Meaningful Learning in Practice

How to put meaningful learning in the classroom

"More than two million visits."
MEANINGFUL LEARNING IN PRACTICE

How to put meaningful learning in the classroom

Antoni Ballester Vallori

Seminar on meaningful learning
Antoni Ballester Vallori

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He has been awarded for his teaching and research activity. Among these awards: the Baldiri Reixac Award from Fundació Jaume I, the journalist award “Práctica Educativa” from Cuadernos de Pedagogia and the Emili Darder Award from 31 de Desembre Awards by Obra Cultural Balear.
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To all teachers working for the enhancement of teaching.
## INDEX

**FOREWORD** ........................................................................................................... 07

**PRESENTATION** ..................................................................................................... 09

1. **INTRODUCTION** ............................................................................................... 11
   1.1. Introduction and justification ........................................................................... 12
   1.2. Seminar on Meaningful learning ................................................................. 17
   1.3. Meaningful Learning ..................................................................................... 18

2. **MODULES** ........................................................................................................ 25
   2.1. Recommendations ......................................................................................... 26
   2.2. Module 1: Open working ................................................................................. 27
   2.3. Module 2: Motivation ..................................................................................... 36
   2.4. Module 3: Environment .................................................................................. 45
   2.5. Module 4: Creativity ...................................................................................... 55
   2.6. Module 5: Concept mapping .......................................................................... 69
   2.7. Module 6: Curricular adaptation .................................................................... 86
   2.8. Module 7: Conclusions .................................................................................. 103

3. ‘MEANINGFUL LEARNING IN PRACTICE’ APPLICATION OUTCOMES. TEACHERS’ ASSESSMENT AND STUDENTS’ OPINION. 108
   3.1. Interview to Principal Edelweis Monreal from Buzanada state school. 109
   3.2. Opinions of the coordinators of Centros de Atención Preferente when applying the seminar in their centres/classrooms. 111
   3.3. What do students say? ................................................................................... 115

4. **PRACTICES** ....................................................................................................... 118
   4.1. Practices and opinions of the Meaningful learning seminar teaching board. 119

5. **APPENDIX** ...................................................................................................... 163
   5.1. Didactic Resources ....................................................................................... 164
   5.2. List of didactic resources .............................................................................. 164
   5.3. Assessing in an objective way ...................................................................... 168
   5.4. Recommended references ............................................................................ 170
   5.5. General references ....................................................................................... 172
It is my pleasure to write this foreword to express my appreciation for the good work presented in this volume by Dr. Ballester and his associates. The book grew out of an ongoing seminar and the efforts made by Dr. Ballester and some 20 associates, all of whom were engaged in the application of new learning ideas, instructional strategies, learning tools, and use of electronic resources. The work done by the associates with students in real classroom settings, with a wide range of ages, economic circumstances, and disciplines, not only has put theory into practice, but it also shows the very positive cognitive and affective outcomes that derive from effective instruction fostering meaningful learning.

The work is based on Ausubel’s (1978; 2000) assimilation theory of learning, constructivist epistemological ideas on the nature of knowledge and the nature of knowledge creation, and sound instructional practices supported by research done over the past two decades.

Central to this work is the distinction between *rote learning*, where students memorize information without relating this information to their prior knowledge or to their current experiences, and *meaningful learning*, where students make deliberate efforts to integrate new knowledge with knowledge they already possess and to events in their current learning environment. In addition, much of the learning takes place in a collaborative learning environment, taking advantage of the learning facilitation that comes from dialogue with peers, and the positive affective consequences that derive from manifest success in mastering new knowledge.

The book makes the important distinction between *extrinsic motivation* of students, that relies extrinsic rewards, and *intrinsic motivation* that grows out of a sense of grasping new meanings and the power that comes with meaningful learning. Many examples are given to show the positive cognitive and affective outcomes that can be achieved by learners and teachers when meaningful learning and intrinsic rewards guide the instructional program.

Dr. Ballester and his colleagues also make good use of the Internet and other electronic resources, resulting in some of their own highly informative web pages illustrating their work. Furthermore, they make excellent use of the concept map tool to represent student’s understanding as well as to guide their work. Given the availability of anew, free software for concept mapping that allows for creating essentially “portfolios” of student learning experiences, all organized by concept maps, I expect their work will be even more effective in the future.
It is also gratifying to know that Dr. Ballester will “publish” his book electronically, making it available to anyone who has access to the Internet. The ideas and illustrations in his work need to be seen by the widest possible audience. The Internet represents the first revolutionary step for reaching large audiences since the invention of the printing press in 1460, and even more importantly, it is available at no cost! I trust it will be read by English speaking educators all over the world, as well as other educators and lay persons interested in improving education.

Florida, October 2002
PRESENTATION

Federico Mayor Zaragoza
UNESCO Former Director General. President of the European Research Council Expert Group for the “Knowledge-based Economy”. Co-founder of Severo Ochoa Molecular Biology Centre and The Spanish National Research Council (CSIC).
President of the Foundation Culture of Peace.

The educational process has usually been planned and assessed from teaching. The right way is to do it from learning in terms of ‘incorporation of knowledge and reflection capability’ by the student. We focused on the sender and we did not pay proper attention to the receivers.

On the other hand, the distinction between means and ends is a fundamental issue. According to Giner de los Ríos definition, the end means to ‘manage one’s life with sense’. The main actors are those which mould the ‘personal sovereignty’ that the student progressively acquires. And finally, the instrumental means and tools. The family, teachers’ role..., how do they pretend to compare it with the interactive communication teams? In the first place, the mother, which I have repeated with deep conviction. And secondly, the father. The educators whose task is commendable due to their dedication, generosity and wisdom.... then, the book where the reader becomes the speaker and nearly the co-author. And, then, the media.

Every human being is unique. Every single student is different, even when he belongs to the same age group and same context. This diversity is the essential part of their greatness and we should help him to keep his identity. The standardization is the opposite of education. In daily circumstances, culture, beliefs and ethnic heterogeneity are particularly relevant. Therefore, learning must be, as far as possible, ‘personalized’, that is, it must bear every student “profile” in mind. Constant interviews with parents and teacher meetings make this better self-knowledge easier.

Facilitate the ‘day by day’ of the teachers function! This is the main target of this great didactic value book. Teachers experiences ‘coming back’ to illustrate other teachers’ actions. Antoni Ballester has researched in great detail the different aspects of teaching practice, specially analyzing how knowledge is better incorporated, how ‘meaningful learning’ is pursued in a more efficient manner.

Turning the information into personal knowledge. Nowadays, the excessively abundant information in some prosper suburbs of the ‘global village’ is part of learning, yet, it must be duly selected. ‘Helping to watch’- as that little Uruguayan girl asked to her teacher the first time she saw the ocean- is what really matters in this initial phase. And, the most important thing- in this and all phases- for the good fulfilment of this activity, essential in the reflexive action and conscious of knowledge, is the quality of the teaching staff.
To the four pillars of Jacques Delors Commission for the ‘Education in the 21st century’- learning to know, learning to do, learning to be and learning to live together and among others, learning to learn. This is the dimension developed by Antoni Ballester in this excellent book protected in examples and guidelines properly recognized by putting his recommendations into practice due to his own experience and other teachers’.

I want to congratulate the author and his colleagues for the wisdom and opportunity in the publication that today it reaches you. I cannot conclude these introductory notes without the recommendation of Novak’s foreword. A great pedagogue highlights the excellent and imaginative didactic approach of another. It is not frequent. However, in other situations it can be as worthy as it is in this one.

Granada, July 2004
1. INTRODUCTION
INTRODUCTION AND JUSTIFICATION

Currently, we are facing a new school reality, due to factors that have changed such as motivation, discipline and classroom atmosphere. New concepts have arisen: students’ higher diversity and heterogeneity, new special educational needs...

It appears to be that this situation is requiring a new approach in teaching action aimed to all students where all kind of advanced learning levels must be included, trying a different working methodology in order to face this new problem and provide a solution.

The central idea of this work is to make the task easier to all those teachers attending school every day. In this sense, it is done from school and for school, from the classroom and for the classroom, from teaching staff and for teaching staff. Consequently, it has to be said that this book has been elaborated to be put into practice.

This work is the result of years of research in education to detect those relevant aspects to be applied in the classroom. That is to say, we have been very interested in finding what the most important aspect is when learning, and once it is detected, find what is essential part in order to put it into practice. Without a doubt, there is a countless variety of educational aspects which are important. But, our effort has been addressed to all these highly outstanding variables.

The research to detect these key variables in the classroom is part of Antoni Ballester’s thesis “La Didàctica de la geografia. Aprendentatge significatiu i recursos didàctics de les Illes Balears”. We investigate the variables in a subject to obtain meaningful learning through different experiences in the classroom and we analyse curricular materials with proposals for enhancement and present a battery of didactic resources for teaching practice. Research has been carried out in geography to extrapolate it to other disciplines.

Once the research was done, we organized a seminar with teachers from different domains and educational levels in Institut de Ciències de l’Educació (ICE) at the University of the Balearic Islands in Palma de Mallorca. The research consisted of identifying key variables of meaningful learning whereas in the seminar teacher staff had put these variables into practice in their own area and level with surprising outcomes.

This work has been written to reach all interested teachers and to be applied, taking always into account proposed cautions and advice to optimize outcomes.

We followed, with true interest, the contribution of ideas and opinions both by all people in the seminar and advisers, having a very enriching and meaningful task for all of us. The seminar has also been carried out on the Internet via Cibereduca.com. by psychologists, pedagogues and experts on

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1 BALLESTER VALLORI, Antoni: La Didàctica de la geografia. Aprendentatge significatiu i recursos didàctics de les Illes Balears. Palma de Mallorca, Documenta Balear, 1999, 366.
didactics which provided us with broad points of view about this work. We exchanged ideas about variables and we applied this work with teachers from different schools and thanks to them the product has been improved.

Psychopedagogical and didactic advice has been provided to this work with the goal of optimizing, triangulating and improving it. Our advising team is formed by doctor Climent Picornell, lecturer of the Earth Science Department and lecturer Maria Jesús Castro from the Department of Historical Sciences and Arts Theory at the University of the Balearic Islands, psychologist and pedagogue María Hortensia Prieto, Doctor Pilar Benejam, professor in Social Sciences Didactics, and Doctor Montserrat Casas, lecturer in Social Sciences Didactics at the Universitat Autònoma de Barcelona. All throughout the research and seminar, we established contact with professor Federico Mayor Zaragoza, President of the Foundation Culture of Peace and Joseph D. Novak from Cornell University in the United States.

We highly appreciate the support and collaboration of Lluís Ballester who is the Director of Institut de Ciències de l'Educació (ICE) at the University of the Balearic Islands for the Meaningful Learning Seminar and the collaboration of this book, as well as, Maria del Cristo Alonso, coordinator of Preferential Attention Centres from the Government of the Canary Islands for her advice.

We appreciate the support and collaboration of Joan Jordi Muntaner and Gabriel Janer, directors of Institut de Ciències de l'Educació of the University of the Balearic Islands, and of Caterina Morey, coordinator of the above mentioned institute and the support of Marian Socías and Antoñi Bibiloni from Cibereduca.com for the fulfilment of the seminar through the Internet. We also want to thank José Escaño’s advice in the text revision, and Joan Pagés, lecturer in Social Sciences Didactics of the Universitat Autònoma de Barcelona, Jerma Payeras and Joana Salazar, lecturers at the University of the Balearic Islands, Josep Maria Corró, music teacher in secondary school, Carolina Caballero, kindergarten teacher, Vicenç Rul.làn, secondary school, Juana Olivares, Spanish language secondary school teacher, Mar Seguí Juan, translator of the book, revisor Stephanie Campbell and Luis Vidaña, social sciences secondary school teacher.

Central to this work is optimizing student learning, assuring the improvement of the classroom atmosphere to facilitate teachers’ work. Immaculada Cortés on her reflections about the seminar mentions:

‘As a teacher of kindergarten, I am possibly more concerned about the importance of meaningful learning. If I cannot connect with children and capture their curiosity, I fail to capture their interest and motivation to complete any sort of learning. It is not about making spectacular things or live strong emotions, but to reconsider my acts as an educator, to be involved within the teaching-learning process as an active part, looking for the best way to get their interest and keep children’s illusion with our work.

This seminar made me think about how to carry out curricular contents within the classroom so as to make children easily excited. This year I am working as a support teacher, which makes me learn a lot from my school colleagues
(manners, strategies, organization, resources...), with meaningful learning tools, I am allowed to have time to create educational strategies to do our work.'

This lies on the fact that the teaching staff makes a process where they have to incorporate gradually the meaningful learning variables. The proposed model is not out of the curriculum but it consists of tackling the same contents from another perspective, bearing all meaningful learning variables in mind.

It is not a method of projects but a model of variables monitoring that, applied in the classroom, enhances meaningful learning.

The teacher is the person who knows his pupils best and he decides what students may learn and work according to the curriculum. The model of meaningful learning variables permits that every teacher develops a single product adapted to his reality and context, monitoring every single variable in the class and taking into account the didactic unit according to the curriculum.

In this work we take as a starting point all outcomes made in the research and prepare an educational model to include these variables into the classroom. We present a model from every variable to put into practice.

The variables to put meaningful learning into practice are:
1.- Open working.
2.- Motivation.
3.- Environment.
4.- Creativity.
5.- Concept mapping.
6.- Curricular adaptation.

When it comes to teaching, it is important to know how the students learn. If we teach in the way the students learn, that is, in a connected and interrelated way, the vast majority of students will be able to learn. Otherwise difficulties may arise in the learning process. Our objective is to improve learning and make teaching work easier through the process of variables control within the curriculum.
Concept map in meaningful learning in practice.

In the concept map presented we can observe how a meaningful didactic unit is prepared. We have to take into account the subject, to develop the didactic unit depending on the curriculum, the product (material produced by the student) which must be open, motivating, related to the environment and creativity; the concept map to connect all concepts to be consolidated in the didactic unit and the proper curricular adaptation.

First, we want to know how the student learns in order to see how knowledge is built, identifying the concept of meaningful learning after creating this theoretical body, by putting this theory into practice through key variables of meaningful learning.

There cannot be any doubt that in order to learn, students should understand what is taught, which does not entail that they do not have to put any effort in learning and studying. Most of the educational research that we have comes from theory. We believe that teachers need more research for practice and in the classroom, from the teachers and for the teachers, with efficient psychopedagogical advice, to have operational experiences, either applicable or comparable, in order to be able to transfer them to other educational centres.

To achieve a better quality of education, a quiet atmosphere in the classroom is required. Consequently, this will create more school achievement and more motivated students. It is likely to think that putting this work into practice requires a lot of work. We believe that it takes a little bit of an effort at the beginning but it is later rewarded since the outcomes are immediate, without us having a large amount of work that may have been anticipated before.

It is very interesting to observe that once they have been introduced into this new way of working, we can continue with this methodology due to obtained advantages without any doubt.

This book has been put into practice in a systematic way in different parts of the world like Colombia, the Canary Islands, Valencia, the Balearic Islands with notable outcomes. See Maria del Cristo ALONSO MARTÍN, “Variables del aprendizaje significativo para el desarrollo de las competencias básicas” y CD de prácticas.2

All participants in this educational project encourage teachers to know and put it into practice. The satisfaction and the outcomes obtained are irreplaceable for teaching staff as well as for students.

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1.2. SEMINAR ON MEANINGFUL LEARNING

This seminar is a space for exchanging and participating where we can help each other build on our shared work. It is advisable to participate by asking questions, adding some comments to other people’s ideas, clarifying some points, commenting on what we think about the different aspects. All contributions are necessary. Even if there is some idea that we demonstrate that it is not relevant, it will serve as a way to build a new one and to make the subsequent idea more efficient.

This seminar has been held all these years at the Instituto de Ciencias de la Educación (ICE) at the University of the Balearic Islands (Spain) and currently we are doing so through new technologies. The outcomes of the seminar are launched via websites, interviews, examples of the work done, etc. by showing and promoting meaningful learning in practice.

Among the advantages of holding the seminar and putting meaningful learning into practice, we can see the satisfaction of teachers for the work done by students, the positive answer of students, the reduction of problems and the support diversity and heterogeneity in the classroom, without having excess of work for teachers. Besides, the student fulfils learning, which is so satisfactory for the educational activity.

It is about doing a work in the right direction, to avoid later work with little or any result, through carrying out a more varied, attractive and less monotonous task. This way, difficulties in the classroom decrease because we anticipate them before.

The most important practice in the classroom is the control of meaningful learning variables. In this way, we are able to execute the most suitable work in every moment and at the same time we are creating long-term learning for students, helping them remember it after their holidays or exams so they do not have to repeat assessment tests, handle support works, repeat a year etc.

In the seminar we manage to control learning variables. After our formation and exchange of ideas about all kind of variables, we practise them in the classroom so we improve every practice, get more experience from the previous one and obtain very positive and gratifying outcomes.
1.3. MEANINGFUL LEARNING

In teaching practice it is advisable to have not only specific science knowledge, but also to know educational psychology evolution, thus, how the student learns. The most recent research in educational psychology and from our own point of view is the constructivism initiated by Belarus psychologist Lev Semionovitch Vigotski.

David Ausubel, Joseph Novak and Helen Hanesian, experts in educational psychology at Cornell University, whose precedent is Vigotski, have designed a meaningful learning theory, long-term learning, and constructive theory according to which, learning is necessary to link new knowledge from students’ previous ideas. From this perspective, learning is a process of contrast, knowledge schemes modification, balance, conflict and new balance again. ‘The same process of getting information produces a modification in gained information as well as the specific aspect of cognitive structure to which it is linked’. (AUSUBEL, NOVAK y HANESIAN, 1978).

Learning is knowledge construction where pieces fit together in a whole coherent. Therefore, to produce real knowledge, that is to say, a long-term knowledge that could be easily forgotten, it is necessary to link teaching staff didactic strategy with students previous ideas and present the information coherently and not arbitrarily, ‘building’ concepts solidly and interconnecting them in a knowledge network.

Learning, to be named so, must be meaningful and it has to be long-term learning.

In teaching practice it is of vital importance to examine the previous knowledge of the student, and to be able to link it with new ideas and obtain real meaningful learning. In constructive learning, concepts fit in the cognitive structure of the learner, where this one learns to learn, increasing their knowledge.

Human beings have a great learning potential which can exist without being developed, and meaningful learning facilitates the spread of this potential. There is a favourable disposition to this learning from students since it increases self-esteem, fosters personal enrichment, makes learning outcomes noticeable and increases motivation for learning.

‘The essence of meaningful learning lies in the fact that ideas are symbolically related in a non-arbitrary manner (not exactly) with what the student already knows’. (AUSUBEL, NOVAK y HANESIAN, 1978). Therefore, regarding learning materials and resources, we can say that meaningful learning takes place if the material is linked to the particular cognitive structure of the student in a non-arbitrary manner.


While meaningful learning facilitates the related new knowledge, learning based on repetition tends to refrain from new learning. On the other hand, materials acquired in a meaningful way can be retained during a relatively long period (months or even years) whereas knowledge retention after learning by mechanic repetition last for a short time measured in hours or days. (GONZÁLEZ et al., 2000).

Rote learning is an isolated issue, disconnected and rout in student memory, and it does not allow to establish relationships in their cognitive structure. This learning is easy to forget and, although it allows an immediate repetition for a short time, it is neither real learning nor meaningful.

It is important to know how students learn to be efficient when teaching work. Otherwise, student learning can be at risk. Ausubel’s learning theory depicted by Novak is the best explanation for knowledge building. (NOVAK, 1977)

The most important thing is to know how human beings build knowledge and to do so we have meaningful learning theory. The question is, obviously, how we should put it into practice in the classroom. The answer to this question is the main objective of this book, facilitating teacher staff putting meaningful learning into practice.

Nowadays, after multiple proved empirical evidences generated mainly from research by professor Novak at Cornell and professor González from Universidad Pública de Navarra, there is no doubt about the virtuality and efficiency of meaningful learning to obtain skills and learning levels. This is the reason why all people from the field of education should put an effort to facilitate and announce a practice implementation of meaningful learning in the classroom.

Constructivism reveals a learning structure that has not been considered before, materializing it into a knowledge structure. By managing the student to have powerful and meaningful knowledge frameworks, it makes him feel good and self-esteem is enhanced. He is interested in what he is learning and he likes what he does. He is highly encouraged since he observes a positive outcome in his learning process and makes the group very optimistic and excited to learn.

