Learner's Mental Model and the need for the Creative Teacher.

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Abstract:

This paper endeavors to shed light on the learner's mental model, its importance in understanding the learner's mental representation regarding his learning experience. Sometimes, the wrong mental model might lead to wrong interpretations and wrong future decisions which might hinder the learning situation as a whole. Therefore, the presence of the creative teacher to deal with the learner's mental model is crucial as he inquires and seeks for alternatives to solve the learning problems. On the light of this, our paper is divided into two main parts; in the first, we will discuss the importance of knowing learner's mental model for both the teacher and the learner and the role of the creative teacher in dealing with it. Whereas in the second part, which will be practical, we will test second year students' mental models regarding oral expression class using one of the measuring tools to come up in the end with some results and recommendations.

Key words: mental model, creative teacher, effective learning, Kenneth Graik's theory, measuring the mental model.

الملخص

في هذه الورقة نحاول تسليط الضوء على نموذج التمثيل العقلي للمتعلم و أهميته في فهم تمثيل المتعلم الفكري لتجربته التعليمية. فأحيانا النموذج الفكري الخاطئ يؤدي إلى ترجمات خاطئة تتبني عليه قرارات مستقبلية خاطئة ما يؤدي إلى عرقلة التعلم الفعال و الصحيح.

و حتتى نتعامل مع النموذج الفكري للمتعلم على الأستاذ أن يكون ذا مهارات إبداعية تسمح له بالتعامل مع النموذج الفكري للمتعلم من خلال محاولة فهم و تحليل المستوى المعرفي للمتعلم و إيجاد البدائل من أجل حل المشاكل التعليمية للمتعلم.

و على ضوء هذا نقسم ورقتنا إلى جزئين مهمين. ففي الأول نناقش أهمية معرفة النموذج الفكري للمتعلم لكلا المعلم و المتعلم و الدور المهم للأستاذ المبدع في التعامل معه. و في الجزء الثاني و هو تطبيقي بحثنا فيه على النموذج أو التمثيل الفكري لطلبة السنة الثانية فيما يخص ماذة التعبير الشفهي بإستعمال أحد أدوات القياس المقترحة انخرج بعدها بنتائج مهمة و توصيات مستقبلية.

The cognitive nature of language relates it to many cognitive sciences namely cognitive psychology which "study mental processes as they are indispensable for understanding human experience"(Carsten Held et al,2006), cognitive neuroscience which "emphasizes the connection between mental processes and the brain"(ibid). And last, philosophy of the mind which "study the nature of mind, including consciousness, mental representation and rationality" (Ibid).

This connection of language with the mind leads us to search in one of the aspects of the functioning of the mind which is mental models.

The term mental models is said to have been originated with the Scottish psychologist Kenneth Craik in 1943 in his book The Nature Of Explanation. Before him, it is important to mention the work of the French psychologist Le Dessin Enfantin published in 1927, in which he states that children construct internal models.

The idea of mental models is used in many areas such as human-computer interaction, or in discourse analysis with Walter Kintsch and Teun Van Dijk who used the term situation model to show the relevance of mental models for the production and comprehension of discourse.(http://en.wikipedia.org). In education,

the notable psychologist Philip Johnson Laird published <u>Mental Models: Towards a cognitive Science of Language, Inference and Consciousness</u> in 1983. (ibid).

In fact, hundreds of publications, books and book chapters by a variety of researchers are published on mental models, to mention as an example,Paul Thagard who discussed the mental models from a neural perspective in his paper <u>How Brains Make Mental Models</u> (2016).

In this paper, we would like to point to the importance of mental models for the learning of English as a foreign language.

I-The Notion of Mental Models

Many definitions are attributed to mental models:

Philip N Jonson-Laird in "Language, Brain and Cognitive Development" by Emmanuel Dupoux defines it: "…, a mental model is an internal representation of a possibility" (p: 86).

