between the concepts: phonological word, syllable, mora, and phoneme; while the double-headed arrows indicate the horizontal relationship within each of the concepts.

In order to carry the students along, they can be asked to work out the units in the categories or levels left out. Another way of making students active with SP is to involve them in the construction from the beginning. After lecturing, the teacher may ask learners to graphically represent what has been said in the class in a pyramid form.

3.3 Venn diagram (VD)

This is the structuring of phonological information in intersecting circles called the Venn diagram. Each set represents an entity with peculiar features; whereas the intersection (i.e. the overlapping point)

represents commonness or similarity. This is a vital teaching and learning tool because it enables learners to see the key concepts and their characteristics. It encourages students to compare and contrast ideas. It further trains them to see the differences and similarities in the patterns of information presented to them. Venn diagram can be used to visualise the convergence and divergence between two or more theories or concepts in phonology. For example, it can be deployed to explain the concepts *phonetics* and *phonology*, as shown in Figure 4 below.

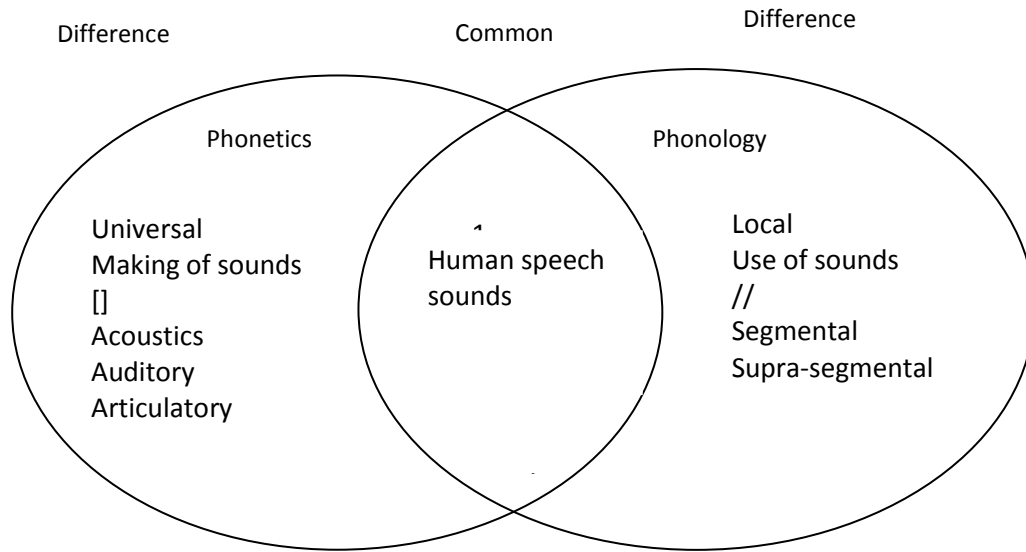


Figure 4: Venn diagram

A Venn diagram is very easy to construct provided the similarities and differences between ideas are explicable. Beside circles, other shapes such as rectangles and triangles can be used to construct VDs.

3.4 Sequence Flow Chart (SFC)

This chart depicts continuous flow of events or ideas from one point to the next, with each point representing a structured concept that has detailed phonological or phonetic features. The activities at one point determine what happens in the next point. Sequence shapes (e.g. rectangles, squares, triangles, etc.) are used to present the relationship of ideas that occur in progressive order. SFC enables learners recognise the main idea in the array of interconnected topics. It can be used for instance to illustrate the sound production process in phonetics (see Figure 5).