With meaningful learning the learner provides sense to all that has sense, to what he understands, and what it is inside his closed field of learning, because out of this closed domain, he is unable to understand us. Meaningful learning provides the learner with anchorage elements in the own experience of new concepts presented in a coherent and connected manner. Thus, learning is an individual and personal construction process. Human beings incorporate, within knowledge frameworks, all concepts which take into account and are linked to what we already know. (AUSUBEL, 2000)

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Marco Antonio Moreira, M. Luz Rodríguez Palmero, Concesa Caballero Ileana Grecia remind us that it is decisive that learning should be critical in a way that it expresses the willingness to analyze the materials presented from different perspectives, dealing with them from different points of view and working actively in order to attribute meanings. (MOREIRA, 2005, and RODRÍGUEZ, MOREIRA, CABALLERO, GRECA, 2010)\(^7\)

Meaningful learning is a gratifying, non-arbitrary, duly structured, and rational. The reason why it is necessary to block prejudices is to respect the use of meaningful learning in education since it is not advisable for teaching centres to always work and think in the same manner. A qualitative change is needed to improve learning by taking advantage of diversity and embracing differences.

Rote learning (use concepts to be learnt and extrapolate them to other situations) has a poor transference value and the information coherently acquired allows the extrapolation to another situation of reality. According to constructive theory authors, above mentioned, incorporating clear, connected, stable and integrating ideas is the most efficient way of boosting transference. (AUSUBEL, NOVAK y HANESIAN, 1978)\(^8\)

According to Fermín M. González, most of school learning consists of the assimilation of concepts in which new concept meanings and the relationship among them are of prime importance. Thus, meaningful learning has several advantages, among them, the concepts that are meaningfully learned can broaden one’s knowledge through related concepts. In addition, as meaningful learning implies the intentioned building of substantive and logical links between recent concepts, the meaningfully learned information will be longer retained. (GONZÁLEZ, et al. 2000).\(^9\)

When the learner recognizes in his own cognitive structure the basics of the educational fact and of what he learns, the meaning in his experience will be lasting. Meaningful learning thus helps to think, keep connections between concepts and structure and helps the relationships in different knowledge frameworks which allows to extrapolate the information to be learned for another situation or different context. So learning becomes real and long-term.

We have probably had an experience in which the student we want to teach cannot understand us. We ask him if he knows an easier concept related to what we want to teach. Once he says that he is aware of the easier concept, we connect those concepts through the relation of this concept with the one he already knows. In this way, we are relating the new concept with the one we wanted to teach in the beginning. It is at this moment when the student perfectly understands the new concept and he or she feels that they have learned something meaningful.


\(^8\) AUSUBEL; NOVAK y HANESIAN: 181.

\(^9\) GONZÁLEZ et al.: 32-44
In the constructive or meaningful learning theory the main process is to facilitate knowledge integration and create events in a sequence to use what we know and to build on that. If we do not teach in a clear, transparent, exciting, stimulating and positive way, the learner will not have proper understanding.

Jesús Escaño y María Gil de la Serna remind us that ‘the student, basing himself in his dynamics, sets out an intellectual effort to learn and even when these conditions are given, it cannot be guaranteed that he or she learns meaningfully. During the process, meaningful and sense conditions can be settled to a greater extent so the student learns but cannot be replaced in this work. Certainly a student can learn something meaningful, even if good conditions are not available in the teaching process.

For meaningful learning, however, teachers, as experts and taking into account their responsibility in the teaching/learning process, must try to create the proper atmosphere where the presentation is clear and based on the student capacities so that he or she can find the meaning and the sense to learn and sets his or her intellectual activity to reach it” (ESCAÑO, GIL DE LA SERNA, 1997)

The object of this book is to provide guidelines and examples to the teaching staff in order to promote students meaningful learning.

For the constructive conception, learning is building, and learning itself -as it is upheld by Isabel Solé and César Coll- is not about copying reality since we learn when we are able to ‘elaborate a personal representation about a reality object or concept that we pretend to learn’. This implies that to learn from experience, from interests, from prior knowledge, we must build our own and personal meaning. (SOLE, COLL, 1993)

The more world knowledge they have, the more questions can be made and more connections between concepts can be formed. So knowledge creates knowledge.

Meaningful learning is not a synonym of meaningful material learning. From a constructive perspective, material is only potentially meaningful, since meaningful material can be also used repetitively. So meaningful learning would not be promoted among students. When meaningful learning takes place, new ideas are related to some relevant aspect in the cognitive structure of the student, e.g. a meaningful image, symbol or concept, all linked to their knowledge structure.

Students have an endless ability to create, so it is necessary to use one’s greatest potential. Meaningful learning theory fosters this human quality. Diversified and attractive materials are a source of high motivation and promote the interest to learn.

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Ausubel, Novak and Hanesian conclude that motivation is both a learning effect and an outcome. So motivation might not be expected before starting with the learning task, but, according to these authors, ‘it is advisable to increase cognitive impulse, awakening intellectual curiosity and using attractive materials.’ (AUSUBEL, NOVAK y HANESIAN, 1978)\(^\text{12}\)

Meaningful learning is an inner-learning for the student. This is the result from relationships and knowledge connections in a non-arbitrary way between what the learner knows and learns. According to constructive theory authors, the efficiency of meaningful learning is due to its substantiality and lack of arbitrariness. (AUSUBEL, NOVAK y HANESIAN, 1978)\(^\text{13}\)

We currently have a very powerful tool to optimize meaningful learning and it is concept maps. When elaborated properly they make the inner plot of conceptualization clear. Prepared meaningful concept mapping prepared is consequently the ideal instrument to foster long-term learning.

In education, therefore, it is necessary to have the teaching staff and students’ involvement in teaching and learning and to connect new concepts with prior ones. As a result, we can obtain meaningful learning and it can be easily transferable to another real situation, and the student’s real life, allowing the so-called transference. It is worth the time to take a moment to ‘connect’ a concept, situation or new idea with the whole coherent idea known by the student.

**Concept mapping and didactic resources**

Concept mapping is the most appropriate tool to promote meaningful learning since presented concepts must be connected to an internal coherence and proper connection.

In concept mapping, concepts are presented in a hierarchy or levels, from the most general to the most specific. So as to work and understand concept mapping is essential to have a good knowledge of prior basic concepts and design them in a way that comprehension could be guaranteed with a clear presentation of concepts. (NOVAK, 1998)\(^\text{14}\)

Concept mapping is a very powerful instrument to detect students previous ideas through an initial assessment manner. Thus, we can provide the student with new connections between concepts and use concept maps both by assessing students’ learning and by leading learning.

Concept mapping may be used in all kinds of educational levels. In grade school, they can be created through pictures and drawings, or in university levels, the consecutive maps for each concept can be displayed in order to structure,

\(^{12}\) AUSUBEL, NOVAK and HANESIAN: 374.
\(^{13}\) AUSUBEL, NOVAK and HANESIAN: 47.
relate and study in depth all subjects, being a powerful tool to improve educational quality.

There is an excellent software to develop concept maps created by the Institute for Human and Machine Cognition (IHMC) of West Florida University freely available at http://cmap.ihmc.us for non-profit uses. This software called Cmaptools allows either to create concept maps with concepts and linking words or provide that every single concept is workable by placing a picture, a video recording, a text, or another concept map complementary to this concept, etc.

Before presenting CmapTools software to students, it is highly important that teaching staff will be able to properly create concept maps and teach them to students. Concept maps consist of concept mapping related to linking words and making propositions.

According to constructive theory authors, didactic resources such as models, slides, films and television allow to make concepts clear and expand the variety of samples. Their value lies mainly in the fact that they may complement a well-planned learning setting.

The resources to be used as an example of the learner’s experience, with different incoming information, develop meaningful didactic units and thematic settings that foster learning and increase motivation and interest. Thus, it is necessary that what resources show should be linked and coherent with the whole unit of concepts.

The need to integrate resources within didactic units is extrapolable to other resources, i.e. working on textbooks, audiovisual resources or school visits, because the most important thing is for the student to be taught. This must be done in an integrated way with concepts for meaningful learning, such as concept mapping, organizing and providing coherence to worked concepts.

Videos of experts
We recommend to visit the experts’ videos on meaningful learning and concept mapping at www.aprendizajesignificativo.es
2. MODULES
2.1. RECOMMENDATIONS

Over the years, this methodology has been put into practice by teachers from different domains and educational levels. This researched methodology so far provides real solutions to the current school breakdown.

Modules laid out in this methodology focus on the possibility to carry out a personal process through reading and implementation of them, creating a remarkable product for each teacher to put into practice in the classroom. Thus, the use of modules step by step, once per month, as it is depicted in this textbook is advisable.

It must be said that the non-continuing use of these proposed modules leads into error in the process. Apart from seriously distorting the model, it could hinder a proper outcome.

The strictly oral communication of modules from one person to another, is risking relevant information of the content of the modules. Hence, teaching staff should follow the material we are presenting here.

The elaboration of an open product with the first module, even though the outcome is remarkable and original, does not imply that the student is learning, as it is shown in the objective assessment. Only with open working the student is not able to learn. Therefore, it is necessary to draw on the concept mapping module to say that the student has learned and that a meaningful product has taken place.

Over the years, the experience with this methodology shows that 100% of students in the classroom learn meaningfully once the proven process is finished through objective evaluation tests (see appendix). Thus, we can say that, if we obtain an unfavourable outcome throughout or after its implementation, we should revise it if some of the content of the modules is not clear enough. In this case, it would be necessary to revise them in order to detect where the mistake is.

Putting module by module into practice, once per month with the least troubled student groups, is advisable to give teachers security at the beginning of this methodology. Once the results obtained have been assured, it can be laid out in other groups.
2.2. MODULE 1: OPEN WORKING

Meaningful learning

In order to learn, it is necessary to link new knowledge from prior ideas of students. That is why learning is a process of contrast, modification of knowledge schemes, balance, conflict and a new balance again. Thus, we are not dealing with a new sort of learning but for learning to be named so, must be meaningful; it must be real and long-term learning.

Constructivism focuses on the idea that learning is knowledge building where pieces fit together in a coherent whole. It would be better to link teacher staff didactic strategy with prior student ideas and present the new connected information with the already known in a coherent and non-arbitrary way, solidly building all concepts, interconnecting them in a network of knowledge. On the other hand, rote-mode materials are isolated entities related to cognitive structure only in an arbitrary and strict way which does not allow the establishment of connecting relationships. (AUSUBEL, NOVAK and HANESIAN, 1978)

This theory, whose principles are easily understandable, needs meaningful learning theoretical knowledge from teaching staff, apart from the need to control all classroom variables to put meaningful learning into practice.

Diversity

One of the obstacles a teaching staff must overcome is classroom diversity. We all know that levels and competitiveness in student curriculum are both very disparate and different, resulting in heterogeneity in classes.

Diversity, far from being a problem, is an advantage. In fact, if the teacher makes a work proposal, this can be too difficult for the learners' level, so it will be impossible to be followed by middle or slow-witted learners. This can also provoke a discipline problem. If a lower level proposal is made, it will be easily followed by slow-witted learner whereas the advanced and middle level learners will get bored. It can also happen that if the teacher makes a middle-level proposal, the advanced student will be bored and slow-witted learners will not be able to follow it.

In practice, this can be solved by the first meaningful learning variable: open work.

In the classroom practice, it is very common that boys and girls are asking, “How should I do this, in pencil or in pen?” The teacher’s answer often is ‘in pencil’ or ‘in pen’. “What colour should I use?” The answer often is ‘red’ or ‘blue’ and other questions of the same kind with similar answers.

Then, the student may also ask: “Where is Iceland?” Teachers tend to answer in a closed way with answers such as: ‘in the North Atlantic Ocean’ but the open answer ‘where can you find it?’ is more efficient.

15 AUSUBEL, NOVAK and HANESIAN: 48.
Closed questions have a poor acting margin for learners. We can think about closed questions such as: What title should we choose? Do we have to copy the outline? When do we have to finish our paper? Do we place the paper broadside or right? Can we colour it? Can we put the letters here?

Open answers and work provide the students with an acting margin and respect their diversity. When it comes to the question, what colour do we have to use? The open answer could be: what colour do you want to use?

When learners ask teachers how to do the work, we can answer: Who has to do the work? He may answer ‘I’ or ‘we’. We ask him: how do you think you can do it?

We can tell learners the subject and the material to be used but not the way to do it. Every student or student team must proceed in their own way, providing us with a remarkable and original work.

To do open work, first we have to connect a work topic or curricular didactic unit and decide which product the student will use from a didactic resource or their idea. For example, the creation of a comic, a tale, drawing, game, mural, album or any other idea that we may have. We can get ideas from daily life, from a film or as a result of imagining a product.

We may choose the product that the student will develop, and the subject or material that will be used. It is important, when controlling this first variable, to choose a subject that we are already know or we have previously been working on, since it will provide us with more security when working.

It is advisable either to use slides or pictures, or to use videos, cassettes and other recording items for the activity in the classroom. Through slides or pictures we can later present our practice.

Illustrating your task and encouraging other teachers to do the same, would be the best way to show what you have done. It is important to remember that if the activity is not recorded at once, after that it will be too late, because time passes by. For example, if you have not taken pictures or done slides, you may ask another person to do so (i.e. the school custodian)

Examples of open questions:

*What do you think?*
*What would you do?*
*How would you manage to solve it?*
*Why...........?*

Open questions have the advantage that they encourage people to explain ideas and concepts. Besides, they make us think and show an interest in the other person.
Open working

Open working fosters meaningful learning which entails to work with a certain non-directivity. Open works by students fosters learning.

Open productions are not enough condition to meaningful learning once learning has been reached. Nevertheless, they are an irreplaceable experience for students and teachers due to their richness, novelty and diversity. That is why it is necessary to control other variables exposed in the next modules.

NOTE: Only for those people not belonging to the teaching practice or with little experience, should elaborate a certain work with the condition that later on they have to think about their own product.

In this case they can make a mural:

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.

They can make a mural with all the material about the curricular subject in an open manner.

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.

Teamwork

Without a doubt teamwork fosters the effect of providing different incoming information to students in a simple and diverse manner, since all kind of materials related to work are drawn upon.

It is advisable in practice to have teams working in pairs. The best team is the one formed by four. However, people can also work in pairs. In both cases, it is recommended to ‘balance’ groups (from initial evaluation information, other subjects’ outcomes, direct classroom monitoring etc.) Teachers should assign the groups since he or she is the one who knows the students better. The teacher is able to make groups with a more advanced learner, one with an active behaviour towards the group, another slower and one curricular adaptation learner (special educational needs, attitude or discipline problems...).

If we explain to students that they cannot frequently choose their working mates, this will help to form the groups. So, it is important to learn to work with different people and consequently these groups will change throughout the school year.
How to make a balanced group with four components depending on the initial evaluation:
1.- ADVANCED LEARNER
2.- MIDDLE-LEVEL LEARNER WHO IS MORE ACTIVE
3.- MIDDLE-LEVEL LEARNER WITH MORE PASIVE STUDENTS
4.- CURRICULUM ADAPTATION OR STUDENTS WITH DISCIPLINE PROBLEMS

Making teams
1.- MORE ADVANCED LEARNER
2.- CURRICULUM ADAPTATION OR DISCIPLINE PROBLEM LEARNER

1.- MIDDLE-LEVEL LEARNER WITH MORE ACTIVE STUDENTS
2.- MIDDLE-LEVEL LEARNER WITH MORE PASIVE STUDENTS

If we are interested in high-level work:
1.- MORE ADVANCED LEARNER
2.- MORE ADVANCED LEARNER

Open work and balanced teams are a highly efficient response to classroom diversity and heterogeneity, insofar as the teacher prepares just one product and students adapt it to their level.

Getting to know the students

In order to be efficient in the class, we need to know all the students. With regard to psychological characteristics of secondary school students, it is necessary to take into account that they are in the passage between specific and abstract operations. We may consider the student evaluation level; if we have students with a thought based on specific operations (i.e. grade school), we could consider using an inductive method based on experimentation and practice. On the other hand, if we are dealing with a person with fully developed formal thought and he or she is able to use it easily, we could consider the use of a didactic methodology based on verbatim and deduction (CLARIANA, 1994)\(^\text{16}\).

We must not forget that secondary school students have both a specific and formal knowledge. In many cases, the student behaves in a cognitive way depending on specific knowledge characteristics (he needs an icon and physical support to understand what is being taught and he works more inductively than deductively). From our point of view, the best intervention in secondary school is the one both combining practice activities characteristic of teaching based on finding and induction, and verbatim instruction through theoretical exhibitions which favour a deductive character reflection. It can also lead the student towards reflection and deduction closer than the induction to general science principles. (CLARIANA, 1994).

In grade school, it is more convenient working with specific materials through a physical support in order to understand what is being taught.

Material

One of the factors fostering learning is the varied use of materials. Appealing and attractive materials increase interest and make the work in the classroom more helpful. When projects are made by students with colours and different materials, motivation is higher.

In order to have the material in the classroom, it is important to establish a difference between material easy to obtain by students (pencils, rubbers, pens, paintbrushes etc.) and those materials with difficulties since students themselves do not have access or because they are expensive (transparencies, continuous feed paper, tempera etc.) The most convenient thing to do is to have the student bring the easy and cheap materials whereas teachers may get the difficult ones to obtain material by purchasing it at wholesale stores. Thus, it can be that the student brings a paintbrush, an individual and cheap material. Teachers are in charge of getting temperas which can be bought in bigger and cheaper packages and paid with the school budget.

In those classrooms where teaching is more difficult and family problems are highly pronounced, it is more efficient for teachers to bring the materials. The effort resulting from providing all materials for the whole class can be seen in later outcomes regarding classroom atmosphere and student general achievement. We are encouraging teachers from educational centres with high difficulties to pick up materials for the classroom. This does not entail that they are necessarily expensive. A high percentage of materials used in the class are cheap or even free.

Materials that are easy to obtain can be brought by the student. However, in the case of the poster card of the first open work, this can be provided by teachers since they are forgetting that students may not remember to bring it.

Possibly difficulties

In some cases, open work has been done without appropriate information. Thus, it is important that we do not tell working mates how we are managing to do all steps and how we do control variables because it is part of a process. They may proceed following their own criteria. We know that it is complicated to say so in a random and isolated way. Results cannot be satisfactory if it is done anecdotally and non-rigorously.

As stated, this is a process where the student must know what to do. Teachers must choose the curricular subject, tell them what to study and decide a sole product for the whole class, leaving the procedure open.

It is advisable to make students work with only one product since the use of several products makes the work harder and teachers are not completely paying attention to possible questions held by students. Consequently, students may elaborate the same product with the same support, respecting diversity in the execution.
It is not convenient to make different teams elaborating one part of the subject. They learn only that part and not the rest since they did not practice it, even though a work exhibition is done later.

All students must work on all sections of the subject. In order to gain time, it is advisable to put two subjects together, i.e. ‘high-income countries’ and ‘lower-income countries’, summarizing 12 or 15 subjects into 8 or 9.

From now on, we are going to name students’ work as ‘products’. As a result we will have an ‘open product’, a ‘motivational’ product and when we get into the module of the concept map, we will talk about ‘meaningful product’ once we put the rest of variables all together.

Thus, it is important that students know what to do and the way they do their work is all the students’ responsibility.

It can also happen that some students are not able to follow the work they do when they are applying the first module of open work, thus it is better to catch the vast majority of students, only then, we will be able to reach the others applying other modules.

We cannot talk about a project, unlike the projects method, but about a product. Students produce something in a physical support; however, the product is more important than the learning process the student develops.

We might take into account that when the open work is applied, all students’ learning is not fulfilled. Atmosphere improves in the classroom. The rest of the variables must be applied in order to be understood by all students in the class.

**Advantages**

In this sense, the teacher acts as an advisor and guide of educational activities. He is not the only source of information and control the classroom. Students devote their time to work and learning and the teacher becomes a support of these activities, consequently saving energy.

When students are busy with their work, they enjoy themselves and learn and as a result they do not cause any problems. We avoid wasting time in discipline incidents, taking the children to the school principal, warnings, expulsions, calling parents etc. All of these only increase conflicts and foster negative behaviours to be repeated.