According to researchers in the field, a mental model is a kind of reasoning learners make about any kind of situation or experience they come across whether in everyday life, or in the classroom, about a teacher, a lesson, a friend, an exam,..This idea is well explained by Lyn Henderson et all (2016:01): " When interacting with our environment, we form internal mental models of ourselves, others, and the artifact of technology with which we interact (Ehrlick, 1996 and Norman, 1999). For some researchers, it is a kind of background knowledge about a particular field in the world (Barbara Hemforth et al in Carten Held et al (2006:190). Moreover, in the field of language learning, mental models are also viewed as the kind of conceptualizations which carry our views, beliefs, and attitudes on different learning aspects including the world, ourselves as learners or teachers, our capabilities and prior experience, the tasks we undertake, the issues we confront, and the strategies we employ. (Norman, 1983 in Lyn Henderson et al, 2016). In Wikipedia it is: " *a representation of the surrounding world,*

the relationships between its various parts and a person's intuitive perception about his or her own acts and their consequences".

2-Kenneth Craik's Theory of Mental Models:

All literatures agree on the fact that the notion of mental models was pioneered by the Scottish psychologist and physiologist Kenneth Craik in 1943 who died very young at the age of 31.(Johnson Laird 2016, Sara Mc Neil 2016). He talked about his new theory in his book <u>The Nature of Explanation</u>:

> *"If the organism carries a 'small-scale model' of external reality and of its own possible actions within its head, it is able to try out various alternatives, conclude which is the best of them, react to future situations before they arise, utilize the knowledge of past events in dealing with the present and future, and in every way to react in a much fuller, safer and more competent manner to the emergencies which face it" (Craik, 1943 in Johnson Laid, 2016: 179).*

In other words, Craik asserts the ability of the human mind to present a small structure of the outside world which he calls " small-scale model"; moreover, it can also structure the possible actions inside it, as it can think of alternatives, it can make conclusions, it predicts future situations and react accordingly, use past knowledge to deal with the present and the future, and finally can react safely to emergent situations.

Therefore, according to Knenneth Craik, the models constructed are the result of perception, imagination or interpretation of discourse (Cf. Amir Khella, 2016).

3-Importance of Mental Models:

According to the psychologist Abraham Maslow (2006: 126), satisfying the cognitive needs of the learners is one of the very

important elements necessary for future development. He states these cognitive needs as follows (p: 137):

-students know how to learn.
-use study skills.
-use of formative assessment.
-regular vision built into the timetable/curriculum
-knowledge of student's preferred learning styles.
-pupil-centred approach to teaching and learning.
-opportunities to get involved with subject material and the learning material.

Therefore, these cognitive needs can be addressed through exploring the learner's mental models. The results obtained from this inquiry lead the creative teacher to suggest what is appropriate to the learner's cognitive needs.

The mental models do not only stop at helping learners in reasoning, but they also help them in perception (Carten Held, 2006: 208). In other words, it makes the process of perceiving things more concrete. For example, being aware of his mental model on a topic the learner will be able to recognize his knowledge gap or misperceptions the fact that will facilitate for him future decision making and acting on the base of it(Eleni Darkarolis Kring, 2004: iii).

At the individual's learning level, the mental models can effect the learner's knowledge, critical thinking and problem solving in learning environment (Nguyen, Trang et al, 2016). That is they have a great connection with his future learning decisions which lead him to success or failure.

The mental model become more fruitful for the learner when the teacher accompanies it with the adequate feedback: " …feedback is a necessary part of accurate mental model development and learning" (Eleni Dakarolis Kring, 2004: 32).

On his part, it is important from time to time, that the teacher checks his learners' mental models first to help them to think and reflect about their learning experiences and second, it gives him insight about their state of mind. That is the teacher can go deeper into minds to direct them through their mental models and to make them avoid the wrong mental models which may lead them to the wrong decision making.

4-Features of Mental Models

Since mental models are a small representation of reality, Sara Mc Neil (2016) qualifies them as being simpler and less complicated.

According to Marina Banello (2008), researchers have identified some features to mental models, namely, they are personal, that is they reflect the subject world of the learner (Greca and Moreira, 2002). Also they mark part of the conceptual system which consists of many elements as knowledge and beliefs. Moreover, researchers can infer the mental models of the learners which guide their inferences by designing particular instruments about learner's performances, and this collected data enables them to infer about their mental models and their underlying belief systems.: " They can provide information about student learning products and processes and demonstrate how cognitive, social and contextual factors affect conception development (Venville, 2004: Vosniadou et al, 2001) (Ibid: 43). Finally, the learner's mental models are dynamic in nature. (Ibid, 2008). In other words, they are, as researchers assert, constantly changing. They change with time or during a single conversation. This is why we see Amir Khella (2016) on his part describes mental models as incomplete, constantly evolving and do not have accurate representations.