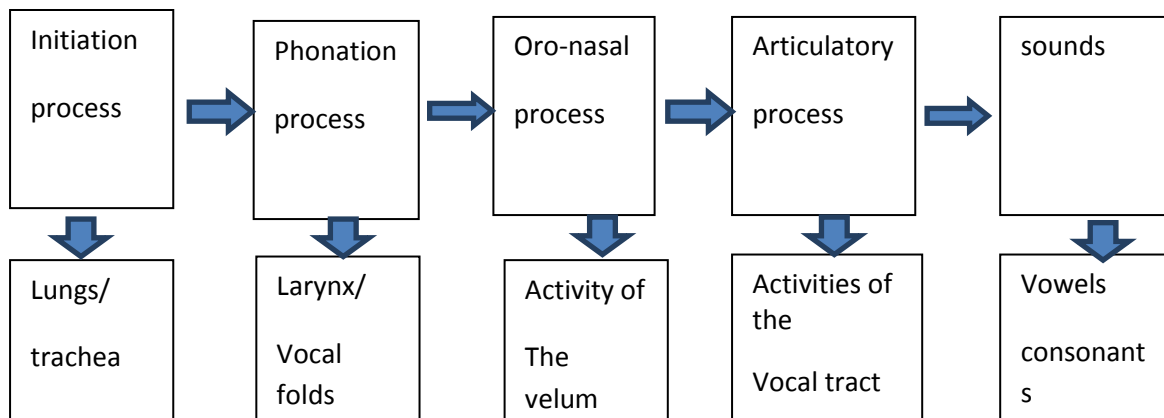


Figure 5: Sequence flow chart

The movement of the arrows indicate the progressional relationship between the concepts. Following the chart, it will be easier for students to discuss among themselves how each phoneme is produced, for example. They can also easily see graphically the nature of the activity that takes place at every point in a sound production without instructor's explanation.

3.5 The Big Question Map (BQM)

This CM makes learners to reason independently by engaging their ability through guided questions to which they are expected to respond. In order to get the best out of this CM, it is important that instructors avoid the yes-no question patterns; rather, the wh-question format should be adopted. Therefore, the guided questions should begin with any of: what, when, where, why, who, and how. This type of CM is usually good for any phonological topic that aims at enhancing the cognitive understanding of learners. That is, depending on the lesson's objective, BQM can be configured to fit in any topic. Figure 7 below illustrates how the CM can be used in teaching intonation in English.



Figure 6: The big question map

It is vital to note that the response(s) to the questions should not go beyond a few words or a sentence, and they should be written in the boxes of the concept map. BQMs can be used by teachers to measure both the previous and end-of-lesson knowledge of the learners. They can also be used in groups, where each group takes a question and discusses.

3.6 The Web and Details (WAD)

This CM helps learners refine phonological ideas by allowing them knit together componential concepts to form a definition. It is often good for any topic that has numerous sub-topics, with each sub-topic having distinct characteristics. That is, this CM is good especially when the topic involves a chain of interlinked sub-topics. It

develops in students the skills for establishing association and cognitive connection between ideas. This can be used to illustrate topics such as distinctive features as shown in Figure 7 below.