Although we know the certainty of all aspects mentioned above, this does not mean that problems do not exist. They can arise less frequently and when this happens we can provide the right answer because we have a quieter attitude. Teachers can solve two conflicts per day but not twenty or even thirty.

This fact avoids problems for teachers, meetings etc. since there is no possible debate because the problem is not present anymore. Teachers enjoy in the classroom, doing their tasks and helping the students’. Students submit papers, attend lessons and they have less absences.
These works make coordination of teachers, both from kindergarten and primary school, easier in courses and cycles since common activities can be carried out. This is also possible in secondary school with teachers from the same level, combining two different subjects to work in a common didactic unit and also with activities of the same subject but with different courses.

Although we can believe in principle that working in this way takes a lot of time, the truth is that it does not take such a large amount of work because we will not do most of the work regularly because there will not be problems and we can easily take advantage of this work. When we are using software to write a text, i.e. word processor, if we have never used it before we do not know how to do it, but once we try several times, then, it will be very easy.

The work done in this course with fewer changes can be used next year and in consecutive years.

We believe that 80% of the teacher’s work in one day is not suitable anymore. Once the teacher is within meaningful learning dynamics, he or she will not want to go back. One year after the seminar, he or she will take advantage of the work done as it is used from the very first day.

There are many other advantages that can be discovered once we make progress in our work process.

Self-assessment

After monitoring open work we shall state the improvement of the classroom atmosphere and the improvement of students work. Their productions in which we can value their enrichment, variety and diversity also improve. There is also high motivation around school working. Most likely a group part of students will not bring the material. Discipline-derived problems decrease. With open work the student does not learn all of the concepts so it is necessary to apply the variables in next modules.

Vocabulary

Open work: task in which teaching staff finishes the subject depending on curriculum, chooses a product and thinks about support and materials, allowing students to do and submit the work in their own manner.

Open questions: questions that make us reflect, think and explain ideas.

Deduction: argument that goes from the most general to the most specific.

Induction: argument that goes from the most specific to the most general.

For the next module:

Before starting the next module, every one of us will make a product with students, monitoring the first variable of meaningful learning: open work. It is
important before working on the next module to read about ‘meaningful learning’ in the introduction.

**Book references:**


**Recommended reading:**


Simple and ingenious fable showing us that everything changes: “Éranse dos ratoncitos y dos hombrecillos que vivían en un laberinto. Estos cuatro personajes dependían del queso para alimentarse y ser felices. Como habían encontrado una habitación repleta de queso vivieron durante un tiempo muy contentos. Pero un buen día el queso desapareció…” (Spanish translation)

**Websites**

We recommend visiting the following websites:

http://www.bl.uk/
This is the British Library. In the section ‘catalogues’ we can find textbooks published in English. It is an open website to search any reference book. They have 14 million books, 920,000 journal and newspaper titles, 58 million patents, 3 million sound recordings, and much more.

http://www.yahoo.com

Once, while exchanging ideas about the Internet, a teacher asked me where he could find a Peters’ projection map. I told him on www.yahoo.com. This is an answer of open website when there is a tendency to always say ‘in this book or the other’. Certainly if the teacher looked on Yahoo, he would find other things which we did not plan.
2.3. MODULE 2: MOTIVATION

Motivation

Motivation is a word frequently mentioned within the field of education. However, we seldom think and focus our attention on the proposal of an encouraging product for learners: what should we do to encourage them?

Motivation is the action and effect to motivate, that is, the reason to do something and foster interest.

We may talk about two kinds of motivation, intrinsic and extrinsic motivation. Intrinsic motivation is related to what people may do and it is the basis of motivation in childhood and adolescence. Thus, we can encourage learners with outstanding materials and activities to make them learn, and carry out interesting activities for learners so that they can have a good time and at the same time foster learning.

Intrinsic motivation is linked to what the learner does, tasks, to what we ask learners to do and it tends to be the most efficient sort of motivation. On the other hand, extrinsic motivation is external to the activity itself. For instance, it can be a reward, buying some materials or external motivations.

Extrinsic motivation is both a positive and negative support external to the activity. External supports are the most used in schools (buying a motorbike, a present, passing an exam....). They are helpful supports but they are not the only and the most efficient ones. It is very important to have a combination of both motivations, fostering the intrinsic motivation and complementing the extrinsic one.

It is important to increase scientific curiosity and the level of interest. Sometimes it can seem difficult but it is easy. For instance, when learners ask: Where is Mount Everest? Instead, we may ask: Where can it be found? The most important thing is to encourage learners to learn because it is interesting. Providing them with a straight solution, research is 'killed' and they are not eager to learn.

Learning is fun, recreational and interesting, so it increases satisfaction for research. The use of motivation is a key variable to teach and learn.

Educational psychology and motivation

The increase of motivation in the classroom depends on several aspects mentioned below (AUSUBEL, NOVAK and HANESIAN, 1978).17

Motivation is both an effect and the result of learning. Thus, we cannot expect motivation to be developed before introducing learners to learning activities.

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17 AUSUBEL, NOVAK and HANESIAN: 374.
If we ask a group of primary school children or teenagers if they are motivated for the next week lessons, they will certainly answer that they do not know. It depends on ‘what we will do’, that is, what we ask them to do. In this sense, we are talking about motivation related to the task that has to be done. We are talking about intrinsic motivation.

Making the aim of learning a task as explicit as possible.

If we know the activity learners must do from the beginning, and the reason of the task, why it is taught and for what, this makes it more interesting and motivation will increase. Knowing the goal and the aim helps and encourages reaching it. If the learner does not know where he is heading, obviously motivation decreases because the objective is lost.

Coming back to existing interests and motivations without being limited by them.

By broadening learners’ interest in school activities, we foster motivation so we may bear them in mind. We also may introduce the learner to unknown topics and extend his interest domains. The teacher shall decide the topic to be done and the curriculum context.

Increasing the cognitive boost and awakening intellectual curiosity by using attractive materials in order to guarantee the success of learning outcomes.

Through open questions such as: What do you think? What would you do? How would you manage to solve it? Why? etc. and encouraging research and putting eye-catching materials together, for instance, materials to keep one’s attention. By using visual materials (colour pens, colour papers, cards, scissors, glue, colour crayons etc.), we are fostering learning and motivation.

Assigning tasks according to each learner level of capability. Failure and frustration decrease motivation.

When the learner is not able to carry out school activities, he fails. As in the case of special needs learners, we propose to him other activities they may be able to do. It is very important for the rest of the students to do learning activities (we are not talking about school grade level but capability level), since motivation and interest decrease because of the impossibility to carry out the above mentioned activities. It is frequently common to have groups in a certain school grade with lower curriculum and knowledge skills. They can only learn in a meaningful way if we get to know their level.

Helping learners to reach realistic goals and assess their outcomes by providing them with tasks which evaluate their skills and giving them feedback on their way to working towards the objective.

It is necessary that work enables learners to do them and in order to increase group’s motivation and morale, it is highly important to work towards goals, topics and easy contents for students. We may note that in order to
encourage them to reach the main objective, we must tell them what it is right, what it is necessary to improve, where the mistake is and how to learn from it. It is the best way to make learning easier and raise motivation.

**Bearing in mind changes in motivation patterns due to development and individual differences.**

Learner’s motivation depends on several things. The most outstanding motivation in kindergarten and primary school comes from the task which adults propose. In secondary school, motivation depends on these two factors: the work to do and adults’ approval. Nevertheless, it is important in both cases to finish with intrinsic motivation (marks, rewards etc.) In all educational levels, especially in primary and secondary school, it is advisable to find an agreement within the group and try to make them reach the goal. In adult and college levels, motivation is based not only on outcomes and the satisfaction to get them but on tasks and adult’s approval activities.

**Carefully using extrinsic and aversive motivations, avoiding having high levels of both issues.** (AUSUBEL, NOVAK and HANESIAN, 1978)\(^{18}\)

The excessive use of extrinsic motivation decreases short-term motivation, thus, it is necessary to have unexcessive use of extrinsic motivations.

According to educational psychology research in animal conduct, the external reinforcement through material rewards or corporal punishment is very efficient, whereas in human behaviour, it is the internal reinforcement of activities.

**Intrinsic, extrinsic and adult approval motivation**

Motivation is very important in sustainable learning in order to have a good level in the classroom. In order to have positive learning, motivation should come from the task itself apart from external motivations and adults’ approval. (AUSUBEL, NOVAK and HANESIAN, 1978)\(^{19}\). These are the three basics and the most important in practice. We must remember the importance of intrinsic motivation. It is the most important and the least used in classrooms.

Nowadays, intrinsic motivation is considered an enhancer of motivation rather than extrinsic motivation (material rewards etc.). We can note that external motivations can be additional resources for motivation; however, basic motivation resources depend on what we tell the learner ‘to do’.

Motivation has to deal with the same activity. Motivation activities encourage following the same activity. We may insist on the fact that motivation helps learning and vice versa. So it is necessary to make learners more interested in what they are doing in order to avoid having a long-term learning problem. (AUSUBEL, NOVAK and HANESIAN, 1978)\(^{20}\)

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\(^{18}\) AUSUBEL, NOVAK and HANESIAN: 374.

\(^{19}\) AUSUBEL, NOVAK and HANESIAN: 374.

\(^{20}\) AUSUBEL, NOVAK and HANESIAN: 350.
The important thing is to do motivating activities with learners. Students should learn and have fun in the process. In learning, there is no need to suffer. The learner enjoys long-term or meaningful learning, and at the same time, we are able to control the variable of classroom motivation.

Adults’ approval by encouraging kids to continue with their effort in learning, increases the positive conduct in the sense that ‘You are doing a really good task’ ‘You are working very well. Continue like this’ ‘You are a very good group’ etc. We can encourage learners with these expressions. Consequently, there is a higher morale in the class, a better atmosphere and an increase in motivation.

Adult's approval is highly motivating because tasks are better done. Negative reinforcement related to school achievement or behaviour in the classroom is not so efficient in practice for learner to be motivated. On the contrary, learner and classroom morale and motivation decrease.

Usually, when a learner or a group does good work and they have good behaviour; teachers do not say anything whereas when learners behave badly, teachers attach importance to that fact. In order to motivate a learner or a group, it is very important to tell them if they are right or not.

When there are incidents in the classroom, that is, when the class does not properly work as well as other days, it is better to say that during this day the class has not been working well. By opening the door, for instance, we may say ‘Look how you worked the other day... I encourage you to have a positive attitude to work and behave properly’, reminding them when they did a good job and had good behaviour.

In order for good conduct to be repeated, it is necessary to reinforce it positively which is fundamental in childhood and adolescence since it prevents conflicts and improves the atmosphere of the classroom, because learners are busy with tasks and learning. In adolescence, the most important motivation is the one facing the ‘task per se’, that is to say, the most important this is telling learners what they should do.

**Material for motivation**

Material is an important source of motivation. By using appealing materials with children and teenagers, we are stimulating learners to a great extent. The use of different materials all throughout the year and the exchange of learning aids, will increase everyone’s motivation.

Prior to coming into the classroom, it is necessary to think about the idea and the physical aid with which the project will be carried out, planning all materials and the work topic. Once in the classroom, thinking about the previously stated is not possible. We may think in advance that the material should be affordable for learners so that they are able to bring all resources. Creative ideas can also arise in the classroom. These allow improvising with excellent outcomes but it is advisable to have a prior idea before starting.
By using diversification of resources we can arrive better to the learner. Thus, we can change the working support size. Instead of working with DIN A-4 paper we can use DIN A-3 (twice DIN A-4), working with a half sheet of paper (or a quarter) etc. This means to change size, shape and think about learner’s production in a different way. Depending on the context, we will have better access to one material or another. The most important thing is variety and diversity.

We can motivate our learner by using different sorts of materials. Even though they are the same resources, they can be used in different ways. For instance, blackboards have the possibility of colour chalk. We can have countless ideas such as screening a slide or drawing an image. We can create many working ideas for our learners by using different resources (blackboard, chalk and slide). The third chapter about didactic resources from “La Didàctica de la geografia: aprenentatge significatiu i recursos didàctics de les Illes Balears” (BALLESTER, 1999) contains multiple ideas to work.

Motivation practice

Corporal punishment and material rewards work out with animals but they are not efficient for humans whose better motivation is adults’ approval, task per-se and appealing materials together with extrinsic motivation.

In the vast majority of classrooms, especially in teenager groups where conflicts have increased in the last years, learners are basically doing two things: they are busy with their work or distracted. The first is obviously preferable to the second one.

Learners get motivated when they are enthusiastic with work and they like what they do. Meaningful learning motivates students to keep learning since they realize they are progressing and, as a result, intellectual curiosity increases.

In kindergarten and primary school, it is important to keep the interest higher and move children towards action in things close to experience.

Carolina and Josefina, second grade primary school teachers, are planning to go camping in a natural area with their groups during the second term of the school year, so they try to motivate students by fostering the interest in working through the elaboration of a mural. However, they decide to make a giant book of the visit where all children will be participating. Thus, they foster interest for the visit, for the process and the use of the giant book. As a result, motivation does not decrease.

At the school for adults, Pilar increases motivation through the use of different materials and resources with excellent results: overhead projector, slide projector, press, computer, school Journal, etc. She also keeps self-esteem high through the positive reinforcement while working toward to the main goal. She helps students to do individual work such as the solution of problems with creative and different strategies. Then they exposed their experiences, activities, relation with the school, work, drawings and art activities in the school journal. Thus, motivation and learning is higher.
Reinforcement by congratulating learners for their tasks (‘You are working very well’) encourages to continue and to repeat the positive conduct. We are dealing with reinforcement to which learners are very receptive because they believe they are able to do things. It is a reinforcement that boosts motivation. The teacher establishes a reachable, but also high goal which helps to continue working positively. We may think that there is nothing to do with one group of learners, but it is all about looking for the way to reach them.

Affection is very important in learning. Teachers who respect learners, treat them right, create a positive atmosphere, greet and say goodbye, treat them politely and have a friendly relationship get the same response from them. All in all, learners behave the same way.

Elaborating texts

In order to elaborate texts after research, we have to teach students how to write them. First, we can inform them that it is necessary to write what they understand, not copy. We can extract a text from their own works which is not understandable or with difficult words for their level and finally we can read a fragment in front of the whole class. An example for secondary school grades could be: ‘The isostatic balance requires that when there is a lack of sial, it has to have a sima thickening. The crust of the sial…’. We can ask learners: ‘Did you understand the sentence?’ When the answer is no, we may read a sentence from their works like: ‘The Andes is a range of mountains in South America’. Then we can ask if they understood it. If the answer is yes, we can tell them to write the text using their own words. First of all, they have to read it, think about it and then write it.

It is very common for the students to ask if they can submit word documents. The problem is that sometimes is that they print it before looking through it. Previous examples can also be useful but we may tell them that typing is also positive. Therefore, they can make tables by using the computer, printing them and using them as visuals.

Tables can also be helpful for bilingual or trilingual learners who are doing work in a specific language but they include a summary at the beginning in different languages.

Motivation as a key variable of meaningful learning

Motivation is a key variable in the classroom to obtain meaningful learning since motivation is directly related to learning. In fact, motivation fosters meaningful learning and, at the same time, meaningful learning maintains motivation.

We cannot say that learners who participate in an open and motivating activity completely learn past concepts. Motivation itself is not the only variable to satisfactorily assimilate all concepts, although learning increases because of motivation.

Motivation in a didactic activity allows to increase interest and participation as well as to understand productions as appealing activities and at
the same time foster learning. Although motivation is not a variable which makes learning possible for the whole class in a satisfactory way, the variable of motivation is a key variable for meaningful learning because it makes learning easier. Consequently, learning fosters motivation.

Without any doubt, the best example we can have is teachers’ imagination carrying out a product with their learners. We should think of what to do and how to do it for a while. It can take a while but the effort is worthwhile due to its richness and variety. It creates a key variable for teachers to learn more about motivation.

The endless motivating proposals we can have to motivate learners have, as a result, a great variety of enriching ideas for teachers and students. We can prepare motivating productions for our learners, basing our ideas in activities we did when we were young at school and that we really liked. All of them had a characteristic in common: motivation. That is why we have remembered them over the years. Sometimes the opposite happens; those experiences that we did not like allow us not to repeat the same mistakes with our learners.

We can ask learners about their prior activities from previous years and which ones they really enjoyed. We can produce activities by adapting them to our group. We can combine ideas with didactic resources like the example of the blackboard, colour chalks and slides. With a list of different resources we can do many productions.

We can take ideas from reality: daily objects, ideas from images or audiovisual material sequences, etc. Definitely, we can think about different ways of motivation.

By reading, attending conferences, seminars, round tables and being updated in education, we can have a reason to create. In fact, if we attend these activities and we exchange opinions and resources with other teachers, we can generate ideas to be put into practice. When one of these activities makes us have an idea for practice, the effort has been worthwhile. Consequently, this idea becomes part of our teaching structure and it will always be part of our teaching tasks. Finally, I would like to add that evidence of teaching practice shows that every day we can learn something from anyone.

We encourage teachers to think in different ways to motivate students because imagination to do open and motivating products is worthwhile for outcomes and especially to enjoy teaching.

Self-assessment

After doing an open and motivating project, atmosphere improves and we have better outcomes in the conduct of learners. Activities in class improve, because learners are busy with their work. Several students that were not used to working produced more efficient products. However, we cannot reach all students. We can note that there is a higher interest and motivation to submit works as much as possible. It is easier for teachers to create new products according to the curriculum. We observe that only one group of the students work poorly. That is why we explain individually that working in teams does not mean that while one is resting the others have to work. It is about working together and at the same time getting better results. Interest and motivation increase and learners are busier with their tasks.

Vocabulary

Motivation: group of situations that lead one person to a specific direction to do something.
Intrinsic motivation: conduct with an internal reason that moves to action because of a personal satisfaction to do something and it depends on the ‘task per-se’.

Extrinsic motivation: conduct by external reinforcement. The person is not interested in the conduct itself but in external reinforcement outcomes.

Adult’s approval: motivation of positive reinforcement towards learners’ attitude and/or activities that make them continue with the same conduct.

For the next module:

Everyone one of us, before continuing with the next module, will think and create a product with his or her own students, which has to control the first variables of meaningful learning: open work and motivation.

References


Recommended reading


These two references offer an excellent and updated summary about motivation and its theoretical framework, apart from proposals for reflection applied to teaching activities. The first book is an initiation work and the second one, a textbook on teaching motivation.

Websites:

We recommend visiting and using this website:

http://www.school-teacher-student-motivation-resources-courses.com/index.html
We have always found interesting ideas on this website about motivation: film references, ideas to reduce stress and resources for parents eager to increase their children motivation.
2.4. MODULE 3: ENVIRONMENT

Environment

Environment is a priority resource in any thematic area that complements, relates and gives coherence to worked concepts.

In any didactic unit, program or thematic block, it is important to have a relationship between different kinds of material (oral, with text, visual, audible and things related to environment) that is related to what happens outside the classroom.

The samples of concepts and activities that are worked on through aspects linked to student’s environment (local or worldwide) allow multiple connections and relationships which provide coherence and meaning to the used concept message.

The use of situations and pieces of news that happen around the world or on a smaller scale (local, regional, national or international), as well as the learners’ experiences and knowledge not only establish links, meaning and utility but also establishes what it is taught and learned has a sense and learning is fostered.

Environment is a group of environmental, social and cultural conditions where learners live both locally and worldwide. From their knowledge, it is easier to preserve, respect and value their physical and human aspects. According to Francisco Olvera, only critical apprehension of reality which involves us can provide alternative answers to our own reality, to our environment. Environment is considered a whole of physical, social, cultural, economic factors surrounding human being and establishing a dialectical relation with them. (OLVERA, 1989)

Environment is a resource that gives coherence to worked concepts with other resources. That is why the exemplification of aspects related to a learner’s environment, local and worldwide, allows multiple connections and relations, providing information with coherence.

Nowadays, environment is the planet. We cannot talk about our environment in an isolated way without thinking how general problems affect us. It is necessary to make a scale game, going from the particular and regional to the most general and worldwide in a constant back and forth manner.

The study of the environment is related to the study of daily life because it includes the way we live, nourishment, career, housing, amusement and objects. Either environmental variables or daily life can cause countless didactic activities for students of learners of high levels.

Frequently people tend to relate school environment to school trips and visits. However, when we talk about environment we mean both local and worldwide environment simultaneously. When we bear environment in mind the capability of extrapolation to other situations increases, that is, transference capability (capability of extrapolate learning to other external situations of real life outside the classroom).

