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Meaningful Learning in Practice

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Summary

In our research paper, we set out the key principles of learning in the classroom. We attempt to show learner's products which are useful to predetermine meaningful learning. We aim to spread those key principles, according to which concept maps and collaborative works have an essential role. In addition, we offer a meaningful learning experience carried out in our classroom and we expound the advantages of concept mapping and meaningful learning. As a result of our study, we launched our e-book entitled *Meaningful learning in practice. How to put meaningful learning in the classroom*, which is freely available on the Internet. We also present a CD-ROM containing educational tasks, promoted by the Government of the Canary Islands (Spain), and our Web page www.meaningfullearning.eu

1.- Key Concepts

Meaningful learning: According to Ausubel, "the most important single factor influencing learning is what the learner already knows". Therefore meaningful learning, which implies longer retention than memorizing, occurs when humans relate new concepts to pre-existing familiar concepts. Then changes are produced in our cognitive structure, concepts are modified and new links are created. It is a useful tool because it enables real learning, it generates greater retention and it facilitates transferences to other real situations.

Concept mapping: Concept maps are helpful tools for representing knowledge visually. Concept maps were designed by Novak, who based his research on Ausubel's theory.

Their graphic display takes the form of a network that shows concepts connected by nodes and arrow symbols defining relationships between them. Joseph D. Novak's research resulted amazing because concept maps could accurately capture children's knowledge and show very specific modifications in their conceptual understanding. In addition, he proved there are significant differences between knowledge of children who are taught basic science concepts in first grades, with knowledge of these same children in superior grades.

Educational resources: They concern materials and objects which are useful for school teaching. They may come from a great variety of fields and they can be used in countless ways. All materials and objects can indeed become educational resources when used appropriately and logically. They are necessary to illustrate concepts concerning the schoolwork done in the classroom. It makes them more helpful when we use a diversification of sources and supports.

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Principles of meaningful learning: These principles are the key factors in learning in the classroom. Antoni Ballester has researched them in order to make learners' products and predetermine meaningful learning. Those principles should be taken into account to successfully meet Novak's concept mapping.

Open works: Tasks carried out in the classroom, in which every learner is free to make a product and to show it in its own way. It should be noted that the teacher had previously decided the topic according to the curriculum, he had chosen a product and had thought of the support and materials to be used. Each learner is supposed to do a product, considering its abilities. It is a try to facilitate the work by carrying out heterogeneous classroom activities. When learners do open works their learning is reinforced.

2.- Introduction

We know how humans learn. Experts have formulated an accurate theory. Now, next question to answer is how to put that theory into practice. Our effort has focused on identifying the essential principles of meaningful learning theory.

In teaching it is important to know how learners learn. If we teach in a connected and related way, most of them will learn properly. Otherwise learning difficulties may arise. (Ausubel and Novak, 1983).

Novak has developed a theory of instruction that is based on Ausubel's meaningful learning principles. Their studies achieve to explain knowledge construction precisely. According to them, we are really able to learn when concepts are linked. In other words, we acquire knowledge when we relate relevant information to our cognitive structure in a connected and coherent way. (Ausubel and Novak)

With regard to our study, we first attempted to discover the essential principles to do meaningful learning in the classroom. As a result of our research, we elaborated the doctoral thesis "La Didàctica de la geografia de les Illes Balears. Aprenentatge significatiu i recursos didàctics" (Ballester). It should be noted that innovative experiences were carried out to design the essential principles of meaningful learning. Once we got those principles, a number of teachers of all educational areas and levels applied them in the classroom. An ebook has also been published *Meaningful learning in practice. How to put meaningful learning in the classroom*, which is freely available on the Internet. www.meaningfullearning.eu (Ballester, 2011)

Our work is the result of several years of educational research to reveal the most important principles to be applied in classrooms. Although there are many other educational aspects, our effort has been directed toward the essential principles.

Essential principles to do meaningful learning are detailed below:

1. Open work enables all learners to learn.
2. Motivation helps to improve classroom environment and it makes learners be interested in their tasks.
3. Means must be related to the environment of learners.
4. Creativity strengthens imagination and intelligence.
5. Concept mapping helps learners to link and connect concepts.
6. Educational curricula must be adapted considering learners with special needs.