However, the mental models can also be misleading and become wrong mental models either as a result of oversimplification by the learner, or due to his incorrect interpretation to the learning experience because of a lack of adequate mental capacities and

information, or the result of inept measurement. (www.creatadvantage.com/glossary/mental.model, 2016).

5-Measuring The Learner's Mental Model

According to Eleni Daskarolis Kring (2004: 35), there are only few mental models measurements. The primary three include; card sorting, concept mapping and pairewise relatedness rating using pathfinder software.

- a- Card sorting: In card sorting, the learner is given a list of concepts, words or phrases and asked to put them/sort them into categories, and after that, he names the categories he created (www.user.zoom.com/information-architecture-optimization, 2016).
- b- Concept maps: This is a technique to visualize the relationships among different concepts (Valerie-J-Shute et al, 2016). The idea of concept map is based on the idea of putting concepts in boxes or circles. The learner is asked to label the relationship between twoconcepts through a connecting line (Sara Mc Neil, 2016). This line is very significant because it explains the kind of relation that exists between the two concepts (Valerie J- Shute et al (2016). Moreover, these linking lines represent the kind of relation that exists between the two lines as "is part of", "causes", "is required by", or "contributes to"(Ibid: 25). The importance of the concept map lies in helping to get information on how the learner organizes his information, which concepts are included and the type of relationship that exists between concepts.(Sara Mc Neil, 2016).
- c- Pairewise Relatedness Rating Using Pathfinder Software: In this test, the learner is asked to put a numerical rating to each pair of concepts that reflects the amount of similarity or the strength of relationship. (Joyce. D. Jackson, 2007: 31).

Based on Craik's theory of mental models, we see that perception, imagination and interpretation of discourse are key elements in the learner's reasoning process. Therefore, manipulating his mental model is manipulating his perception, imagination and interpretation of discourse. However, all these elements are hidden and can not be seen directly by the teacher. Thus, the best way is through using one of these three measuring tests and discussing the results overtly with the learners. It goes without saying that in this discussion the teacher may encourage the learners to carry on the same path or by making amendments in their perceptions about the learning experience in order to prevent the wrong mental model.

II-The Need for the Creative Teacher:

In this context, the role of the creative teacher is very important in inquiring about the learners' perceptions and imaginations by sensing their feelings. In fact, Downing James P (1997) suggests five types of teacher creativity among them the interpersonal creativity. He (1997: 07) explains how both the learner and the teacher are involved in a high level of interpersonal relationship. This enables the teacher to sense the learners feelings in order to prevent the emotional block or the wrong mental model which might hinder the smooth flow of the learning process.

Questioning the students about their misperceptions, or misinterpretations is also a direct means to spot the light on the obstacles and try to fix them. Downing James P (1997: 40) considers that the teacher who asks learners many questions about their suppositions or previous knowledge is the creative teacher. That is to say questioning the learners many questions about their past or present learning experience is the feature of the creative teacher. In other words, in considering the learner's mental model, the teacher starts to be creative.

1-The Meaning of Creativity

At the beginning, we would like to begin with some meaningful quotations about creativity which are inspiring:

a- " *Creativity comes from trust. Trust your instincts. And never hope for more than work*". (Ritae Mae Brown in Brin Best et al (2008, p: 209).

b- " *Do what you've always done and you will get what you always got*" (Keith Postlethwaite in Kate Aschcroft et al (2002, p: 28)

The Online dictionary defines 'creativity' as follows :

- Give rise to.
- To cause to come into being as something that did not exist before.

In Longman Dictionary of Contemporary English (1995), It is defined as follows :

- To make something exist that did not exist before.
- To invent some thing.

In fact, research in creativity dates back to early times, from pre- Christian up to present times. (James C. Kaufman et al, 2010). Therefore, though some scholars find it difficult to define creativity, many others suggest the following definitions :

« Creativity is the interaction among aptitude, process and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context » (Plucker et al, 2004, p : 90 in James C. Kaufman et al, 2010, p : 49).