We can take into account environment variables in different educational areas and levels which they do not necessarily entail the closest or local environment. It can be also worldwide which tends to be closer to learners’ experiences, through media, which puts them into contact with any place in the world and which belongs to the global environment.

Environment is very important in cultural and social aspects. Thus, for instance, in cases of school areas where students live in an environment that promotes having which a good time and drinking alcohol, it is obvious that these situations are part of the students’ environment. This matter can be worked in different educational domains and levels.

For example, we will discuss Belén Olivares, an art teacher for the third year of secondary school in a touristic place. As a result of a proposal to participate in a poster competition about the dangers of driving under the influence of alcohol, learners participated in pairs for the competition. The aim was to make students and parents aware of this danger (students usually drive small engine motorbikes). This is an example of open, motivating work related to environment and it works for social problems from the learners’ environment.

Learner’s environments do not have to be necessarily carried out by direct observation (see what happens directly). It can be carried out by indirect observation through television, media, audiovisual supports and other works made in class.

Connecting with students by using aspects of current situations of local environment or by relating school activities with other aspects or topics of daily life increases motivation towards school activities and students can link them with learning.

Learners’ real life

Working around the positive evaluation of open school to environment has a more immediate and direct motivation, since environment is an outstanding resource to illustrate teaching activities.

By using different materials that increase motivation from real life materials, we are using a highly powerful didactic resource. Consequently, we could create materials and products to be used with learners from materials they have in real life, according to their interests with which they will develop a special and direct motivation.

The topics they enjoy, concerns and interests are common things to take into account to get along with the students and create a positive atmosphere within the classroom. Effective integration and social needs link to the student in a connected and close way to his external environment to school.

The relationship between the teacher and learners, with a great need of close communication, can be obtained in a positive way by connecting all works
made in school to the student’s reality from environmental aspects. This involves that school is approaching reality and real life outside the school.

Environment and motivation

Learner’s real life is directly connected to motivation and the student is the main character of his own learning. When planning an activity or product to be done in class, it is obvious that the student will be more involved if the proposal is linked to his or her own daily life. The most direct interests of students are successfully utilized for them with educational special needs encourage the student by doing what he likes.

Working with environment as a key variable of meaningful learning makes student implication in his own learning process higher, improving the atmosphere and avoiding discipline-derived problems.

Motivation is necessarily increased by preparing school productions, taking into account the students’ environment, thus, making students behave in a positive way. As a consequence, students are able to produce an educational product based on real life. At the same time, this educational product becomes a practice to interpret reality so we can understand it better in a linked and connected way.

Transference, application of learning into real life

Transference is demonstrated when meaningful learners are able to use their knowledge other than reality. When learners are able to show transference, this means that they have learned meaningfully and they are capable of using this long-term knowledge.

In teaching, thus, it is necessary to involve the teaching staff and learners in teaching and learning tasks in order to make transference possible, that is, the capability of information to be learned coherently. This allows the extrapolation to another situation of reality and daily life outside school.

‘Transference in school learning consists mainly of shaping cognitive structure of the learner manipulating content and the disposal of his or her previous learning experiences so that following learning experiences may be facilitated.’ (AUSUBEL, NOVAK and HANESIAN, 1976)  

Bearing environmental variables in mind when organizing school productions, aids have to connect learning with reality and the information the student already has and it can be used again in real life outside school.

The student with the linked information is able to better use his or her knowledge during learning and use it in a different situation than the one created in the classroom. It is important to have an environment variable in order to obtain meaningful learning.

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22 AUSUBEL, NOVAK and HANESIAN: 171.
Environmental study practice

Frequently the study of environment is linked to school trips and visits, which obviously are outstanding illustrative resources of learning. However, we can say that using the variable of environment for meaningful learning is related to the essence of the work done in the classroom, even though it can also be used in activities outside school.

Learners production when bearing the environment variable in mind, gains utility in the use of information and, thus, in the capacity to extrapolate to other real life situations because they come from reality itself. Relating the environment variable with schoolwork means to have the students’ environment in favour. So a direct relationship with the increase of motivation is established due to learners’ proximity to what they learn. It also means making learning a live experience.

In all school domains, we may take into account the study of the environment. It can cover arithmetic calculations about the sport facility which is being built next to our school or could look from our window help create poems about seasons.

A school trip to a tourist area, for instance, to practise German or other languages can be seen as a likely use of direct observation because of posters, writings, etc. and other kinds of resources to collect spoken or visual information such as making written interviews or using cassettes, videos or pictures etc.

Carolina Caballero, a primary school teacher, works with maths in a direct way and relates to the environment. Boys and girls make a recipe in school which allows them to work on weight or capacity measures as well as calculus. They elaborate a scale model of a kitchen by measuring and making electrical appliances to scale and they recycle parfum boxes and other products to study the polygons. Students work on bike measurements, geometry, vocabulary etc. In short, they have to use maths in real and daily life.

In secondary school, we can work integrals from parabolas describing a rocket, a basketball or golf throwing. We have endless possibilities. It should be noted that all environmental aspects of learners provide sense to school activities. We can use as an example the classroom window or the views we have from the school playground to establish a connection with what we see in the production. Thus, we are fostering learning because learners directly perceive the utility of learning and its application in practice.

Environment as a key variable of meaningful learning

All in all, environment is a key variable in the classroom to obtain meaningful learning since it is directly related to learning. If we use environment, we are using another stage of motivation. Learners will be more involved if the product they are making belongs to their real life.

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23 Carlos Gallego and his seminar works show how maths can help us to understand the world. They provide examples of calculation projects, texts on numerical (shopping or parking lot receipt etc.) assessment and decision-making in the classroom. See GALLEGO LÁZARO, Carlos; SEMINARI REPENSAR LES MATEMÀTIQUES: Repensar l’aprenentatge de les matemàtiques. Ensenyar a compartir la visió del món. Palma de Mallorca: Conselleria d’Educació i Cultura Govern de les Illes Balears, 2000. 130. Spanish edition: Repensar el aprendizaje de las matemáticas. Matemáticas para convivir comprendiendo el mundo. (2005) Barcelona: Graó. 197.
Environment is not the only variable necessary for learning. Nevertheless, it gives sense and motivation to school activities and fosters learning.

Transference capability is fostered when we take the environmental variable into account to prepare school productions. Information may be used in a different situation. Learners must be able to act through product-making, using learned concepts and behaving positively with the others.

In order to learn, information must be connected. However, it is true that compartmentalization in subjects with unconnected curricula hinders the previously mentioned. An educational team should know the subjects and curricula of the other teachers in the same group so that information may be connected with other subjects to avoid repetition and foster connections.

**Possible difficulties**

It may happen that in some cases learners ask teachers to make groups. This fact can work out some days and a contract for the students will be made to maintain the sense of having a good attitude and behaviour while they work in teams. Our experiences in the meaningful learning seminar show that these groups do not work out in a short, middle-term and teachers must rearrange groups.

Sometimes we have been observed a tendency in teachers to create excessive work leading to excessive misdirection. In our research we carried out a completely open practice in which goals and attention were scattered and learning was not fulfilled. It is essential to close topics and the product for the whole class (the same for all) and have the students finish their learners’ products with some synthesis activity (for instance, and individual written summary). Otherwise, the process remains too open.

It can be helpful to use an agenda or minutes to express and reflect on how the team worked. Thus, the evolution of the group can be clearly seen.

There is a tendency to make some changes in the key aspects of the system, learners groups, making some products at the same time, etc. These changes within the working procedure do not give good results at the beginning, which is why it is better to control variables as they are exposed in the modules rather than in important changes in the work. In fact, these variations, widening, reduce and improve the methodology once all possible variables with positive outcomes are controlled and the process is finished. Through research we can add some parts or eliminate the least important.

We tried to substitute modules for summaries or PowerPoint presentations and it did not work out. Personal contributions to this

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24 BALLESTER, A.: La Didáctica de la geografía. Aprenentatge significatiu i recursos didàctics de les Illes Balears. Palma de Mallorca: Documenta Balear, 1999. 289-297. In the research, the direction of a new variable was worked out: leaners interests and the observation in direct contact with reality. We noted that it was a too open process so we took a step backwards. In this book, this variable has been avoided since it does not lead to learning, although we speak about how to work learners interests the module about curricular adaptation.
methodology substantially change the given information in the modules, especially at the very beginning and are not very helpful. So it is not that meaningful learning in practice does not work out but the aspects that are introduced by teachers are the key parts of the system.

For instance, a teacher working with different educational levels pointed out that open working was very helpful for more independent learners but it was not that useful for the rest of the groups because they needed more attention. It is obvious that if the teacher made four different products about different issues, etc. the possibility to help students was slightly lost so it was necessary to make one or two products. This helps teachers to pay more attention to the whole class.

Making substantial changes in meaningful learning in practice (carrying out four products instead of one, and making groups depending on learners interest and others, etc.) can make teachers think that meaningful learning does not work when the problem is that there is some aspect that has been done in a different way and is not under control.

It is highly important to read every module twice. Read this module and the previous one again, highlighting and making comments on the most important aspects. At the same time, you should increase every variable with recommended textbooks for each one because reading and consulting every one of them will provide us with the necessary theory and ideas for practice and carrying out this work, contributing to our formation.

We should take into account that an open product is not a meaningful product. In fact, to be meaningful all variables from each module should be controlled. Open working is varied and diversified but it does not provide satisfactory assessment outcomes. It is necessary to control the rest of meaningful learning variables. Open working is meaningful when motivation and environment have been handled together with the rest of variables: creativity, concept mapping, curricular adaptation, and variables that we will see in the following modules.

A triumphal tendency of teachers may exist in the sense that he realizes that open working increases the level of the classroom atmosphere and avoids conflicts. Sometimes it is advisable to control all variables to put meaningful learning into practice and to have good results with learners by solidly knowing the methodology.

What it does is control meaningful learning variables in practice as it is mentioned in the modules and once practice has been consolidated, all changes, if appropriate, could be done in the following year, bearing in mind reading and research references, advice, and monitored activities in the class.

By changing those important aspects, such as, making products at the same time, doing groups in different ways, monitoring a variable without having worked and getting enough information from the previous one, we can obtain poor and avoidable outcomes.
The following variables are easier to control than the first one. In the case of this module, we should take into account the environment variable when we are thinking about the product at hand.

Learning is meaningful when all objective evaluation tests are passed by learners in the class. Once all variables are controlled, we may be wrong if somebody fails. This means we must detect our mistake, correct it and obtain meaningful learning. When the teacher controls meaningful learning variables, the whole class gets positive results and learners manage to pass all evaluations.

In groups with a high level of conflict and poor grades we can say that learners always learn in a connected way. Learning is building, thus, from educational special needs learners to the most talented or highly-gifted learners, all students learn meaningfully when they connect some information with other students.

In groups with extremely low levels of motivation and with high conflict, teachers must reach a coordinated consensus on intervention and actions. They should establish a priority for intervention about the most important thing. Controlling and applying meaningful learning variables in the classroom may significantly contribute to it. However, sometimes coordinated and meaningful intervention of teachers does not immediately obtain results.

**Advantages**

The advantages of taking these variables into account are among others, energy-saving in teachers’ tasks which goes from a source of information to the coordination and management of the class. Once several practices have been linked, the teacher is less overloaded with the monitoring class since the responsibility of teaching and learning is delivered to both learners and teaching staff.

Atmosphere in the classroom improves and teachers have a good time while teaching, learners have better behaviour and discipline-derived problems decrease, thus, teachers and students’ self-esteem is higher. When variables are controlled and products are linked to learners, teachers are less overwhelmed when it comes to developing lessons, that is, their role as leader weakened because work is redeemed. It should be noted that is work with difficulties, but repetition of evaluation tests is avoided and self-esteem and positive assessment are increased because teachers and students appreciate the results.

Students become more productive and the results for both students and teachers can be seen. Consequently, the student is more satisfied.

Learning means to connect, manipulate, relate, visualize and internalize all concepts learned through the development of meaningful products. Open, motivating and environment-related work variables are not enough to obtain a meaningful product. However, these variables are enough when we have taken into account variables to be worked in the next modules. We encourage you to
practise productions bearing every variable in mind because the experience obtained from them is either interiorized or satisfactory for all of us.

**Self-assessment**

The motivation in the classroom is more direct, and more motivation improves classroom atmosphere and less conflicts take place. The teaching staff avoids an overload of work because learners are busy with their work and will not disturb the class. When conflict takes place, it is easier to control because it not that frequent. Interest improves as a result of applying open working, motivation and environment variables.

We can remark that environment is a direct motivation for learners, thus, it improves the activity in the class. Learners are highly motivated. Although school achievement is more positive, we cannot reach all students, but the activity has improved. Learners have adapted themselves to this working procedure.

**Vocabulary**

**Environment**: natural, social, cultural, economic, etc. factors that surround the individual and are related to him or her.

**Atmosphere**: factors that have an influence on the individual and are close to his experience.

**For the next module:**

Every one of us shall make an open, motivating and environment-related product before starting the next module.

**References**


**Recommended reading:**


This work is formed by several reflections and experiences of the environment which surrounds learners as a fundamental factor in the classroom. It uses reality analysis and provides research in daily school life.

**Websites**

We recommend visiting and working on this website:

http://www.rosasensat.org

Rosa Sensat Teachers Association is a Catalan association of teachers and educators working for quality in education. They have a great level and work on innovative educational services. See *Escoles d’Estiu*, seminars, conferences, publications as well as their journal *Perspectiva Escolar* where we can find really interesting articles.
Meaningful Learning in Practice

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2.5. MODULE 4: CREATIVITY

Creativity

Creativity is one of the most powerful issues of humanity. Imagination, invention, flexibility and divergence applied to teaching have an irreplaceable potential. Creativity is a key variable of meaningful learning since creative, flexible and physical ideas of teacher allow us to make school products active and open and at the same time they foster creativity and learning.

There are different definitions about creativity, for example:

Creativity is a unique phenomenon. It is an inner human aptitude to create new combinations from pre-existent elements (words, materials, rounds, ideas…) – Demory, 1976-.

Creativity deals with creating in a divergent manner as well as converting – Guilford, 1967-. It is a process through which a person is aware of a problem, a difficulty or gap in knowledge for which he is not able to find a known solution. This person seeks different solutions by considering hypothesis, evaluation, tests, modification of the mentioned hypothesis and finally he explains obtained outcomes, (Torrance, 1972, David de Prado, 1982).

As a conclusion to all these definitions, we can say that creativity is a combination, an association and a conversion of known elements to obtain a novel, and original outcome. We are talking about doing new combinations with connected elements of ideas, materials and concepts already known and provide us with novel, original and alternative results.

In practices where creativity takes place, we can work through an active and open procedure from creative ideas as a result of the combination of pre-existent concepts in teachers’ way of thinking, looking for possible solutions, working through divergent thinking and looking outside the rules. In short, creativity is seeing things in a different way.

According to Samuel Amegan, divergence is an intelligence operation. This author, following the model of Guilford SOI (Structure of Intellect), explains that the divergent production allows using an available material so that we can obtain new and different results in an innovative and different way thanks to provided data for cognition, memory, evaluation and convergence. (AMEGAN, 1993)

We are working on thinking as a process. In order to solve a problem, we must look for different ways and different possibilities flexibly. Consequently we must look for possible solutions before finding the most suitable answer.

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25 For the development of this module, we have taken as a starting point the practice on the creativity of educational innovation experiences entitled ‘Maratón fotográfica de una carta en defensa del mar” and the creativity proposals by BALLESTER, A. “La Didáctica de la geografía de les Illes Balears. Aprentatge significatiu i recursos didàctics”.

Things are different depending on the point of view and, the different way to consider an issue makes this one have different results. Teachers’ divergent and creative thinking fosters school activities with new and original outcomes.

Creativity and divergence is the result of looking for possible solutions to didactic matters in a different way, without agreeing with the first solution or clue, looking for a good solution to the didactic problem from the idea that unidirectional thinking hinders creative possibilities.

From the reflexive thinking processes of teachers on different points of view and creative and flexible thinking, we came to the conclusion that school activities can be done in many different ways on the basis of divergent thinking.

Active and creative pedagogy is a decisive and outstanding proposal for school working according to Amegan (1993) 27.

It is very common to use different materials in the classroom, from recycling paper boxes for school work, or keeping recycled paper for the copy machine. However, it is true that using materials in a different way is less frequent. It can be very useful, for instance, to copy pictures or other kinds of material (we often use sheets of paper), to extend drawings or change their sizes. It is about making different productions with learners which manages to motivate them towards learning.

For instance, we had to do a photographic marathon in a school, one of the conditions to carry out the activity to obtain the material. At the beginning, it seemed that we could not get so many cameras, that is, one for each student. The solution was that there was no need to have one camera for each one, but one for each group of four. So, we thought about how to do this activity in groups (making teams, reducing and making the whole thing into something smaller). Finally, the number of pictures to take by learners was distributed (allocate and distribute).

Sometimes a different idea or material is needed to get a good result. Sometimes it is necessary to multiply, divide, cut, distribute, find alternatives, give more answers to a question, create, divide a reality into parts and combine separated elements to form one suitable product.

Creativity is linked to:

- Imagination
- Invention
- Intelligence
- Divergence
- Fantasy
- Side thinking
- Point of view
- The unusual
- Curiosity
- Originality
- Creativity
- Novelty

27 Samuel Amegan in his work, ‘Pour une pédagogie active et creative’ French edition, makes a pedagogical proposal not only about cognitive thinking stimulus, but also about creativity and divergent thinking in order to foster the discovery of creative and active research. Besides, on the basis of J.P. Guilford SOI (Structure of Intellect), he presents the intelligence operations and factors of creative thinking. He also exposes different ways to suggest different activities in school.
- Being different
- Fluency
- Establishing associations
- Making-up
- Innovate
- New productions
- Elaboration
- Being sensitive to problems
- Analysis
- Synthesis
- Communication

Creative and divergent thinking of teachers

From the previous belief that divergent points of view make us consider things differently, we can internalize the idea that seeing things in a different way facilitates and causes the divergence of thinking. The fact that an idea or thinking can have contradictory aspects makes teaching ideas more developed towards creativity and divergence which, when applied to didactic matters, favours creative and divergent thinking of learners.

There is a certain consensus in the fact that active methodology contributes to foster the spirit of research, initiative, autonomy and curiosity, either for acquisition or application about what we already know about students. Autonomy, curiosity, originality, initiatives, variety and the richness of personal experiences are cognitive variables which favour the creative resolution of problems. (AMEGAN, 1993)

It is believed that active methods are appropriate for school work but they can only be done with a limited number of students or with more teachers in the classroom. Besides, many economic resources are needed in order to carry them out. As it is proposed in this book, we think that by systematizing an active and meaningful way of working in class, we could work with a higher number of learners (making groups) with a teacher in class (giving the responsibility of work to learners through open working in order to avoid overwhelming teachers with work) and with poor resources (using more economical materials in other ways)

In Souther lower-income countries, teachers’ creativity and use of materials and to change them into school products and resources is highly important. We can use materials from nature like rivers and stones from beaches in order to develop concept maps, wood sticks to highlight worked information or sand to make school productions, making learning easier.

In schools with poor resources, it is very important to recycle materials and use materials we have in school. If we store them in an organized way, they can be so useful: a piece of cardboard, a thread, a piece of rope or wood, steal sheet etc. can be used in countless situations in creative and innovative ways.

Creative and divergent thinking requires several ideas which does not mean that any response is correct, but only if it is suitable for the problem presented. Creative thinking of teachers implies fluency (to consider different ideas, answers and possible solutions), flexibility (searching for different

28 AMEGAN: 13-25
approaches, different clues, classifying in different ways and to see things differently), and originality (associations of different data, looking for clever solutions, and unusual weird, but suitable answers).

Divergent and creative thinking according to Amegan (1993) needs:

- An open, permissive and stress-free atmosphere.
- To be based on Janusian thinking, which states that an object, idea or phenomenon can simultaneously present two contradictory aspects.
- To be dissociated from lineal, sequential and rigid thinking.
- To respond to emotional need, that is, the need of self-realization and to change close environment.

Variety and diversification of points of view and the different results of open, motivating, environment-related and creative working makes students emotional implication in school work easier. This is decisive for the efficient development of classroom activities.