The purpose of this paper is to set out the essential principles of meaningful learning and its applicability in the classroom. Thus we use Novak's terms such as concept mapping and teamwork. This document also aims to show an experience carried out in our High School to enhance meaningful learning.

Applying meaningful learning, concept mapping and collaborative work in the classroom have been the main objectives in Antoni Ballester's research for the last few years. He has received assessment from Climent Picornell and María Jesús Castro, professors at Universitat de les Illes Balears; pedagogue and psychologist María Hortensia Prieto; Pilar Benejam and Montserrat Casas, professors at Universitat Autònoma de Barcelona; Fermín González, professor at Universidad Pública de Navarra, and Joseph D.

Novak, professor at Cornell University in US and at the very well-known Institute for Human and Machine Cognition of West Florida.

3.- Open Work

Open work promotes meaningful learning experiences. When learners do open works their learning process is reinforced. It should be added that a bit of flexibility is needed in that situation.

A practical session concerning open works can be easily carried out in the classroom. That activity may consist in asking learners to bring into the classroom whatever source of information they find regarding an issue or a unit of work, such as maps, photos, graphs, drawings, sketches, texts and photocopies of photographs. It is very important to let the proposal open, so that the activity becomes enriching and interesting. In case we are asked a question we must answer using expressions such as "for instance". Otherwise if we just tell them one defined thing it will be very difficult to make them look for other materials.

A few learners might not bring all those materials on the first day because they are not used to. However, when they realise that a number of learners and the teacher himself work with them and have a good time while learning, they will shortly bring all sorts of materials.

The teacher may then make teams and suggest that learners work on an open product by using all those materials concerning the learning unit. Educational activities may involve making files, murals, pull-down cards, scrapbooks or comics. The idea must be left open in order to enhance a new, enriching and interesting production.

4.- Collaborative Work

Collaborative works strengthen the effect of giving them a great number of incoming information, by using a multiple diversification of resources.

When it comes into meaningful learning experiences, students work fine when cooperating in pairs, although a group of 4 is considered ideal. We should bear in mind the kind of task we are dealing with: if learners have to produce something using DIN A3 paper, they will work better in pairs, but if they are making a pull-down card or a large mural, they will work better in a four-member team because of its larger size.

Well-balanced teams are recommended in both situations, so teachers should take into account some information about learners: initial evaluations, results obtained in several subjects, academic curricula, educational records, or directly observing the class group. This works out better if teams are set up by the teacher, as he knows his students well. Teams should be made up of members with different capabilities, that is, putting together an advanced learner, an active one (capable of leading the group), a slow-witted or withdrawn student and a learner using curriculum adaptation (with special educational needs, bad behaviour …)

It will be easier to make up directed teams if we tell the students it is not usually possible to choose our workmates in real life either. They will be grateful for it afterward, since they have been given a chance to meet new classmates and work with them while striking a friendship. We must also tell them that their goal is to learn how to work with all kinds of people. Therefore, teams will not remain the same the whole school year. Learners with poor interpersonal skills will be able to interact more effectively with others as a result.

5.- Concept Mapping and Educational Resources

Meaningful concept maps are the most effective tool in the achievement of long-term learning. They include concepts linked to each other with inner coherence and appropriate connection.

Concepts are represented in a hierarchical way with the most inclusive, most general concepts at the top of the map and the more specific, less general concepts arranged hierarchically below.

Therefore it is important to identify basic concepts and set them clearly connected in order to gain comprehension. (Novak and Gowin, 1988)

Concept maps are a powerful learning tool because they are useful to clarify, define and specify concepts and their relations when beginning a new learning unit. Thus, learners really know what they have to learn from the very beginning. In that sense, learning becomes a connected, non-arbitrary process. (Novak, 1998)

It is helpful to use meaningful educational resources in the promotion of long-term learning. That means that teaching aids have to be connected and integrated within the learning unit. Therefore, educational materials must be related to the concept structure of classroom tasks by using, for instance, a well constructed concept map in order to enhance meaningful learning. (Ballester, 1999)

By managing materials that illustrate the concerning concepts of the learning unit with several incoming information, we will be able to promote learning and foster the motivation of learners and their interest in learning. A variety of resources not only motivates learners but also strengthens teachers' motivation. As a result, school teaching becomes richer and new. At the same time, if the learning process is meaningful, learners' morale raises and so does the satisfaction of teachers, who also learn while teaching.