Within the same realm, Seana Moran (Cited in: James C. Kaufman et al, 2010, p : 76) explains the process of creativity that it

is the exploitation of past and available materials to make better choices for the future. Moreover, the way we see our future is an indicator of our creativity. (Ibid, p : 76).

Furthermore, James P. Downing (1997, p:4) sees creativity as being : « *the process of producing a new whole out of existing elements by arranging them into a new configuration*». As a result, in this process, the teacher enters the realm of generative thinking: "*Generative thinking explores a wide range of opportunities and takes risks in developing uncharted solutions. It is characterized by individuals who are able to create a strong focus on positive feature outcomes and tolerate high levels of ambiguity and uncertaintity in the process of achieving those positive futures*" (Brin Best et al, 2008, p: 211).

Creativity is not a simple process, it requires a number of skills which James P. Downing (1997, p: 9), summarizes as follows:

- A gift for associating thoughts and feelings in unusual combinations;
- An attitude of playfulness, openness and flexibility;
- Knowledge of how the creative process works;
- Skill in using the tools of the trade;
- Persistent effort to keep trying until result is satisfactory; and
- A favourable setting in which creativity can find free expression.

2-Features of the Creative Teacher

A teacher who holds some of the following features is considered a creative teacher:

1- The Reflective Teacher: The teacher who thinks about his learner's needs, interests and tries to seek ways to help them solve their learning difficulties by designing alternative or different tasks. Lynne Walker et al in David

James (p 176- 177) present three basic reflective practices that teachers practice that were introduced by Dewey (1916) namely:

a- the Open-mindedness: It implies that the teacher is eager to seek out and understand alternative viewpoints on an issue.

b- Responsibility: The teachers looks at the long term as well as the short term consequences of their actions.

c- Wholeheartedness: Implies that the teacher moves away from a ulitarian consideration of 'what works' to look at issues of 'worth whileness'. This means that professional action must be moral and educationally defensible in its intentions and results'.

Furthermore, part of the reflective practice is when the teacher self-evaluates himself continuously.

2- **The teacher the artist**: Teaching is a complex process; there is the teacher's personality and background, the learner's personality and background, the textbooks, the institution policy and of course the presence of society and its effect on the learners. All these aspects form an inter connected net that the teacher the artist has to consider in order to achieve his objectives. His mind is always in active process trying to improve, change or suggest solutions or alternatives.

3- **The initiative teachers**: They can also be labeled the leaders. These teachers organize or participate in seminars, they always make researches. This kind of teachers are characterized by being more knowledgeable and self-confident, and thus, have a high performance in their classes.

4- **The Flexible Teacher:**

It is agreed that learners, within the same class, differ in many aspects, whether social, psychological, educational or

cognitive strengths and weaknesses. Each time with each new class, the teacher is facing a new experience, s/he has to cope with such differences, needs and interests by adopting suitable strategies and tasks. Therefore, the teacher needs to be flexible. (Keith Postlethwaite in Kate Aschroft et al (2002, p: 29).

III-The Concept of Mental Models in Practice

At the university of HAMA LAKHDAR/ El oued in the department of English, the teacher of oral expression of the second year tried hard to be creative by bringing new teaching methods in the class, by trying to enlarge the learners' thoughts with new topics and information. However, though most of the learners were motivated the results of the test were unsatisfactory below the expectations of the teacher.

1-The Hypothesis of the teacher: The teacher thinks that the learners are not making enough efforts; theylack reading to widen their knowledge and they lack the practice of speaking.

The teacher tries to check the mental models of her learners since she has been teaching them oral expression for two years.

2-Procedure

As a measuring tool, the teacher uses card sorting method. She gives the learners a list of different words and concepts about their learning experience of oral expression and asks them to sort them into categories and then label or name these categories. This list contains the following words:

Oral expression- My teacher of oral expression- love- hate- easiness- difficulty- boredom- interesting- attractive- perseverance- barriers- psychological barriers- activities- pronunciation- courage- fear- hardship- shame- shy- anxiety- participate- motivation- blockage- obstacles- challenge- role plays- discussions- test-

knowledge gap- lack of information- me(the learner)- efforts-
energetic- creative- lovely- kind- severe- hard- can not work- can
not participate- can not improve- dislike- self-confident- competent-
take future decision- indifferent.