Sometimes we can improvise something in class. In fact, creative thinking can be produced at any time and we can do something new and original. However, teachers usually may have properly thought what they should do before they start with lessons. They need to decide the topic, the materials to be used, how work can be organized and think about how they will divide it into different sessions. Thus, the teacher is anticipating possible difficulties and problems derived from discipline, creating a more efficient atmosphere within the classroom.

Although it may seem that the use of creativity is overwhelming when it comes to production, it is not like that. It takes some effort at the beginning but it helps to avoid work afterwards since it is redeemed very soon. All the process done facilitates to do so skilfully and among other advantages, we can use the next course with other learners in the same way or establish some variation if suitable.

Among the advantages of working in this direction, we can point out the possibility of having an immediate result of what is done, either for teachers or students and foster the school approach. Consequently, difficulties decrease and learners’ behaviour and the classroom atmosphere improve.

**Divergent resources**

Divergent resources are those resources created outside the rules through thinking outside the box, that is, from teacher’s creativity, imagination and innovation in order to produce new and diversified results.

Divergent resources allow us to foster learners’ creativity and divergence from teacher’s creative thinking. Materials should be manipulated so that the result is innovative and diversified.

Once in a school, we realize that we had neither a box nor the budget to buy those boxes used to keep maps inside. The solution was, through the divergent thinking, to use an old wardrobe and place it in a different way and cover it with a piece of metallic net used in the construction of a building next to our school.
Creativity is helpful to use materials in a different way, replace them for others, eliminate one part and add another, and divide and multiply them. Once we were at the beginning of the school year without any kind of material and with no budget to buy them. We just had some office material, a Xerox machine and paper. We had the idea that we could get some sheets of paper and join them with some sellotape like a leaflet to elaborate the first schoolwork of the year, using the material as free newspapers to write about news.

Einstein’s quotation ‘in hard times imagination is more important than knowledge’ provides sense to creativity. The most important human traits are creativity, imagination, innovation and divergence. Divergent resources are the result of risky thinking, breaking down barriers about the sense of the ridiculous and an insistent attitude, without getting discouraged if the result we find was not the one we were looking for. It is all about thinking outside the rules and outside the current use of materials and resources.

Not all ideas from outside the norm are divergent thinking that should be used as a resource. Creative and multidirectional thinking should be appropriate, flexible and physical.

Divergent resources are useful anytime of the school year and lead teachers toward divergent work and motivate and enrich potential difference.

Teachers’ motivation through the use of side thinking, that is, multidirectional, leads teachers to meaningful learning in their training and their teaching process is improved. Besides, teachers’ morale is raised because they enjoy teaching, concepts are linked from different domains, and hope is reinforced by the students positive response. As a result, all creative potential that teachers have been able to recover and awake in students has been made apparent.

Teaching staff must be trained, read and practise in class in order to act with flexibility, creativity and lucidity when he or she has to make a decision in different situations and contexts like in the example we explain the situation below in the case of a conflict. Training and reading pedagogical information in interaction with school practice creates difficulties more easily, as stated below.

We are in History class in the second year of secondary school. Students are so excited. They are sitting on their desks, on the floor, seated and standing. Some of them have thrown toilet paper between desks and chairs. There is an overexcited, party-like and provocative atmosphere.

This situation takes place in a grade where teaching is very difficult because there are frequent incidents which hinder the regular development of lessons. There is a poor attitude towards learn.

The first reaction of the teacher is to come into the class and scold, shout or look for those who are responsible. However, he or she is aware of the fact that this kind of response does not work and creates poor results. The teacher tries to think of how he can manage to change the problem into a didactic resource

When the teacher comes into the room, he or she tells students to be seated, but obviously he does not receive any response. In silence, he takes the end of the toilet paper and hooks it at the door and the other end at the window, having a long paper strip. Students suddenly stop and pay attention to what he is doing. They start going back to their desks. The teacher asks: ‘Did you pay attention? Do you know how long people have lived without being able to read and write? All this time you can see on the paper shows the time people have not read or write. Can you see this shorter piece of paper? It is the time humans have managed to read and write.’ The teacher has managed to convert a piece of paper into a chronological freize that he uses as
a didactic resource. The teacher keeps talking: ‘Do you remember that we studied prehistory and history? We studied Egyptian hieroglyphics, Greek letters and Roman Latin... We wrote on clay tablets, on papyrus or paper. Nowadays, we are typing and we send letters without paper via Internet and we are able to communicate via artificial satellites’. In that moment, one student said: ‘We really advanced’.

When the atmosphere is quiet, the teacher considers that it is the right time to talk with students about the incident. The teacher tells them how bad their behaviour was, explaining that the class was not the right place to play with toilet paper. They could have chosen another place to play instead of the classroom. He asks their opinions one by one and the answer is very simple. They are aware that they must not play inside the classroom and that a similar behaviour can cause problems in the near future. (RODRÍGUEZ, BALLESTER, 2001)

We may think that an example like that is difficult to put into practice but María Antonia Ferriol Alomar, a teacher from the meaningful learning seminar, reflects about creativity and learning, and states:

‘With this seminar, I had the opportunity to experiment my capacity to create. It is a shame to assume that creativity is the heritage of a privileged few: artists and geniuses. Above all, when it is obvious that this is not true, creativity is a human intrinsic quality. We all have the capacity to create. We just have to develop it.

In this sense, the Meaningful Learning Seminar is a way to reach it. When learners explore their own creativity, they discover the pleasure of recovering their inner curiosity they have as human beings.

It seems to be that we all forget what learning means. Learning is not about answering some test questions but believing and being confident about our capability. Learning means feeling the power of knowledge that when applied to reality, allows us to build and destroy; it allows us to change, improve our lives and the lives of others.’

We want to highlight the idea that creativity is an intrinsic human activity, we all have the capacity to create. In fact, during childhood, imagination and innovation are extraordinary and it seems that when we become adults, our social, family and school systems restrict our human capacity to imagine and create. Thus, we just have to recover this capacity, which we once had.

We may not copy others’ creative thinking ideas but create them on our own, manipulate materials in a different way, change points of view and consider things in a different way. ‘Wasting’ time thinking about divergent resources for creativity is the best way for teachers (and also for students) to gain personal satisfaction, to break with uniform thinking, and routine and to make the learning experience a positive way to enjoy the satisfactory effects of education: learning while teaching.

The possibilities of didactic exploitation of divergent resources and creativity are not only diversified, but endless. We can create resources from materials such as chalk, a desk, a sheet of paper, a window, a picture, a ladder,
the school hallway, that is, all resources we can use to create with teachers’ potential: their imagination.

**Creativity practice**

Putting creativity into practice has a common characteristic with all creative acts and it takes personal action like combination, organization and transformation of available elements, but not predetermined, which produce a new, appropriate, original and efficient outcome.

Creative practice means to produce new things through unusual associations, transform, organize and integrate different alternatives.

Creative thinking is directly related to intelligence. In order to foster learning and intelligence we need to foster creativity. Concept mapping can be very useful as we will see in the next module. (NOVAK, 1998)

According to Amegan (1993), the following questions can help us to make creative productions:
- What kind of use we may provide with?
- How can we change?
- How do we enlarge?
- How can we reduce?
- How do we make it longer?
- How can we multiply?
- How can we use it several times?

Creative practice means to use a divergence of thinking which calls for the generation of several ideas, different results and solutions to solve the same problem. There is not only one response but it is important to be within the conditions of the problem and only appropriate if it is efficient.

What happens if we add anything?
What happens if we substitute it for...?
What happens if we combine it with...?
What happens if we adapt it to....?
What if we get rid of...?
What if we colour it?
What uses does it suggest?
What if we burn it?
What if we change its usual position?
How can we share?
How can we use it in new ways?

Divergence means fluidity, flexibility, originality and elaboration. Fluidity is the capacity to provide many ideas, to think about more ideas and consider many other solutions:

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31 AMEGAN: 30-35 and 102-103
How do you see it?
How can it be done?
Who has more ideas about...?
What kind of ways?

Flexibility is the ability to find different approaches, solutions and different clues. It means changing the point of view and seeing things differently:
What kind of ways?
What else...?

Originality is the capacity to produce very distant associations between objects and ideas, that is, provide unusual solutions but appropriate and efficient solutions at the same time:
Think about something original
Think about something you did not think about before
Produce something unique, new...

Elaboration allows for the development of details about objects and ideas to complete them:
Add...
Complete with something to make it more interesting...

Next, we will explain an example of a creative process in a school competition about a letter in defense of the sea. We received an invitation to participate in this proposal and when we received it the competition was about to finish in three days. The initial response was that there was not much time to participate but by using creativity and divergence we managed to do so.

The task comes from the idea that teachers' creative, flexible and physical thinking allows them to solve problems from a process of thinking where the five operations of intelligence of Guilford's theory are included. In fact, this thinking made the teacher find other possibilities and ways to develop the school activity.

First, the information was captured and it was understood that there was another way to do school work and an idea and feeling that it was possible to participate in such an activity. We thought about an idea that could be done in three days: a photographic marathon.

We put the convergent production into practice, taking into account the prompt development of the slide. It was the most appropriate way to obtain immediate results. On the other hand, we had the photograph (more expensive at that time) so we decided to reject that support.

Divergent production, which allowed us to use the available material in a different way to obtain diversified outcomes, resulted from teachers' thoughts in the form of cognition, memory, evaluation and convergence.

As an example, we took an audiovisual to explore different possibilities and carry out different approaches to solve the problem. However, it did not seem appropriate at the beginning to make a script, record voices or record on a videotape because more time was needed to make copies). The solution at the moment was to organize a photographic marathon. That is how this experience resulted from a letter about defending the ocean.

Reflection turns around the teacher's thinking process according to whom creativity depended on and the research of different points of view, where facts, particular phenomena, and ideas did not look the same depending on the point of view. This fact was positively supported by Amegan's reading.

Once the marathon and the elaboration of a slide dossier were finished, all those responsible for the competition were asked when the deadline was. They told us that we had ten
more days because there had not been enough time to work. Yet, we submitted our work on time, showing that time was not a crucial factor. Our photographic marathon won the competition.

The use of slides and the thinking process to continue with the photographic marathon is an example of an experience based on the process of creative and divergent thinking by the teacher in an open, reflexive, flexible, physical, constant and immediate way. (BALLESTER, 1999)

According to Parnes (1976-1977), the creative solving of situations follows several steps:
1. Finding all appropriate data for the situation of the problem.
2. Identifying and formulating the problem with the help of data.
3. Considering all possible solutions.
4. Choosing all appropriate solutions in accordance to established criteria.
5. Implementing all possible solutions.

Creativity as a key variable of meaningful learning

Education’s main goal is to train people to become future citizens who have the capacity to think and create before daily life situations outside school. It is possible to have an active, creative and recreational school that optimizes teaching-learning situations from the use of teacher’s divergent, multidirectional and flexible for physical proposals.

As a result of our creative practices, it should be remarked that learners’ open, creative and divergent work depends on teachers’ open, flexible, physical, creative and divergent thinking. Consequently, teachers’ creative thinking processes provide open proposals with creative possibilities for learners.

Once the product has been elaborated, it is highly important to close the work, that is, to write an individual summary with our own words, as it should be told to another person, in order to structure all the information. We do this so that we can have an individual synthesis of the information to review and study because learning will be fostered by reviewing the topic in an interiorized way.

Working with procedures and open and diversified didactic resources allows us to have an open, creative and emotional activity for learners, which is a key factor in an activity’s success. Thus, we consider that teachers’ open and creative proposals also become open and creative for learners.

Open learning situations, such as personal experiences and emotions, with a stimulus of divergent thinking where learners project their ideas, foster the individual differences and originality, being key aspects for an active and creative education.

We cannot consider the success of learning of worked concepts in activities in which the student monitors open working, motivation and creativity. On the other hand, the use of teacher’s creative and divergent thinking is not a guarantee of learning. So it will be necessary to control two variables from the remaining modules: concept mapping and curricular adaptation.

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32 BALLESTER: 280-289
Working with creativity and divergence in teachers’ thinking becomes key and decisive. At the same time, it fosters thinking flexibly outside the classroom, meaning that we have a new point of view about the world or the surrounding reality.

In creative practices, didactic resources are worked in a diversified and open way. The teacher manipulates known resources, interrelating concepts from his own experience in and outside the classroom before coming to the conclusion the fulfillment of the creative production.

Using open works, motivation from the environment, teachers’ creativity and divergent thinking are key factors to obtain outstanding learning in learners.

We can produce creative ideas from daily life objects and transform or use materials or ideas from a different point of view, which will help us be creative.

Possible difficulties

The final assessment results of an open, motivating, environment-related and creative practice show that learners have not been able to satisfactorily understand all basic concepts. So the direct-research way of learning itself does not guarantee that all students will learn the concepts.

Direct-research does not entail satisfactory learning, thus, it will be necessary to control the following variable: concept mapping in order to establish a connection and relationship between concepts to achieve meaningful learning.

Teachers’ creative and divergent thinking becomes a key and decisive variable to enhance active, emotional and implied work from the student. Nevertheless, this variable is not enough to ensure satisfactory learning for all learners.

There are some elements that can stop or overshadow creativity: conformity (doing things as they have always been done), authoritarian attitudes in the classroom (cutting efficient communication for learning), being afraid of being foolish (a powerful limitation for creativity because it is normal to be embarrassed because this work is new and different) inflexibility of thinking (having only one point of view, ‘this is like that’), and intolerance towards recreational and creative activities (which hinders the possibility of using creativity, repressing fun while learning).

It is possible that a student is often ridiculed in their school environment by classmates for being original and utilizing new productions of learning in school. We are frequently dealing with specific comments that can be discouraging because we are being original and different. The most efficient way to avoid such comments is to ask questions such as ‘What grade are you in? What did you do and how does it work? It can also be useful recommend a book because it can help enhance the quality of activities and the school environment. The most criticized school works are often general. We may be persistent in the goal and, above all, give sense to our work being aware that we are right, that it works and that we are not going back to old ways.
Advantages

Some of the advantages of controlling meaningful learning variables in the classroom and using creativity, include:

The improvement of teachers’ self-esteem.
Avoiding an overload of work with poor results.
Results are immediately seen.
Avoiding teachers’ disappointment due to the crisis the educational system is experiencing.
Learners and teachers stress and feelings of sadness or depression disappear.
Focuses attention in diversity due to classrooms’ heterogeneity. The teacher prepares just one task for the whole class but every student does it following his own level. So heterogeneity and diversity in the classroom is not a problem but an advantage. We can say that it is not necessary to prepare individual tasks for every student, which would be work very difficult for the teacher. They can avoid having too much work.
Fostering of school approach.
Enjoying teaching.
Personal realization for teachers and learners.
Light improvement of the atmosphere in the classroom.
Learners’ behaviour improves.
Daily working difficulties decrease.
Communication between teacher and learner improves.
Parents consider teacher’s social task very important because they realize that their children are happy with their work. Parents positively evaluate teachers’ work so their social assessment increases.
Managers of educational centres rewarded due to the improvement of teaching since their schools are able to work well.
Educational administrative staffs positively evaluates teachers and students’ tasks, with students being motivated without the teacher having an overwhelming amount of work.

Self-assessment

There is a good atmosphere when it comes to learning and self-assessment. Learners are highly positive and motivated. Through their comments we can see that they are enjoying what they are doing. Because they feel motivated and activities in the classroom are so varied, teachers and learners satisfaction increases due to the work done, but not only for the results but also for the process. Some students have not been completely involved in activities yet, but the vast majority of them enjoy working in a motivated, imaginative and direct way.

Vocabulary

Creativity: Human capacity consisting of a combination, association and change of known elements to obtain a new, appropriate and original outcome that provides a good result.
Flexibility: Human capacity consisting of looking for different evidences, classifying in a different way and see things from another perspective.

Creative product: new and original product resulting from innovation.

Divergent resources: resources created outside the rules, by thinking outside the box, from teacher’s creativity, imagination and innovation in order to produce new results that are also appropriate and diversified.

For the next module:

Before starting with the next module, every one of us shall make an open, motivating, environment-related and creative product by writing an individual summary to conclude the work and structure the information to study and review it.

References


Recommended reading


It contains models and strategies on creative and active learning that can be included in school curricula in countless exercises and techniques focused on learners. They are designed to enrich acquired knowledge in the classroom in order to consolidate creative aptitudes for learning and development.

It manages to support participation and creativity in the classroom and with teams, helping teachers and learners increase their innovative and spontaneity, opening their mental agility. It contains practical examples of implementation in the classroom.


It provides examples for creativity development and strategies to be creative are included. It facilitates finding all data related to the situation of a problem. It also identifies and formulates the problem with the aid of existent data, it considers all possible solutions, choosing the most appropriate in accordance to established criteria, and finally, illustrates all possible solutions.

**Website**

We recommend visiting, working and relating this module with the following websites:

http://www.iacat.com

*IACAT Creación Integral* is an advanced institute of total applied creativity that is headed by Dr. David de Prado. It is a superior institute dedicated to training, research and advanced development of total applied and integral creativity in all kind of fields and for all people and experts. Its training activities and programmes are available online.

The central core of *Creación Integral* is formed by the IACAT Compostela group. It is constituted by 80 doctors, experts and masters in creativity from the United States, Europe and Latin America. The main contingent of research and creative development are focused on a mission: integral development of total applied creativity for all people and experts, companies, educational centres, society and culture.
In the website of Colegio Piaget San Isidro in Argentina, we can see examples of working creatively through pictures made by teachers and students where imagination and innovation are paramount. In this school it is very common to develop of activities in the classroom with daily work. It is a clear example of creativity put into practice in a whole school.
2.6. MODULE 5: CONCEPT MAPPING

Meaningful learning

Constructivism focuses on the idea that learning is knowledge building where pieces fit together in a coherent whole. It would be better to link teachers’ didactic strategy with prior student ideas and present the new connected information with the already known in a coherent and non-arbitrary way, solidly building all concepts and interconnecting them in a knowledge network.

In order for real and long-term learning to take place, it is necessary to have coherent information in order to learn. So it is important to connect concepts and relate them in a non-arbitrary and coherent way. To obtain meaningful learning we need to use the most powerful tool to connect concepts: Novak’s concept mapping. (NOVAK, 1998, VALADARES and SOARES, 2008)

Joseph D. Novak is the creator of concept maps which are a great tool to achieve meaningful learning. A concept map is a special outline that provides sense and coherence to learning sensitive concepts. By using them, we obtain the necessary connection of information to form powerful structures of prior knowledge so the concepts are all related and interconnected.

Meaningful learning is full sense learning. Meaningful concept maps are highly effective tools here because they allow connecting and relating concepts create powerful networks of properly structured and prior knowledge.

The main problem is knowing how an individual gets the most proper knowledge and how to produce the concept change. This is meaningful learning: the construction of new meanings demands the integration of new knowledge into related concepts and proposals. (GONZÁLEZ, Fermín; MORÓN, Ciriacio; NOVAK, Joseph D.; 2001)

To obtain true and long-term learning, it is necessary to present the information in a coherent and non-arbitrary way, solidly ‘building’ all concepts, interconnecting them in a knowledge network through a concept map.

Fermín González, F.C. Ibáñez, J. Casalí and J.J. López, all of whom belong to different departments at the Universidad Pública de Navarra, explain in their book quality university teaching and concept mapping jointly with professor Novak. They also explain how research carried out in an American university shows that many students do not know how to learn efficiently. However, when the learner recognizes his own cognitive structure as a basis of education, the


34 GONZÁLEZ, MORÓN y NOVAK: 222-227
meaning of his experience significantly changes. Concept maps will help us to successfully overcome our challenges. (GONZÁLEZ, Fermin M. at al, 2000, GONZÁLEZ, Fermin M., 2008)35

The most effective tool in order to obtain meaningful learning is the concept map because promotes the connection of all presented concepts with an internal coherence. We should be cautious in the elaboration and usage of maps. If they are made in an isolated way and only as a technique, they do not produce a powerful effect for learning. The use of the map as a key variable of meaningful learning may be accompanied by an efficient educational approach where variables are controlled for products made by learners to be meaningful as a result of their learning and also meaningful for teachers as a result of their teaching.

The use of concept maps together with the other variables of meaningful learning in prior modules provides the learner and teacher with a new sense of school activities: the teacher enjoys teaching and the student learning.

In meaningful learning, in contrast with rote-learning, concept maps are an instrument to understand connections amongst maps. The map may clarify and give concepts meaning, from the easiest to the most difficult ones, consequently being useful and meaningful.