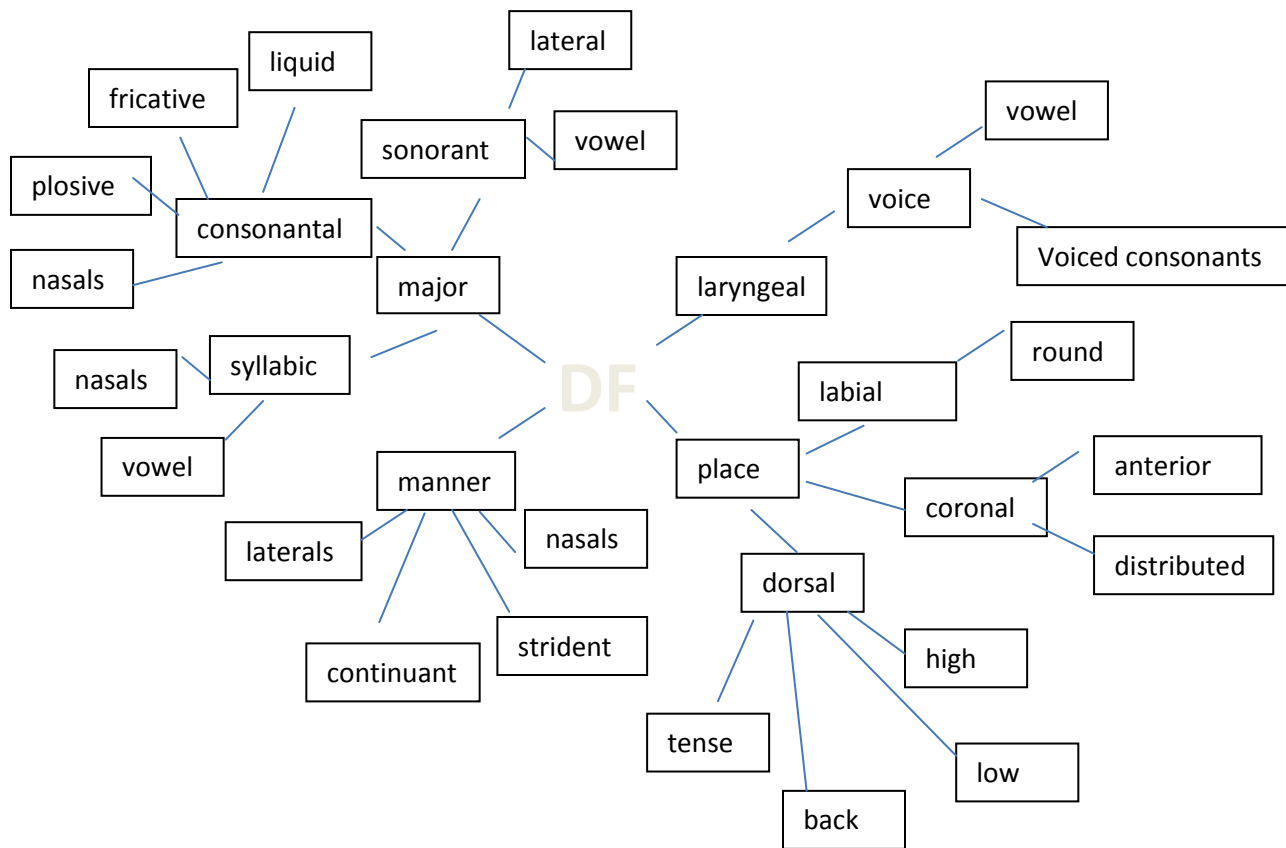


Figure 7: The web and details

Like any other concept map, WAD can be used by both the teacher and students, individually or as a group. However, the network structure of this CM (see Figure 7) may confuse even the smart learners. If properly constructed and handled, its complex nature will encourage analytical thinking among students.

1. Conclusion

There are many ways to use CMs in phonology classroom. Instructors may ask students to construct CM from a given phonological text, or present the CM and ask them to fill in the empty slots, or allow them to construct one by themselves individually

or in group. They can also be used to measure the entry behaviour of learners, to teach a topic, and to measure learning outcome. In whichever manner they are used, their spatio-visual properties usually attract the interest of learners; and this, in turn, encourages them to learn.

Importantly, before constructing or using CMs, students and teachers usually decide on what content or concept is considered vital and agree on the best way to structure the information; after the CMs, on the other hand, both teacher and learners are engaged in a much higher thinking session that involves critical assessment of both the contents and approach, thereby facilitating formative assessment (Second Level

Support Service (SLSS), 2008). The powerful nature of these processes that occur before and after the use of CMs makes them a suitable tool for reflective practice, teaching, and learning. There is the need for something to stimulate as many senses as possible to create the kind of analytical thinking that is desired of ESL students. CMs are capable of addressing phonological contents and concepts at more sophisticated intensity because of their ability to regulate 'semantic information processing' (Masterminds, 2001) and their capability to engender problem solving skills to students. They, therefore, will help present phonological information in smart ways that highlight the relationship of (and between) topics. The authors believe that there is the need to recognise that the commitment of the phonology teacher is to the textual composition he or she presents to the learner. This has to be discussed, bearing in mind the learners' (and, at the same time, teachers') experiences and personal needs.

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