By using concept maps and a diversification of teaching aids, new fields of work are opened within a constructivist view. A new approach means manipulating resources and their didactic strategies, as well as identifying multiple possibilities related to their practical use. As a result, teaching and learning monotony is broken up and the morale of teachers and learners is boosted.

There are multiple advantages in the use of concept mapping and meaningful learning in classrooms. A good representation of them is listed below:

- Presentation is clearer.
- Outstanding information is included.
- Learners know what they have to learn in a connected and organized way.
- Academic performance improves.
- It helps teachers to know what they have to teach.
- It enables collaborative work and teamwork to share meanings.
- Information appears coherently and hierarchically organized.
- Key concepts are linked.
- It provides meaningful learning.
- Teachers are not overloaded with work as no irrelevant concepts are taught.
- There is no need to repeat tests or retake exams.
- The quality of education improves
- Teachers have higher self-confidence as they check out their good results.
- Learners are aware of their learning and this motivates them to learn even more.
- Classroom environment becomes more relaxed.
- Students learn how to learn and they are able to extrapolate their own learning
- Learners are actively involved in classroom tasks.
- Very few disciplinary difficulties arise since they have already been anticipated.

6.- An Example of Promoting Meaningful Learning: a Mural of the Balearic Islands' Geography as a Pair-Work

We developed an activity achieving meaningful learning from the above noted principles. We did the further detailed work:

Our experience was carried out at the Institut Baltasar Porcel in a village called Andratx, in the island of Mallorca (Spain). The target group had 28 students, all of them aged 14, attending the third level of Secondary Education. The subject to deal with was Geography.

Students learned Balearic Islands' geography while connecting and relating concepts regarding the topic. That was indeed meaningful learning, our work's purpose. We were also interested in creating an atmosphere in which students collaborated and developed their social skills. When they worked as a team, there was a better atmosphere in the classroom and we avoided disciplinary conflicts.

According to the curriculum, contents regarding Balearic Islands' Geography are the following: relief, climate, hydrograph conditions and vegetation. It also includes some aspects of human geography, as population or economy.

First of all, the teacher asked questions and had a discussion with learners to identify their previous knowledge about Balearic Islands' geography. It was important for them to do an effort in order to remember and think about what they already knew.

The teacher then grouped them in pairs, according to their abilities. Each pair should be well-balanced. That is, putting together an advanced learner and a not so academically brilliant student. They had to bring a mural card to the classroom, as our activity consisted in producing a mural of the Balearic Islands' scenery and describing it in their own words by using a concept map. It was possible to use pictures, maps, drawings, graphic designs or texts to illustrate it. This way, they learned how to elaborate a concept map before organizing their task.

Out of school they compiled all the information related to Balearic Islands' geography in a collaborative environment. They could go to libraries, consult different books, search on the Internet, read newspapers, magazines, among other sources.

Once the students had collected all those documents, they went on their school task working in pairs, searching information, reading, writing, cutting down on the mural, labelling it and illustrating their concept maps, which learners themselves produced with the aid of the teacher.

That was an example of open working. In other words, a teacher proposed the topic, but each pair of learners developed it in their own way. Making a mural was exciting for them because of the product's characteristics. It was related to their nearest environment, since they studied their own island. It was also a creative work as it fostered design's creativity while writing texts and showing drawings and pictures.

Students elaborated concept maps with the collected information as well as with the help of their textbook and teacher's guidance. Learners with special needs received support to understand basic concepts of the concept map and its hierarchical fashion.

After the introduction of the subject, students were expected to buy a card and bring all sorts of materials, such as pencils, pens, scissors, glue and coloured crayons. They were supposed to have all the tools needed from the beginning of the course. Then they were able to start working on the mural.

Afterwards, murals were showed at the classroom. Students had to individually summarize them in their own words in order to explain and systematize the information.