**Concept mapping and meaningful learning**

It is necessary to have a meaningful attitude toward learning and teaching because the material, which is potentially meaningful, can be repeated (such as using a list of words). As a result, we may have easily forgotten a rote-learning rather than long-term meaningful learning.

It is important to put the rest of meaningful learning variables into practice such as open working, motivation, environment and creativity. We may add also concept mapping and the appropriate curricular adaptation.

The map is a powerful procedure to facilitate meaningful learning. It does make sense to have students learn through repetition. So it is necessary to use concept maps for clarification and concept comprehension because of their accessible and transparent relation.

We may be cautious in the elaboration and use of concept maps. Thus, concept maps can be meaningful by linking words and connecting one concept to another to show their relationship. It makes no sense to fill all remaining concepts because two or even more maps can be properly produced using different concepts and connections between them. Maps can be different and made by several people and at the same, they can be well-constructed.

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We may insist on caution in the elaboration of concept maps and not using them in an indiscriminate way. Concept maps are a powerful tool for learning but in order for them to be useful, they should be properly done. If used improperly, they can become a useless recipe and an inefficient instrument, consequently losing all their potential. (PÉREZ CABANÍ, 1996; BALLESTER, 1999)36

In school activities, it is necessary to retain the core, that is, what is really important. Indeed, the learner is not required to know everything about a topic. In fact, it is impossible to know everything about a specific thematic domain. However, it is outstanding to know the most important, and core idea. Learners must have the ability to relate concepts and extrapolate knowledge because when they find new information they should know how to connect it to the previous coherent and connected structure so that it makes sense.

Meaningful Learning in Practice

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Concept maps are very powerful to learn but practice is needed to skilfully create them. Reading and working on recommended references at the end of this module is very important to work efficiently on concept maps in order to be skilfully in their elaboration to get expected results.

We want to point out that one of the biggest difficulties in the elaboration and use of maps is that their elaboration can be poorly done due to ignorance or copying other maps from curricular materials that are poorly built and from others’ practices. This usually decreases the quality of the elaboration.

There are some interesting web pages about concept mapping. However, not all of them have efficient and reliable material. The best thing to do to obtain information on mapping is to consult the original textbook by Novak and Gowin called ‘Learning How to Learn’. Other helpful books are Fermín M. González’ ‘El mapa conceptual y el diagrama UVE’ and A. Ontoria’s ‘Los mapas conceptuales, una técnica para aprender’. We recommend these as references to construct meaningful maps.  

The concept map as a tool to foster meaningful learning

We have seen that concept maps are the most appropriate tool having connected and long-term learning because concepts are presented to learners with an internal coherence and appropriate connection.

In a concept map, concepts should be presented in a hierarchy or levels, from the most general to the most specific. So it is important to know all previous basic concepts and design them in a clarified, connected and comprehensive way.

The concept map is a powerful tool to learn in order to clarify, define and limit (for example, at the beginning of didactic unit) concepts and relationships, so the students know from the beginning what they should learn. Thus, non-arbitrary and connected learning is supported.

As we will see in the next module, the first levels of hierarchy of concept mapping are useful to obtain meaningful learning for slow-witted students or those with curricular adaptation needs because we all have basic concepts of the didactic unit or thematic block. We are dealing with the fact that learning must be fostered in students with difficulties to learn by attracting their attention, illustrating and interacting with them when working on basic concept mapping.

We have been insisting that concept maps are a very powerful tool but at the same time they are very delicate. So it is pointless to make students learn them by repetition, using random colours, filling remaining concepts and not using linking words because the map will lose all its coherence and sense. It is very

37 NOVAK Joseph D.; Gowin, D. Bob (1984) Learning how to learn. Cambridge University Press. 199. GONZALEZ, Fermín M (2008) El mapa conceptual y el diagrama UVE. Madrid: Narcea.184. and ONTORIA, Antonio Coord. (1996) Mapas conceptuales. Una técnica para aprender. Madrid. Narcea. 207. We consider highly important to read and have a look to these two books in order to construct good concept maps. The initial effort when practising with maps is soon redeemed since their use is specially powerful and useful. We encourage teacher to know, get familiar and practise on maps since they can improve their capacity in many situations.
usual to have the non-elaborated edition of concept maps in curricular materials and textbooks so it is essential to read basic references and efficiently train students to elaborate them.

One of the key ideas of meaningful learning is to link prior ideas with the new information in a structured and coherent way. Thus, to learn it, it is necessary to know our students and see if they know about a topic before they begin to work on it.

According to meaningful learning theory, one of the key elements is to know the situation of the learner before beginning with any kind of learning programme so as to start from what the learner already knows and use it to connect new knowledge. Classroom curriculum must be adapted to students’ prior knowledge of each topic. Otherwise, we tend to base learning on rote-learning which is easily forgetful.

Students’ prior ideas may be detected before starting with a didactic unit or thematic block through the elaboration of a writing about a certain topic, the definition of concepts or the elaboration of an individual concept map. We can ask what they know about an issue before working on it, what are their experiences related to it, and when and where they listened about that topic. We may connect it with students’ environment.

In order to connect with previous ideas, we can present the student with a concept and once we have already taught them how to construct maps, we can ask them to elaborate a map with all concepts that were linked with the first one. We could have a map with students’ previous ideas on a topic to be worked on. (ONTORIA A., 1996)\(^{38}\).

A previous survey on the initial situation of students is needed to work on meaningful learning. From this moment onwards, the different paces of learning through open working should be respected, taking into account diversity, adaptation, and teachers preparing one task that allows every student to work at his or her own speed to understand and learn meaningfully.

Teachers should reconsider how to attract students’ attention in order to learn before coming into the classroom. They should decide what the most important thing for learners to learn is, identify the next field from which they will learn and decide the levels of difficulty and the appropriate connections to begin learning coherently. Concept maps are an appropriate tool to do this.

**Constructing concept maps**

According to Novak, concept mapping has three basic elements:

- **Concept**: it is a regularity of events and objects that is expressed by words. Events are anything that happen and can be provoked and objects are anything that exist or can be observed.

- Concepts are from the point of view of each person. Mental images are provoked by words and express norms. These mental images have common

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\(^{38}\) ONTORIA: 39
characteristics for all people but they are not exactly the same. We will discuss the word ‘car’. Our mental image of ‘car’ is different from others (when we think about the word ‘car’ we imagine different shapes, sizes and brands) but we all agree on several characteristics of the word ‘car’. These are the concepts.

Proper names do not express norms but singularity. Hence proper names are not enclosed in an eclipse or rectangle because they are not concepts, but examples. As examples they do not have to be enclosed. They are placed in the lower part of the map in brackets.

Proposition: propositions are formed by two or more concepts linked by linking words which form a semantic unit. Thus, the relationship between concepts linked by linking words must make a sense.

Linking words: words are connected to link concepts and establish the kind of relationship that exists between them. Words such as ‘from’ ‘maybe’ ‘related to’ or some verbs do not produce mental images. Linking words do not produce mental images. (NOVAK y GOWIN, 1988)

In the sentence ‘plants do not have roots’ the concepts plants and roots are linked by the word ‘have’, thus, we can form a more simple concept outline, with the sentence ‘plants have roots’.

Hierarchy: in concept mapping, concepts are placed in a hierarchy, in order of importance or inclusivity, with the most general and inclusive in the upper part of the map. The less inclusive or specific are placed in the lower part. Examples are placed at the end of the map, in brackets and are not enclosed.

We may bear in mind that in concept mapping, a concept only appears once and maps are not usually definitive at the first attempt. So it is necessary to be repetitive or make it several times to improve the presentation. There is not only one right concept map but different maps can be created properly from different perspectives.

We have to take into account that in every box or eclipse, only one concept is written so we cannot write sentences or lists of words.

We can also elaborate the concept outline of this text by placing an eclipse within the first concept with an arrow pointing down and connecting with the second eclipse and concept:

‘The eye has a balloon shape’

Next, we can make a list of concepts that appear in this text. Later on, we can start constructing the map.

How the inside eye is

‘The eye has a ball shape and for that reason it is called an eyeball. We can distinguish the following parts from the most exterior to the least: cornea,
iris, and crystalline lens. The cornea is the external part of the eye and the iris is behind the cornea and it has a circle called the pupil. Inside there is a crystalline lens that is in the shape of a transparent lentil.  

We propose to do a concept map with the following text:

Soil’s physical support of crops.

‘The soil is the result of the disgregation of a source rock in fragments and the contribution of organic material from the decomposition of animal and vegetable remains. Mineral components give nourishment to plants, which is why their physical and chemical characteristics condition crops. The most influential characteristics of soil in agroactivity are:

Profile or distribution of layers or horizons. Deep soils, like valleys or plains, present well-developed horizons which foster the growth of cultivated plants. Thin soils, with poorly developed horizons, like in mountains, are not the best to use when growing crops.

Dimension or organization of particles. These are classified as gravel, sand, mud and clay depending on their size, from the biggest to the smallest one. They are also characterized by water retention. Sandy lands hardly retain water. However, clay lands retain water filtration in subsoil.

The level of drought. Certain crops adapt themselves better to acidic soils whereas others adapt to alkaline or basic soils. However, very acidic or excessively alkaline soils are often not very fertile.

After constructing the concept map, we can make a map about any topic like a hobby, a sport, an amusing activity, etc.

In order to get practice in the elaboration of maps, it is necessary to practice. For example, we can make some maps to improve the technique and after that we can prepare maps for didactic units and thematic blocks to be worked on in the classroom. We can use ‘Post-its’ to write concepts and linking words to construct the maps better.

Concept mapping in practice

The strategies for the usage of concept maps are diverse. For teachers, concept maps are useful as a previous organization of content and curriculum, which means the connection and relationship between conceptual contents allow for the integration of the information in a hierarchical and organized structure.

Concept maps can be used in all kind of school levels and subjects. As an example of concept mapping in kindergarten, we can construct maps using images, pictures, paper and drawings. In primary school, we can explain

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concept words with attached texts and images in order to enclose meaningful productions. As far as secondary, high school and college is concerned, they can use to elaborate, meaningful and thematic products. Without a doubt, teachers will find many possibilities in the use of concept maps through imagination and creativity.

The map makes the previous diagnosis about students can possibly have all concepts organized before starting with a didactic unit. It allows detecting previous ideas and relationships between concepts, although some of these connections are wrong.

The map is used before the didactic unit and thematic block are worked on because students are aware of their prior knowledge. The most appropriate thing is the individual elaboration of the concept map as an initial assessment. Previously, we should teach students to construct maps.

In order to detect poorly defined ideas, we can give a list of concepts to learners from the next didactic unit. They can construct the map and see how they should organize key concepts individually. (ONTORIA, A, 1996)\(^\text{42}\)

The most frequent use of concept maps occurs at the beginning of the activities as an initial organizer of the topic presentation and all throughout the didactic unit to extend the initial map with successive maps. Consequently, all concepts are structured and related in a connected way and this advanced elaboration is very useful for teaching and learning. Thus, the map is highly efficient before and during the activity.

Another efficient use of the concept map is a summary to improve comprehension, to be aware of the relationship between concepts and a synthesis activity to structure knowledge in products.

The possibilities and didactic strategies of concept maps are multiple and diverse since they can be presented in different ways and combined with different didactic resources. They can be done individually, in a notebook or in DIN A-3. Pairs of students can make a concept map in a slide and then project it. In teams, we can construct a concept map with a poster with continuous listing paper.

Concept maps can be put up on classroom walls or on a bulletin board. They can be presented on cards or in front of the classroom. For educational special needs or curricular adaptation students, it is very helpful to make rectangular pieces of paper and elaborating an eclipse with them to teach them to move and place concepts on the map that they can put in their notebooks or on colour papers later. Maps can be constructed with removable materials. So we can have different ideas. For example, we could cut out round corners to obtain an oval shape to place all concepts.

We can teach how to make concept maps, create them in teams, and produce them in any size to explain topics we like.

\(^{42}\) ONTORIA: 39.
It is advisable for learners to construct concept maps on their own. Sometimes, they tend to memorize the map by copying but when the map is done by the student, he or she is able to interiorize it to the level the student has constructed it.

The use of concept maps as a synthesis activity must be completed with an explicative summary structured by every student, with his own words, in order to reinforce the information during the open elaboration of the product. It is very important to close didactic units with a synthesis activity or individual summary in writing about the topic to structure and complete the work.

Concept maps can also be used in objective tests in the evaluation of the learning process. For example, an evaluation question could be: ‘Can you elaborate a concept map about...’ It is a question that will provide us with not only the concepts that the student knows about a subject, but how he is able to relate, structure and organize them into a hierarchy. This allows us to assess what students know in an objective and efficient way.

Through the evaluation of objective tests, we can see the level of acquired knowledge and assess learning-teaching processes as well as the decisions to reinforce the next didactic unit and control the educational process. Thus, we can detect those uncontrolled or insufficiently reinforced variables. Through the concept map we can be aware of the less worked or unclear aspects to improve them in the next didactic units.  

**The concept map as a key variable of meaningful learning**

It should be remarked that a product is not meaningful until the concept map has been used. So it is necessary to designate meaning to all those products that have not worked all variables, including the concept map. Indeed, the evaluation of the didactic units will not be positive for the vast majority of learners until they use meaningful concept maps. Evaluation shows the level we manage to control for all the different variables.

Concept maps can be used before starting with the didactic unit to organize the presentation of contents during the learning process to provide the product with new information. Later on, it can be used as a synthesis or evaluation of activities. It is also very useful and practical to teach students to make maps at the beginning of the year so we can use them during the school year. We may bear in mind that if there are that several teachers in the same grade, it is advisable not to use the same resources. Maps are a very powerful tool but they must be presented in different ways. So different ways of presentation must be taken into account.

We can present concept maps with a blackboard or a projector (in this case, we should sit in the back of the classroom to know how learners can see it in order to improve our presentation). We can also present them in a DIN A-3 or DIN A-4 format, copy them in a notebook, reproduce them in products, place them on a wall, etc. Hanging concept maps on the classroom walls is a great way to teach the student how to construct them.

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43 Examples of objective evaluation applicable to different didactic units are shown in the appendix.
If there is a school with several teachers teaching the same grade, it will be necessary to organize the presentation of concept maps. We may ask for advice from the director of the centre because he or she can help us be more organized. For instance, we can produce a double chart with subjects and days to register all those days when maps will be used by teachers in order to avoid making students and teachers bored with using the same maps. They have to be sequenced in time and organized in different ways.

**Structuring and systematizing information**

Students’ elaborated creative products, which are used to create concept maps, must be structured and systematized at the end of this didactic unit. We can ask the student to prepare a properly written summary based on the didactic unit in order to revise, systematize and study it. Using this technique, students check all worked concepts and reinforce memory because they have created connected, linked and structured information. They use memory to review and study the most important and central concepts.

**CmapTools software**

At the Institute for Human and Machine Cognition (IHMC) at the West Florida University Professor Joseph D. Novak and Alberto J. Cañas, jointly with a team of colleagues, are focusing their research on the development of computer tools to construct and share knowledge models based on concept mapping. (NOVAK, CANAS, 2008)\(^\text{44}\)

This excellent software to build concept maps is called CmapTools and it is freely available for computers on the website [http://www.ihmc.us](http://www.ihmc.us) for a non-profit uses. This software allows making concept maps by linking concepts and their linking words. At the same time, every concept should be workable to open a picture, a video recording, a text, complementary concept maps, etc.

Before presenting the software CmapTools to students, teachers must be able to construct concept maps, to place the concept in the ellipse, using linking words with arrows generating ideas in a sensible way. Afterwards, the teacher is able to teach students. Once learners know how to build maps they can construct them with computers, linking concepts and taking into account that colours make the map more aesthetically pleasing.

The use of knowledge models based on Novak’s concept maps with the use of computers and multimedia allows us to use software tools for students’ meaningful learning. The implementation of key variables of meaningful learning in this book can be very helpful to revolutionize education by combining learners’ products with CmapTools.

Possible difficulties

It is necessary to gradually and progressively introduce concept mapping with other didactic resources and not using them in a massive and indiscriminate way. Otherwise, the resource is ‘burnt out’. So a planned and sequenced introduction is needed to avoid falling into that trap.

To conclude, we may say that the concept map is a very powerful tool to obtain meaningful learning but at the same time it is very delicate. We do not have to trust concept maps in textbooks or journals as a model to learn how to make them. We recommend prior training, for instance, “Learning how to learn” by J. D. Novak and D.B. Gowin, “El mapa conceptual y el diagrama UVE” by Fermín M. González and “Los mapas conceptuales, una técnica para aprender” by A. Ontoria, where we are shown how to do them for different ages and levels. Without teachers having prior training, concept maps can become a counterproductive or unsatisfactory instrument for teachers and learners.

In the classroom practice, when students say ‘do we have to do maps again?’, we have to stop and organize them in a way that will keep students interested in.

As stated above, when several teachers work in a school, it is advisable for them to collaborate and have department meetings in order to organize the elaboration of maps to not burn out the resource. They must do throughout the school year, preferably by using through a double entrance chart, organizing the use of computer rooms, distributing activities such as school trips and using audiovisual resources.

Advantages

The advantages of concept mapping are multiple and diverse, among them:

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

**Self-assessment**

With concept mapping, the learning environment improves. Students notice that they are learning so this motivates them. When the classroom environment improves students are happy with their work. Academic performance, as a result of objective tests, also improves with very positive results as a consequence of connecting concepts in concept mapping.

With open working, motivating, environment-related and creative variables, we can have success with the map. With these variables and the application of the concept map, we can affirm students’ meaningful learning. Only curricular adaptations lack positive results in objective evaluations. The teacher takes a stance on coordination and advising. By evaluating the efficiency of the methodology, the teacher connects several products, depending on the curriculum, in order to make the most of the school year and continue with the methodology.

**Vocabulary**

**Concept mapping:** elaboration of mental outlines of learning where concepts with a hierarchical structure are linked. These concepts represent meaningful relationships between concepts in the form of propositions.

**Concept:** word used to create a specific ‘image’ of an object or event.

**Hierarchy:** levels where the most inclusive and general concepts are in the upper part of the map and the most specific and particular in the lowest part.

**Linking words:** words used to link concepts and establish a relationship between them, making a coherent structure.

**For the next module:**

Before starting with the next module, every one of us shall make an open, motivating, environment-related and creative product by using the concept maps.

**References**

BALLESTER, Antoni; BORDOY, M. Antònia; MÉNDEZ, José Manuel (2009) Com fer i com utilitzar els mapes conceptuals. Perspectiva escolar. 331 65-73


**Recommended reading:**


In this book we have the example of a teacher who has mixed learning theory and practice and he avoids all extremes. Concept maps are the best way to learn because they help us explain what we want to say with our own words to establish a hierarchy between concepts (from the most universal to the most specific one) or to see analogies and diversity between similar concepts. Maps technique is quite old and at the same time very new: it began with Aristotle and the systematic ideal of philosophy whose most visible example would be Hegel.
works, structured with a mathematic rigor. González and his American colleagues have deepened in this order and have applied it to learning processes in school. They have also managed to include the practical virtuality of ancient ‘science trees’. Ciríaco Morón Arroyo. Professor at Cornell University (USA).

BALLESTER, Antoni; BORDOY, M. Antònia; MÉNDEZ, José Manuel (2009) Com fer i com utilitzar els mapes conceptuals. Perspectiva escolar. 331 65-73

What are the characteristics of a concept map? What are the elements of concept mapping? What are the strategies in the use of the concept map in practice? This article deals with all of these questions, and the advantages of working with this technique.


This is a complete vision of concept maps which reinforces and completes the information about them. It includes a key work that justifies, argues, provides ideas, clarifies and gives sense to concept mapping with multiple examples. It is a work especially appropriate for high school and university students or anyone interested in maps as a tool for learning and teaching.


This is a masterpiece of Novak’s concept maps and Gowin’s UVE diagrams that presents guidelines to construct concept maps with countless examples in different subjects and educational levels.


Novak’s education theory is broadened and updated in this book where ideas of knowledge, nature, assimilation process, creation and use are extended. The author has also included his experience with the application of his contribution to school and companies training.


This is very helpful work that proposes the general framework for teaching and learning with a great expositive clarity and very practical orientation with activities
and solutions for real problems. It is an ideal textbook to understand psychopedagogical principles of constructivism.