During the analysis of the students' answers, the teacher cancelled
the impersonal answers and considered that the students who both
mention the negative and positive side of a category as being
negative.

3-Remarks and Results

Most of the learners divided the list into three categories, namely,
the session/module of oral expression, the teacher of the module
and the learner himself.

Number of participants: 42 students

	Positive mental model	Negative mental model
The teacher of oral	27students: 64,28‰	2 students: 04,76‰
Module oral expression	20 students: 47,61‰	9 students: 21,42‰
Me (the learner)	2 students: 04,76‰	33 students: 78, 57‰

From the results of the table, two important issues to consider

- a- The learners' perception of the module of Oral expression.
- b- The learners' negative perception about themselves.

We notice from the learners' category about themselves that most of them use the same negative words about themselves including: " difficulty, anxiety, psychological barriers, shy, lack of ideas, hate, boredom".

Nevertheless, beside these negative qualifications, the learners expressed their aspirations to be better in the future.

4-The teacher's Decisions:

1- The teachers should be more sensitive to the learner's feelings (i.e, the creative teacher).
2- The teacher has to question the learners about the psychological barriers they have and suggest adequate oral activities that can help them overcome these obstacles.
3- The teacher advices the students to read more in order to widen their knowledge and information.

5-Oral Activities that can Help Learners overcome the psychological barriers:

1- More free choice of topics: giving the students more freedom in choosing the topics for discussion.
2- Give the students more chance to practise: more students' talk and less teacher talk. The teacher has to be less dominant.
3- Practising more role plays and drama in the class.
4- Introducing more personal topics for discussion: this enables the learners to speak aloud about themselves in front of their mates. This helps them to overcome their psychological barriers by the time.
5- Choosing highly motivating speaking activities.: "If all the students are participating fully – and if the teacher has set up the activity properly and can then give sympathetic and useful feedback- they will get tremendous satisfaction from it" (Jeremy Harmer, 2005: 88). In addition, the writer (ibid)

suggests activities as role-playing, discussion, problem-solving etc).

Conclusion

This brief research sheds the light on the importance of considering the learners' mental models for both the teacher and the learner.

For the teacher, it enables him to address the cognitive needs of the learner, as knowing how to learn, how to self-evaluate, knowing the learners' preferred learning styles, in addition to having an idea about their past and present knowledge. And here, the teacher should accompany his learners' mental models analysis with adequate feedback to help them develop.

For the learner, mental models enable them to reason better, to practice perceiving his learning experience concretely. For example, he becomes able to recognize his knowledge gaps or misperceptions which facilitates for him taking future decisions and acting on its base. Mental models have a great connection with his future learning which might lead him to success or failure.

Due to the importance of mental models, the teacher can manipulate his learners through testing their mental models in order to find out their perceptions which are related to their learning experiences. These perceptions can be about the teacher, their past or present learning situations, a particular lesson, themselves as learners, …in an endless list.

Researchers postulate many features to mental models, namely, they are simpler and less complicated than real life experience which they represent, they are personal, part of the conceptual system. Thus, they are a road to the learners' thoughts and beliefs. Also, they are dynamic, i.e, they can change with time or within a single conversation.

Therefore, in order to address the learners' mental models, researchers designed some measuring tools including, but not limited to, Card sorting, Concept maps and Pairewise Relatedness Rating Using Pathfinder Software.

In this context, the presence of the creative teacher is crucial to deal with the learners' mental models for many reasons; he is reflective, that is he always thinks about his learners' interests and needs and work accordingly. Furthermore, he is responsible, artist, initiative and flexible.

The second part of the research is practical. We try to test the learners' mental models with regard to their module oral expression since they are studying it with the same teacher for two years.

As a measuring tool, the teacher uses card sorting. The results show that the learners have positive mental models about their teacher and their module oral expression. However, they have strong negative mental models about themselves as learners due to personal psychological issues.

Therefore, on the light of these results, the teacher makes decisions for future action in order to help the learners overcome their psychological barriers. These decisions are manifested in being more sensitive to the learners' feelings, advice them to read more to enlarge their knowledge, allow more student talk than teacher talk, using more plays and drama in the class, introducing personal topics, and engage the students in choosing the kind of topics to be discussed in class.

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