This kind of mural made in pairs is just an example of meaningful learning in the classroom. It should be noted that there are many more meaningful learning experiences that teachers may suggest. To sum up, when we appraised those activities, we find positive results regarding to learners' behaviour and evaluation tests. Learners' performance is excellent and so it is the classroom atmosphere.

7.- Meaningful Learning Seminar

A Seminar with educators of different subjects and levels is periodically carried out at the Institut de Ciències de l'Educació in the Universitat de les Illes Balears. Its purpose consists in achieving meaningful learning experiences in the classroom.

Teachers are required to learn how to control the principles of meaningful learning and put them into practice. They just have to advise learners on the production of their work and good results will be obtained.

During the Seminar teachers manage to control the principles of meaningful learning step by step. They realize that good results are obtained when a motivating open work is developed. In other words, schoolwork must be related to the environment, must involve high levels of creativity and significance to engage students in meaningful learning. Thus it becomes an exciting activity for both teachers and learners.

8.- Our ebook is freely available

As a result of that Seminar an ebook entitled *Meaningful learning in practice. How to put meaningful learning in the classroom*has been published.

That ebook is freely available on the Internet www.meaningfullearning.eu . In March 2011 our ebook has already received 2,000.000 visits on the Internet www.aprendizajesignificativo.com

According to what Joseph D. Novak asserts in its foreword, studies developed by educators who took part at the Meaningful Learning Seminar led by Antoni Ballester proved to be effective. Some experiences have been carried out in real classrooms with the participation of learners of all ages, with a wide range of economic backgrounds and disciplines. With their work, they not only put meaningful learning theory into practice, but also confirmed the advantages of the excellent affective and cognitive results produced by effective teaching in a meaningful learning environment.

9.- Training Courses and Seminars

We are running training courses and seminars in order to encourage teachers to use concept mapping, meaningful learning and collaborative work. These courses take place in several high schools and universities, such as the Institut de Ciències de l'Educació (ICE) of the Universitat de les Illes Balears, in the Associació de Mestres Rosa Sensat in Barcelona, in the Universitat de Girona, and in Secondary Schools from Menorca, Tenerife and Palma de Mallorca.

We organize talks in which trainee teachers have free entrance. Prior to participate in debates, students read our ebook during their academic year at the Universitat de les Illes Balears (Departament de les Ciències de l'Educació i Didàctiques específiques). They also elaborate works for a subject called General Didactics, led by professor Jerma Payeras.

10.- The CD-ROM about Meaningful Learning Experiences Promoted by the Canary Islands Government

The above mentioned CD-ROM comes from a free ebook published in the island of Tenerife (Canary Islands, Spain). A coach team, which received special support by the local government, followed that ebook module by module, applied it in some institutions and carried out some seminars in Primary and Secondary Schools in the whole island. Nowadays there are plenty of them.

It is worth to say that their research has been done without any contact with us. Actually we did not share opinions until reaching the very final results. During the current academic year (2007-2008) some modifications are being made to it in Tenerife. Moreover, meaningful learning experiences are also being accomplished in islands such as Las Palmas de Gran Canaria. By the way, we uploaded that CD-ROM making it freely available on the Net www.aprendizajesignificativo.com

11.-Web page www.aprendizajesignificativo.com and www.meaningfullearning.eu

That web site serves to promote our project. There you can find important information, practical tasks, experiences and links to other related sites. It is good place to share and provide information, articles, interviews, useful projects and practical sessions.

All studies, carried out in seminars and training courses, help us to update the information as well as to spread ideas. Moreover it freely offers ebooks, fresh news, resources, blogs, interviews, articles, a CD-ROM containing educational activities, recommended readings and several links, including Cmaptools www.ihmc.us, a concept mapping software, and international conferences concerning concept mapping.

Our web page aims to agglutinate reliable information concerning meaningful learning. It is our intention to provide useful tools to successfully get an improvement on education. It has been created for non-profit motive; its only objective is to boost meaningful learning. Thus, it offers all sorts of materials to accomplish the teaching task.

12.- Conclusion

In summary, we can easily state the benefits of meaningful learning experiences in the classroom as well as the effectiveness of the students' meaningful products. In addition, it is surprising to see how unsuccessful learners are capable of working hard and willing to increase their knowledge. By working with that methodology good results come out from the very first day.