**Websites**

http://cmap.ihmc.us  
and  
http://www.ihmc.us

CmapTools is an excellent software program for constructing concept maps. It was created at the Institute for Human and Machine Cognition (IHMC) of West Florida University and it is freely available online for non-profitable uses. (To check the web you may remember that the first site is written without the “www”).

This software allows us to make concept maps with concepts and their linking words. At the same time, every concept should be workable so as to place or open a picture, a video recording, a text, another complementary concept map related to this concept, etc.

This excellent software is a reality of IT. It is very important to build maps properly and consistently, putting linking words together efficiently. We have a model to revolutionize education by relating meaningful learning.
2.7. MODULE 6: CURRICULAR ADAPTATION

Curricular adaptation

We can define curricular adaptations as ‘the necessary modifications to carry out different elements of the basic curriculum for different situations, groups and people to whom it is applied. So this task meets one of the most outstanding responsibilities of school, teaching teams and teachers’ didactic performance. (GARRIDO, SANTANA, 1994)\(^\text{45}\)

We may say that the student is different and unique, so they have to learn according to their level by efficiently applying open working. If we make teams according to homogeneous characteristics, there will be differences within these groups, including more advanced learners and lower-witted. Consequently, it is more efficient to work with heterogeneous teams to avoid burdening teachers.

Learners not only learn from teachers but also from classmates. Attending to educational special needs students is done by the rest of the class because everyone is working together. Team work facilitates the learning of curricular adaptation students because they learn from each other.

In order to make the class work efficiently, we should use diversity as an advantage and integrate different students into groups in order to have progress, which avoids problems with discipline and improves motivation and educational performance.

Special needs students have specific resources and classes that are catered to meet their special needs. However, it means that they are separated their regular school environment. So this special school could lead to unhappiness and rejection when these students return to regular school, increasing their aggressive behaviour because they feel lonely and frustrated. (GARRIDO, SANTANA, 1994)\(^\text{46}\)

Educational special needs children need to be taught positive social skills and behaviour standards to become integrated. This social integration is more important than school integration even though we do not have to set it aside.

These social standards make schooling and integration in a common classroom preferable most of the time. However, sometimes it is necessary to have special needs students in regular classrooms and with special needs teachers who have the proper resources. If the case is detected by teachers or psychologists, individual attention may be needed when the student cannot participate and is disruptive. This is especially advisable in cases of severely retarded children.

For educational special needs students, it is very important to develop their social skills so they can learn to live with others. In this sense, the social


\(^{46}\) GARRIDO y SANTANA.: 41
function of students working in teams is very important. Thus, meaningful learning in practice is the ideal framework for students that need to adapt to the curriculum.

Through experiments, it has been shown that development and learning are better fulfilled if the integrated student is in a more advanced group rather than with a similar or lower level group. Homogeneous teams, result from having groups in which each member has the same learning level. Keeping advanced, intermediate and lower-witted students in groups of their level does not work out and problems increase without a coordinated action and special teachers. We all know that by making groups of students with a particular characteristic, this characteristic amplifies so homogeneous groups usually create more problems.

Students are different so to avoid difficulties, it is important to work with diversity because trying to make a homogeneous, uniform and balanced group increases conflicts and problems for teachers and for the classroom.

In conclusion, we may say that pretending to homogenize diversity does create more problems. By using open working, diversity is well treated. More advanced and lower-witted students are able to work at their own level.

If we produce a report about pollution and environmental issues in a classroom, we can assign fifteen or twenty pages for the students to elaborate the work. However, we can also encourage advanced students to make the task longer. So it is possible, the length can be forty pages or even more. We can help curricular adaptation students to do the same by focusing their task on producing five or six pages.

Using the creativity variable can be very useful in these cases since we can make the summaries easier by reducing or expanding them. For example, cutting the paper in half for special needs or undisciplined students is more doable for them.

It is important to pair students from other nationalities or cultures with advanced students who know the language very well and are close to teachers in the class. We may pair them off with advanced, extroverted and bilingual learners, that is, they have to know the foreign students’ mother tongue very well in addition to properly speaking the language at school. Foreign students should be able to communicate with other students with more knowledge of the language. For these groups to be beneficial, we have to change pairs during the school year. Curricular adaptation can be based on grouping but it is not enough.

In kindergarten and primary school, children who speak a different language speed up their learning process through immersion and rapidly learn the new language from their classmates and their environment. The teachers’ assistance can also help the student. Primary school children learn new languages easier because of their receptiveness and open linguistic possibilities.

In secondary school, specific and intense lessons of language and culture are needed in order for students to integrate themselves better into regular classrooms.
Having educational special needs students fosters values such as companionship, solidarity and assistance.

In a primary school class with five year-old children, a bright girl tells her mother that she is going to pick a flower from the garden as a gift for a blind boy so he can smell and touch it.

This is a very good example to see the importance of learning between equals. The little girl was kind and gave the blind boy with special needs the flower to signify friendship. For the blind boy, this gift is a source of learning because it is a resource that fosters his senses.

Real integration means having in the same classroom students with same learning difficulties in a classroom. This should be an advantage and not an obstacle for the rest of the class. In order to get positive results, it is necessary to have psychopedagogical supports and to lead teachers into the right direction.

Social skills and socialization of curricular adaptation students

Social skills are social behaviours which the student develops in order to respond to specific situations and to establish appropriate and positive relationships with other people. Social adaptation has benefits for students and social skills are very important for their integration in society.

Social skills are directly related to students’ adaptation and make cooperative and team work easier. Lessons that combine both individual work and team work are less competitive and more supportive. So the elaboration of meaningful products in pairs and teams help students get to know each other, work for a common goal, learn from the others and foster social skills.

Supports or intensive lessons are more appropriate for those activities concerned with specific works, whereas open activities with teams that are more social (such as school trips) are especially focused on special need students. We do not have to waste time in teaching support due to the importance of social and adaptation skills for students.

Educational special needs or curricular adaptation students must be seated near the teacher’s desk and close to advanced students. Advanced learners will change throughout the school year to benefit both groups. Both advanced and lower-level students will change their position to work with other types of students, which will help and facilitate learning with different people, contributing to students’ integration and abilities to work with others.

At the end of the school year after students have been changing their positions, they see team work as a very positive because they have been able to know their classmates better.

In the case of having many students with special needs in the same classroom, discipline-derived problems or problems understanding the language, we may foresee difficulties by placing them in other classrooms, using school transports or any other solutions which demonstrate their efficiency due to their integrating characteristics. The department of education should provide solutions to certain situations that hinder classroom work as well
as have teachers facilitate work by having heterogeneous groups do open work and allocate students into different places to avoid the concentration of difficulties in the same class. Departments of education shall not place all students with difficulties but in the same educational centres and respect heterogeneity and take advantage of it.

Most of the time, grouping students by their characteristics of conflict or special needs is a contradiction to heterogeneity by pretending to have groups that do not provide any response to neither educational needs nor to students’ progress. These groups can work sometimes if certain pedagogical or special situations take place. This could be a reduction in the number of students in a classroom, reduction of subjects, a coordinated performance with experts and with a common pedagogical and consensual line.

It is important to integrate and not separate since integration reduces work. On the other hand, dividing people or with different problems provokes a huge effort and difficulties or problems increase. Homogeneous processes within the classroom, such as keeping the same levels together or rewarding only advanced students can cause a lot of problems.

Students’ socialization and integration is very important for educational special needs learners. So team work with other classmates seeking a common goal is essential. Apart from the influence of equals favourable to achievement and solving problems, there is an advantage of team work. So we believe that it is the most important field of work for future education, even more than new technologies.

**Educational special needs students**

Before starting to work with educational special needs students, it is necessary to be informed about their academic activities and characteristics. We can ask for advice from experts on therapeutic pedagogy or special education since they have all the information about specific characteristics of mostly those students with psychopedagogical reports.

It is also necessary to ask for their reports and their student records to have more information before beginning lessons because they will provide us with individualized information and we can avoid many problems.

It is also possible to have students with learning disabilities but no psychopedagogical reports. These reports should be required if teachers or course tutors want them because they know the students well. As far as students with diagnosed or non-diagnosed learning disabilities are concerned, we may take into account curricular adaptation in the classroom and avoid discipline-derived problems that can hinder learning for the rest of students.

**Curricular adaptation in practice**

Curricular adaptation in practice can be done easily using materials prepared for the rest of the class. However, for students with learning disabilities or educational special needs, if we do there could be a decrease in motivation and increase in learning difficulties. We should guarantee these
kinds of students the easiest and most important parts; otherwise we can make them feel frustrated.

In the classroom, we can use several strategies for educational special needs students. These strategies do not have to overwhelm students and teachers with work. For instance, in a didactic unit, which we use in the first chapter of the textbook with special needs students, we start working on the title and students must know the subject we are working on and what it means.

We can also use the first two paragraphs of the sections where the introductory concepts are and use different strategies such as enlarging a copy of basic texts so we can easily have an adapted text. Students can work on the main topic of learning and at the same time we can guarantee that special needs students learn the main concepts of basic texts. We do not give special students a special text but the same text all students work on so special needs students can have all basic and core concepts.

As we have seen above, we can use the same materials for all the class by using just one part. For instance, we could use a map of Europe and cut the Mediterranean part which would facilitate Spanish students’ knowledge of these countries. We can focus their attention on the Mediterranean countries by covering the rest of the countries with a sheet of paper. Once they know all Mediterranean countries, we can add more difficult and complex ones.

It is also very helpful to use teachers’ didactic exhibition for all the classes in which students remember the first minutes of introductory and basic concepts. Later on they become the most important for curricular adaptation learners so it is necessary to repeat and reinforce key concepts. We consider these key concepts basic and central. From now on, they can be used by the rest of students. If they are able to find other concepts, it is not good to limit them. They can also work with these concepts. However, our teaching task consists of focusing on and teaching basic and central concepts.

For curricular adaptation students and those with discipline-derived problems, it is efficient to carry out a work between teachers and learners in order to have a meaningful product. To study agriculture and ranching we can propose the elaboration of a report about plants and domestic animals. Teachers can lend an encyclopedia or bring pictures or copies that can be used for the elaboration of the product. These works made by pairs or teams of teachers and curricular adaptation students are strengthened due to adults’ approval because it is very easy to foster and motivate students to work. We can correct their mistakes and help them overcome difficulties.

Works in which teachers and students can bring materials and make teams to elaborate meaningful products have an exceptional advantage. By doing this work, teachers can check out students’ skills and activities as well as their educational potential, increasing their satisfaction for teaching since they see the results.

María Jesús Castro, an advisor of our research on meaningful learning, told us that a father, a mother or the guardian should not leave a day without sharing a meaningful moment with their kid. This is supposed to be a curricular adaptation in the class and a moment of positive attention for these children in every school session with teachers.
An efficient curricular adaptation is the one that takes place in the classroom, little by little, throughout the school year with children, because all having many sessions with a teacher for many years result in very good results.

In a third year class of secondary school, a student expelled from another school due to his aggressiveness said to me ‘Tell me one reason why I should behave with you if I have always been bad to teachers’. In that moment, I remembered what María Jesús Castro once taught me when we discussed attitudes and behaviour in educational centres. She said that the most important thing was that these kinds of students knew that I was not taking them into account. I told this student ‘There is one reason why you should be good to me. The most important thing for me is not ‘me’ but you and you have to be good because I care about you’. The student answered ‘I agree. You touched my heart so I am going to behave’.

Conflict situations can be solved in an educated and efficient way by following the right direction. Students who provoke severe discipline problems need curricular adaptation which includes conversation and consensus through tutorials and positive reconduction towards educational activities using educated dialogue. In many cases, these learners have to check that they are able to do an efficient school production where they feel valued and show they can reach their goals.

We can prepare texts with students and use materials from textbooks, the Internet and printed materials such as magazines and newspapers. Given the difficulty of keeping and transporting all the material that some curricular adaptation students have, it is effective and useful for the teacher to keep it until they get in the habit of taking care of their materials. By keeping the material, the teacher is responsible and shows students to appreciate his or her task to facilitate students’ commitment in the creation of meaningful products.

In primary education, for instance, from curricular competence of the student in a didactic unit about animals, we can teach basic concepts, (i.e.: what types of animals they are: mammals, birds, reptiles, amphibians or fish), which we spend time on with curricular adaptation or special needs students. Depending on the case, we may not force the most complex concepts because students can become frustrated with complex teaching. This does not mean that we do not have to establish a high goal to foster and motivate students.

For curricular adaptation students, it is beneficial to give them the chance to see if they are able to learn more complex concepts. So we must leave the door open to this sort of learning. Our work is focused on meaningful and connected learning of basic and central concepts with which the student will be able to link new information when he or she finds concepts throughout or after the didactic unit.

In practice we may give the title and basic concept of the didactic unit to curricular adaptation students. However, the distance between these students and the rest of the class makes individual aid even more necessary. Activities such as individual filing of books, additional notebooks or computers can be very helpful in these cases. This can happen in a didactic unit about geology or complex mathematical operations where we should adapt the curriculum and work with the concept of rocks or minerals or with division and multiplication rather than equations.

It should be remarked that we may leave the door open to these different ways of teaching. Special needs students have the same interests and motivations as learners of the same age. So it is very important to relate what they have learned to the environment. For
instance, a Down syndrome girl told us that she really liked the Spanish band ‘La Oreja de Van Gogh’. We asked her if she knew who Van Gogh was. We told her that he was a painter who cut his own ear off which is why the band has this name. The teacher looked for it on the Internet and we could show the student all his paintings, biography, etc. We fostered her learning by discussing something that she was interested in. One year later, when she was no longer a student, we asked her if she knew who Van Gogh was and the answer was that his name was Vincent and he was a painter. She also remembered his paintings and that he cut off his ear.

Motivation is what makes students active so it is a driving force in learning. By using attractive materials and looking after the presentation of products with formal guidelines we are developing habits and potential and educational attitudes that foster self-esteem.

It is important to have a relaxed atmosphere in the class so the teacher can be relaxed in order to aid curricular adaptation students. Meaningful learning in practice through monitoring learning variables helps teachers to spend time with curricular adaptation students because the rest of the class is busy working on meaningful products.

Glue, scissors, colour pens and pencils, apart from other attractive materials, are very common in the classroom so we can consider them motivating and attractive resources that facilitate the use of materials and learning. Special needs students frequently have the same interests and motivations as the rest of the students so it is important to use these motivations, connect concepts and stimulate learning.

By providing special needs students with motivating material, we are facilitating teaching tasks because school activities are carried out with interest and we can say that motivation through material fosters positive outcomes.

We have both special needs students and advanced learners. Thus, advanced learners’ curricular adaptation consists mostly of open learning and independent research. The basic concepts of advanced students are to develop strategies of free working so they can learn on their own which increases motivation.

Curricular adaptation is also possible with advanced learners. They can be encouraged and stimulated to do additional work that is being done by the rest of the class. They can carry out an outstanding task such as writing an article for a magazine or local newspaper, or preparing a conference about that issue.

Advanced learners make teachers’ tasks easier when they work on the same topic as the rest of the class. If we show them books or materials with a higher level, we will obtain very good results because their capacity to get information is greater.

Depending on the characteristics of the activity, it can be prepared individually or in pairs. It is also very important to have adults’ approval, and positive reinforcement in order to reach the goal. Integrating strategies work out and avoid problems for teachers. Without this integration, higher levels of disputes, poor self-esteem and discipline-derived problems can arise.
It is very common for those students who do not work very much in class to make an effort when they are encouraged by teachers when they have managed to do well. We are using adults' approval as a motivation to learn. Excellent results are obtained with curricular adaptation.

**Curricular adaptations as a key variable of meaningful learning.**

Open, motivating, environment-related and creative work jointly with the use of concept maps and diversified resources within a working-team class facilitates curricular adaptation because teachers have a lot of time and are relieved from control. Consequently, he or she is able to help special needs students.

By tending to the characteristics and difficulties of students with special needs, we meet the turn of our work in a clear way and based on psychopedagogical research, we can make the daily life of students easier.  

According to Jesús Garrido and Rafael Santana, the most useful compensating abilities in permanent special needs students consist of realizing that blind people's eyes are in their hands, deaf people's hearing in their eyes, the mobility of the paralyzed is in their mind and the intelligence of mentally handicapped people is in their behaviour. (GARRIDO, SANTANA, 1994)

Good results are obtained with special need students by providing them with attractive, motivating and manipulative materials and putting motivation variables and creativity into practice.

It is also necessary to make easy and efficient use of curricular adaptation in ways such as making questions, guaranteeing the first levels of concept mapping hierarchy and being close to the teacher or to advanced learners. We should stimulate and clarify those aspects to what they have to pay more attention to because they need to focus all their efforts and attention on the most relevant.

Putting meaningful learning into practice through implementing key variables in the class makes cooperation in teamwork develop meaningful products easier. Learning fosters interaction among students and allows teachers to have time to help special needs students. Thus, meaningful learning in practice makes teachers' work easier and promotes curricular adaptation in the classroom.

In curricular adaptation, it is also very important to ask what they know about the topic they have to do before starting it, what their previous experience was and when and how they heard about a certain aspect. Basically, they have to connect it with the environment.

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47 There are many edited referentes about educational special needs students in the above mentioned work “Adaptaciones curriculares” by Jesús Garrido and Rafael Santana. We can find there several references and easy readings for kindergarten, primary and secondary school which can be very useful to work with curricular adaptation students. We will have a theoretical and efficient support for daily works.

48 GARRIDO y SANTANA.: 152.
Many special needs students can benefit from meaningful learning. According to Miguel López Melero’s research on Down syndrome patients, the acquisition of information and its processing, providing spontaneous answers and being able to control their own learning can be very difficult for these people. However, everything is modifiable. Indeed, meaningful experience development and the maturational process increase. According to this author, meaningful experiences can change and improve synaptic structures for those with Down syndrome, whereas environments deprived of meaningful experiences can reduce this kind of structure. (LÓPEZ, 1999)\(^{49}\)

**Concept mapping**

Concept mapping is a paramount tool in meaningful learning and it is necessary to guarantee the first levels of concept maps hierarchy to special needs students or those with difficulties in learning.

The first levels of concept maps hierarchy are very useful to guarantee meaningful learning when taught slower or with curricular adaptation because we can find basic and central concepts of the didactic unit or thematic block. We may guarantee learning for students who have difficulties in learning by attracting their attention and interacting with them in the creation of basic concepts of concept mapping.

One of the key ideas of meaningful learning is to link previous ideas with new information in a structured and coherent way. Through curricular adaptation students can learn the most complex parts but we have to ensure that they learn the most basic ones, which means we may not limit them. They can learn the most complex parts if they manage to do so but we may check that they learn the most basic and central part in a linked and connected way. Thus, it will be easier to connect and understand new learning material.

According to meaningful learning theory, it is very important to knowing the situation before starting with the learning program. By being familiar with curricular adaptation students’ characteristics, it will be easier to start from what the student already knows and use it to connect and link new ideas.

Special needs students get easily accustomed to the use of concept maps. There we can find key concepts in an organized and clear way. These maps make learning easier, starting from the simplest concepts and using examples from students’ daily life, their environment and connecting them to their activities.

Solidarity, sincerity, companionship, positive attitudes, values and rules necessary for coexistence are increased by facilitating and fostering special needs students’ integration and using it as an educational activity from which we all can benefit.

In a united and supportive class, work will be easier than in an individualistic group. We can increase group cohesion by doing activities outside the school, such as school trips, which improve contact with teachers and communication amongst the kids. Coexistence in the classroom is also improved.

**Set of materials**

For curricular adaptations, it is very useful to prepare in advance a file with all materials to be used by each grade. We may open a file and gather all kind of materials in order to use them in curricular adaptations. After putting all materials together, we can open the file and use them in different situations. Advanced learners can use material for students in higher grades whereas lower-level students can use materials from previous years.

The file or set of materials is formed by very different materials: textbooks, notebooks, holiday books, etc that are prepared to be used every year. It is not feasible for teachers to prepare individualized work because a lot of time is needed. However, it is possible to prepare a file of materials for curricular adaptation students based on textbooks provided by publishing houses, schools, or students themselves who do not use them anymore.

The set of materials can be formed by all kinds of didactic materials such as newspapers articles, pictures, drawings and magazines. We may collect different didactic resources that can be used by both special needs students and the rest of students in the class.