When teachers of all educational areas and levels realize the progress of learners and their resultant products, they feel motivated to go on with that project and they do not want to turn back ever again.

Teachers find the sense of teaching because their educational effort is rewarded. They can get enormous satisfaction since all students successfully accomplish their classroom tasks every day.

It should be remarked that the applicability of that methodology enables teachers to find the meaning of education and school teaching. They very much appreciate the good results obtained and they even positively change their perception of education. Given that success for learners and teachers, we encourage everybody to educate in terms of meaningful learning.

In meaningful learning, the use of concept maps and collaborative work makes learners take a new approach to school tasks. They enjoy themselves while learning, they are motivated, they like carrying out their work, they hand their materials in and they are pleased with their educational experience. Teaching task is also dramatically different, as teachers save much effort taking that new direction, which prevents them from frustration. Before they used to work too much and did not obtain any result.

Nowadays teachers have a powerful tool to introduce learners to long-term learning. They just need to take advantage of it and enjoy the teaching process and their results.

13.- Advantages: Heterogeneity and Discipline

Some of the advantages of meaningful learning experiences are the satisfaction of teachers at the finished work and the positive response of learners. Problems of discipline are reduced and teachers are able to pay more attention to the diversity and heterogeneity of learners without being overloaded. In addition, teachers manage to make them all learn, which is highly satisfactory with regard to school teaching.

As evaluation tests show, the learning task is optimized with a high level of achievement. Quite a few of the current conflicts existing between learners and teachers can be easily solved. Many of those problems do not occur because they had already been cut off.

Teachers are supposed to act as counsellors and advisers while learners work and learn with dedication. Teachers help learners to do their tasks; this means that they save much energy.

Among the advantages of this methodology we can state the following ones: we immediately obtain results, classroom environment considerably improves, difficulties regarding attention to diversity disappear due to the heterogeneity of activities, and we are not overburdened with work.

As teachers are not the only source of information, they can easily keep their energy. When students are busy with their work, they can enjoy themselves while learning. Consequently they do not bother anyone. Thus the rate of conflicts in the classroom is much lower.

It is important to recognize that it does not mean that all troubles completely disappear. They seldom emerge; however, if a difficult situation comes up, we are able to face it better.

The classroom dynamics itself works as a tool to prevent conflicts from happening. Teachers have a good time as they teach; they really enjoy what they do and what students do as well. Students do their homework, which was not common before, and they regularly attend to lessons, so they do not skip classes often.

It may seem that this method involves a lot of work, but actually it makes it much easier for teachers. Students reach a high level of achievement and the effort is soon paid off.

Work done in one school year will perfectly suit the year after, implying even less effort on the second, third or fourth year. We believe 80% of the teaching work would already be done. So when a teacher gets into the meaningful learning dynamics, he will not abandon it. On the first year, teachers may prepare one practical activity every three months. On the second year, they may prepare three more tasks and, this way, the whole curriculum will be soon completed. Teachers can take advantage of their work from the very first day.

If teachers have several practical tasks, they are going to find it easier to teach with respect to class monitoring. That is because students and teachers will share responsibility for learning and teaching. We will get a better atmosphere in the classroom.

Moreover, teachers will enjoy teaching, students will behave themselves, disciplinary conflicts will be avoided and self-esteem of both teachers and students will improve.

Major advantages of meaningful learning experiences are further listed:

- It strengthens teachers' self-esteem.
- Teachers are not overburdened with work.
- Results immediately work out.
- It avoids teachers' sense of unease caused by Education System crisis.
- Difficulties related to attention to diversity are easily overcome thanks to the heterogeneity of classroom tasks. Educators must prepare the same activity for all learners, although every learner can carry it out according to his abilities. Thus, heterogeneity and diversification are not a problem anymore.
- School is being regarded in a much positive way.
- School teaching becomes an enjoyable activity.
- It gives teachers and learners a sense of fulfilment.
- Environment in the classroom considerably improves.
- Learners have a much better conduct.
- Daily duties are not so awkward.
- There is a much better interaction between teachers and learners and their communication is optimized.

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