Once this set of materials has been systematized, it will improve work in consecutive years and it will help kids with special needs to have individual work. Difficulties will be avoided because we have been anticipated them.

We may choose the most motivating and useful materials with the aim of gathering all materials for these students. We can exchange files with other teachers of other grades to have more material.

Concept maps from previous years are especially helpful for the work in the classroom. We may advise students from previous years and those who pass from primary to secondary school to keep books in order to use them in the future. Thus, we can prepare an additional file of didactic units or parts of textbooks in an organized and integrated way within the new didactic units of the new school year. The first months of the school year are the most appropriate to prepare the set of materials. We may open a file and fill it with useful materials.

Putting together materials avoids stress in teachers because they have very appropriate material which will help decrease difficulties in daily life. So, we have materials that can be used throughout the school year and every year in the future.
The computer

Computers have shown to be highly useful for special needs students because many software programs for different ages and educational levels have been developed to be used in the class. We can find on the Internet and on CD-ROM free software that contains interactive material from different fields such as music, English or maths. Nowadays, the capacity of these software programs and prices imply that they are an investment that can be later redeemed because they can be used several times as a lasting material. This software includes basic reading and writing operations and advanced searching of the Internet, which can facilitate advanced learners widening of contents.

Software resources and materials are abundant and they have been successfully used by special needs students or by students with very severe social problems. This kind of software offers potential possibilities to improve social skills. The computer allows special needs students to be busy with an educative, motivating and monitoring work on the computer. They can also efficiently complete didactic units with the aid of teachers.

Before working with the computer in the classroom, we may establish some rules and how usage will be distributed so all students can use it in an organized way. Teachers’ responsibility will be defined as well as students’ when it comes to the computer: Who will be responsible for its running? When? Who is going to use it and what will the objective be by using of the computer?

The computer is a useful tool to work with educational special needs students. Books and magazines, which are usually included in book collections for young people in school libraries, are adaptable materials for special needs students because it illustrates and makes learning easier. These collections are so attractive and motivating as well as magazines that include high quality pictures to foster learning.

Newspaper kiosks and book shops are the best allies for teachers to work with special needs students because, although they do not produce school material, they produce lasting additional materials that are very appropriate for learning illustration and are also very cheap. These can be part of the set of materials for special needs students.

Specialized references and psychopedagogical reports

Specialized references can help us see what we should do in order to work with educational special needs students. We can be provided with information about these kids’ specific characteristics and where educational activity should be addressed.

In our third year class in secondary school, we had a girl with Down syndrome. At the beginning of the school year, we did not know which direction we should to take with Down syndrome students and what to teach them. We looked for a specialized book about the subject which was very useful to work with this girl.
We found Miguel López Melero’s book “Aprendiendo a conocer a las personas con síndrome de Down”:

‘They can be cognitive, linguistic, social and culturally competent as long as we manage to have the opportunity to humanize them with real coexistence’ (LÓPEZ, Miguel. 24)

‘Down syndrome people’s main difficulty in memory lies in the lack of spontaneous use of strategies to organize and remember material. We always sought to make them understand before memorizing, based on visual and auditory information... (LÓPEZ, Miguel, 69)

‘We noted that those with Down syndrome withheld (with no difficulty) the name of football and basketball players, TV shows or the latest hits and they poorly withheld with great difficulties academic contents. We thought that taking advantage of their interests and as we pretended to develop memory skills, we could start to develop these close experiences as a way to organize learning. For example, working with children through the memory of a serial of daily life outside of home, at home or at school’ (LÓPEZ, Miguel. 70)

Of course! La Oreja de Van Gogh! This helped us to teach the girl with Down syndrome countless academic contents. With regard to Greek history, we based our teaching on her experiences (her grandmother went to vote) so this student easily learned that Greece was a country and about democracy. After some years, she was able to remember all those concepts.

‘Meaningful experiences can indeed modify and improve synaptic structures, whereas environments deprived of meaningful experiences can reduce this kind of structure’ (LÓPEZ, Miguel. 30-31)

‘It is very important that the person with Down syndrome manages to find a way of organizing work and monitor the strategies that have been used to help them to solve real problems. This is quite important because he or she could understand and generalize what they have learnt in a new situation or circumstance. We should not forget that all this learning must be carried out through games or meaningful and interesting activities which will awaken the interest to learn, talk, exist, etc’. (LÓPEZ, Miguel. 68)

Psychopedagogical and student reports are useful to add information about specific characteristics which may complement specialized references.

The school secretary has all student reports. They are sources that can provide us with information about students’ characteristics at the time the report was done and they are excellent materials about individual characteristics.

At the beginning of the school year and before starting lessons, it is important to know if there are special needs students which can be helpful to avoid possible troubles. Asking for advice is very important.

In order to develop the school year efficiently, it is also important to start off well with special needs students. Specialized references are very helpful for those students.

By organizing the work through an agenda, we obtained very good results with Juan, a student with ADHD (Attention Deficit Hyperactivity Disorder), because it is very difficult for these learners to plan prior to acting. We do short activities which allow him to start and finish. We might not give several tasks at the same time, but rather one after the other. These students should be seated near the teacher and close to a student who is a positive model and move the ADHD student at least three times all throughout the school year.

Because of laws, Juan can move around the class and he is responsible for opening and closing windows, handing out sheets of paper, looking for material, etc. We permit his

50 LÓPEZ: 24, 69, 70, 30-31, 68.
mobility which is very helpful for these students. See STILL (2007) Guia pràctica de recomanacions d’actuació per als centres educatius en els cursos d’alumnes amb TDAH: Associació STILL. En http://weib.caib.es/Recursos/tdah/GUIA_PRACTICA_TDAH.pdf

Therapeutic pedagogy teachers give advice to teachers with these kinds of students in their classes with some practical strategies to carry out.

**School organization and curricular adaptations**

Good organization in a school is necessary to give the most attention to special needs students. Thus, we may define time and spaces to be used because to ensure the efficient organization of measures such as individual support lessons which must be very well organized because they make us to have an intermittent follow-up of lessons.

It should be noted that therapeutic pedagogy teachers might be needed in certain moments when individualized attention is needed. Due to diversity amongst special needs students, we do not think they can be generalized so acting will depend on each case. We also do not believe that intermittent attention outside the class is efficient because students spend time in the classroom because they do not have individualized attention without a clear objective.

Individual working with special needs students is often inefficient if it is intermittent since it interferes in the continuity of the regular classroom. If they use their group schedule, it usually happens that one session is used to work individually with an expert, the second one in the regular class whereas the third is not useful because students may not attend lessons, creating an intermittent situation which hinders teachers and students task in the follow-up of classroom activities.

It is neither feasible nor efficient to expect that the teacher make three different groups, one advanced, one intermediate and a lower-witted group working at different levels in the same class. It is not feasible because the teacher is overloaded and splits the attention into different groups. Hardly does the teacher manage to pay attention to more than one group in a proper manner because efficiency in learning can be lost. Working on three different subjects at the same time is neither possible nor realistic.

In order to avoid troubles afterwards, we can propose an efficient, well-structured and systematized organization of schedules and timetables. The most efficient thing is the collaboration of teams with teachers where files and resources must be gathered to work, for instance, with a set of materials to help these students not only in the sense of providing responses to possible discipline resulting problems, but also they have to learn while they are in the classroom.

Teachers need additional material to work with special needs students. Textbooks from previous years are more adapted to curricular competence. However, we may take into account that many daily life and environment materials can illustrate didactic units such as an advertisement, a letter, a newspaper, a magazine, etc.
The set of materials based on files and resources for curricular adaptation is an efficient way of avoiding possible problems with special needs students. It is feasible to gather in a couple of hours a great amount of usable material in a dossier to be later used in curricular adaptations. It would be great to have the collaboration of several teachers with the same goal to use all the material afterwards.

This task will allow us to have a set of material which will cover any unforeseen event or need in the class. Students will always be busy with learning activities, which would be more difficult if the material was not previously collected and it is used depending on the moment.

Regardless, in curricular adaptation, we may mostly use the same material for all the class and give the easiest parts to students with learning difficulties and give the additional material and activities to more advanced learners.

In a second grade class in primary school, children are beginning to learn the first musical notes. There is one girl attending music lessons outside the school. She has been attending musical classes for several years and she plays also the violin. In order to foster her work, she is asked to bring the violin and play some melodies in front of the class. Thus, the teacher contributes by valuing her effort in learning and showing children how to appreciate music by encouraging the kids to play an instrument. Sometimes this girl explains some basic concepts of musical language to the other kids with learning difficulties. This also reinforces her learning.

With talented students in the class it is very efficient to openly encourage and foster some curriculum areas where their interests and skills are developed. We may increase their motivations for knowledge implementation by helping them to look for new information about key topics by using their activities from didactic units’ basis but encouraging them to work individually.

It is important not to limit advanced learners when it comes to their concerns and comments on new learning concepts, even though they do not belong to the didactic unit in which we previously thought. Talented or highly-gifted students must be encouraged to show their concerns, and we may encourage them to add information to the aspects they discuss or ask about.

In the third grade of primary school the teacher frequently uses the Internet both for advanced and special needs students in order to easily get information to use in the elaboration of school products from easy texts in English to additional materials on minerals, animals, etc. The teacher provides these learners with useful texts and pictures to make learning easier.

Provided that a talented student shows his interest for world countries and capitals, we can give him a proficient atlas where he can look for the most important cities’ names and their locations. Sometimes, even though they are very young, they do not have problems recognizing and identifying countries, places and cities. We can add some information about rivers or mountain chains, and we can even learn new concepts through the atlas. Working with talented or highly-gifted learners is a great opportunity for teachers to learn with them. They just have to encourage them to learn and broaden in the concepts they like to foster independent learning.

It should be highlighted that the importance of adaptation does not lie in the fact of reflecting it on paper or through a report, but the strategy to be carried out in the classroom, that is, putting adaptation into practice, being
aware of the way we should follow because if it is appropriate, outcomes will appear sooner or later.

**Self-assessment**

Positive school achievement can be seen in the objectives tests once curricular adaptation has been carried out. Teachers manage a high academic achievement with less effort. Curricular adaptation students are integrated in the class. Integration is not a special situation, but is necessary for students to have so they respect each other and help. The teacher links several meaningful products depending on the curriculum to be used with small changes for the next school year.

The atmosphere in the class is positive, and discipline resulting problems have been avoided because we have foreseen them. The teacher immediately picks the fruits of his labour and he is more relaxed and satisfied. Both teachers and students have adapted the methodology. School achievement improves. Learning is meaningful for all the class.

**Vocabulary**

**Curricular adaptation:** consists of the necessary modifications to be done in the basic curriculum to adapt it to situations, groups and people.

**Special needs:** students with special needs because they have difficulties learning, there are many levels of this that can range from severe to mild.

**References**


LÓPEZ MELERO, Miguel (1999) *Aprendiendo a conocer a las personas con síndrome de Down.* Málaga: Aljibe. 182.

**Recommended reading**


This guide is addressed to all teachers who will find high-level students for the very first time in their classes. It acts as an aid for teachers, giving an example of characteristics, interventions and problems these kids may have.


A textbook about practical and very clarifying curricular adaptations aimed at working in the classroom. It includes suggestions on applicable adaptations to all students. It is very helpful not only for primary education but also for other educational levels.


It is an outlook on the concept of diversity and provides proposals to organize the work in the classroom with practical examples and additional activities. We can find an introduction about diversity in the classroom as well as all organized decisions for curricular adaptations thanks to a rigorous approach.


This practical guide is based on the recommendation of the scientific community with regard to the importance of adapting the methodological system to ADHD students’ needs for their development and learning.

**Websites:**

http://www.tdahcatalunya.org

**TDAH Catalunya** is a private and non-profit association of people affected by ADHD and associated disorders. It includes very useful ideas and resources for families and teachers.
2.8. MODULE 7: CONCLUSIONS

This methodology consists of applying every meaningful learning variable step by step, not all at once but focusing on each variable in order to improve them. Once the methodology has been refined, we may use it day by day and prepare didactic materials like this.

By applying the first variable, the classroom atmosphere improves noticeably. However, the students do not consistently learn. In order for students to learn, concept mapping is needed. Therefore, it is important to implement the first variables in order to have success with concept maps later on.

When putting meaningful learning into practice, there are two parts. The first includes the first variables: open working, motivation, environment and creativity. The second one consists of applying to the first part concept mapping and curricular adaptation. In order to be successful with the second part, the first part must be carried out. Although the first manages to improve classroom atmosphere, reduce conflicts and difficulties for teachers, the second improves students’ academic achievement making the first variable even better.

Once we become familiar with this methodology, we will be even more efficient in preparing a meaningful didactic unit. First, we are going to select a curriculum topic so that it will be easier to think about the product to be done with students based on didactic support or resources that comply with the applied variables. We will easily manage to make a concept map for the didactic unit and curricular adaptation will be easy to apply.

There is a certain consensus on active systems being very appropriate for school work. However, they can only be done under specific conditions since teachers are often overloaded with work. By systematizing and practising what is really important to teach, classroom atmosphere and motivation will improve and students’ will achieve more with less effort, without teachers being overburdened because we will anticipate any problem.

It is also believed that active working needs a lot of time to be carried out, leaving too little time to cover all topics. By systematizing active work meaningfully and putting all topics directly related together and creating broad thematic blocks, we will have more time and we will broaden every topic improving learning quality. For instance, in social science class, in the second grade of primary school, we could manage to join in one thematic block ‘Family and Housing’ which are separate topics, and ‘Village and City’, etc. In third year of secondary school, we can join the topic about higher-income and lower-income countries and broaden the topic on the North-South relationship. And the last two years of secondary school, we can see ‘vegetation, fauna and natural landscapes’ in the same block as well.

Regardless of this methodology, the textbook is not the only resource but an additional one to teach and learn. Nowadays, the textbook is the only resource which easily provides each student with edited and press material. It
includes all subjects the student must learn all throughout the school year. We consider it very useful to have a textbook.

It should be mentioned that we do not have the idea to teach just with videotapes. Therefore it is also logical to think that it is not appropriate to teach just with the textbook. Having a textbook for students is important; however, we also believe that textbooks should be improved to facilitate teaching and learning.

The advantages of the textbook are basically that we can resort to them throughout the school year because they include summaries and illustrate synthesis on curricular themes.

We can avoid the teacher being overburdened with work by monitoring meaningful learning variables in the classroom, because the work the teacher does to put the methodology into practice is redeemed from the very first day. School becomes more attractive to students, which means that they do not have to put as much of an effort to study. Once products have been carried out, it is very important for students to write a summary on what they learned in order to study and strengthen their review because revising concepts and making a synthesis help structure the information.

By practising the utility of meaningful learning variables application, we have a noticeable change in students work as a result of better attitudes toward the involvement of students in school tasks. This creates more motivation for learning. Students learn and educational quality improves. We obtained very good results by placing students’ work at the school entrance and hallway because it encourages them to continue with their educational activity.

This methodology must be applied daily and didactic units must be carried out in this way due to all the advantages offered, following the curriculum as a guideline to be applied.

The satisfaction of teachers as a result of the implementation of this methodology becomes evident because the teacher can see their success because the students have a good behaviour, an increase in motivation and interest, and improvement in their learning. Besides, it is also important for the students since they are satisfied with the work done in class and they are highly motivated and very pleased to have done it. The problem with absentees is diminished because they are more interested and they feel that they are useful and should come to school.

We suggest reading every module twice before putting it into practice in order to get details and aspects that we may have ignored at first.

It will be very helpful to revise, check and read the modules twice to gather more information and be more efficient when applying the methodology. We may also check websites and all recommended references.

We may find it hard to apply the first variable of open working at the beginning but it is worth it because work becomes easier afterwards. We encourage teachers to make the first move. This initial effort is rewarding from
the very first day. Besides, each product is part of our personal practice which can be used the following year.

We believe that the logical review we may have by using a different methodology is dissolved when the objective results and multiple advantages are evident. Thus, it is very usual for the first difficulties to become an interest and an application of short and middle-term methodology.

At the beginning it is a little bit difficult because it disrupts routine. However, the results are evident later on and both teachers and students take advantage of it.

With regard to the curriculum, we can control variables that we may take into account to elaborate products. Besides, we can also prepare a meaningful concept map which links concepts in order to have meaningful didactic units.

The value of the methodology lies with the fact that it has to impact all students and make heterogeneity easier, thus avoid teachers becoming overburdened.

It is important to carry out products according to the curriculum in order to choose the topics to be worked, applying variables and making products. Thus, the application of teaching must make sense and be useful.

This methodology consists of working in a different way, with better results and more efficiency. At the same time, difficulties in teaching must be reduced.

We are very pleased that this work comes from teachers, as it is for teachers and we hope they should perceive it as useful and practical. We encourage you to spread meaningful learning and we are convinced that sooner or later you will have the opportunity to encourage people too.

Websites

These are the websites where the e-book is available in English, Spanish and Catalan:
www.meaningfullearning.eu
www.aprendizajesignificativo.com
www.aprenentatgesignificatiu.com

D.P. Ausubel’s meaningful learning described by J.D. Novak and in which constructivist theory is based has been put into practice in the classroom through A. Ballester’s research. Its practical application in different areas and educational levels has been carried out from the meaningful learning seminar at Institut de Ciències de l’Educació de la Universitat de les Illes Balears with a team of teachers.
In order to carry out a good teaching practice, it is important to have a good theory. Ausubel’s meaningful learning described by Novak is the best explanation to understand knowledge and how it is learnt. These websites were thought to have all relevant information about meaningful learning with the aim of facilitating the spread of effective educational improvement.

They are non-profit websites to spread meaningful learning. At these sites, we can find software, web pages, references, video or examples of practices to make teaching easier.
At the website of Institut de Ciències de l'Educació de la Universidad de las Islas Baleares in Palma de Mallorca (Spain) where the seminar has been held http://www.uib.es/ICE, more information can be found about the meaningful learning seminar.

Jointly with this work, we also launched the meaningful learning in practice website http://www.antoniballester.com where all information about the seminar and practices, research, articles, as well as meaningful learning in practice are included.

Videos

You can watch the following video: “Experts in meaningful learning and concept maps” at www.meaningfullearning.eu “L’aprenentatge significatiu a l’aula” at www.aprenentatgessignificatiu.com ;and “Expertos en aprendizaje significativo y mapas conceptuales” at www.aprendizajesignificativo.com

Audio CD

In the freely available CD “Cómo educar, cómo enseñar, cómo aprender”, several international experts talk about how to educate, teach and learn. The topics are: educating children and teenagers, meaningful learning in practice, creativity, concept mapping and CmapTools software. It can be downloaded from: http://www.aprenentatgessignificatiu.com

Practice CD

The technical team of Centros de Atención Preferente. Dirección General de Promoción Educativa. Consejería de Educación, Cultura y Deportes del Gobierno de Canarias has put this e-book into practice in educational centres and with thousands of students with noticeable results.

See: ALONSO MARTÍN, Maria del Cristo, ORIA DÍAZ, Candelaria, SAGASETA DE ILURDOZ, Elisa, REYES HERNÁNDEZ, Javier y Docentes participantes en el Seminario de aprendizaje significativo de las Islas Canarias. Dirección General de Promoción educativa. Gobierno de Canarias. CD de prácticas http://www.aprendizajesignificativo.es
3. ‘MEANINGFUL LEARNING IN PRACTICE’ APPLICATION OUTCOMES. TEACHERS’ ASSESSMENT AND STUDENTS’ OPINION.
3. ‘MEANINGFUL LEARNING IN PRACTICE’ FREE E-BOOK APPLICATION OUTCOMES. TEACHERS’ ASSESSMENT AND STUDENTS’ OPINION.

3.1. INTERVIEW TO PRINCIPAL EDELWEIS MONREAL FROM BUZANADA STATE SCHOOL.

THE SCHOOL BOARD OF THE CANARY ISLANDS GOVERNMENT HAS UNANIMOUSLY ACKNOWLEDGED BUZANADA STATE SCHOOL FOR ITS QUALITY EDUCATION.

The school board of the Canary Islands Government has just unanimously acknowledged Buzanada State School for its quality education and the excellent qualities of its school board. The school board of the autonomous community is a body that represents administration, parents, teachers, primary and secondary schools, institutions, trade unions, etc. The school board has acknowledged the centre because of its constructivist implementation along the methodological lines of meaningful learning in the classroom through professor Ballester’s work and the implementation of its basic competences. The centre has created the basis for a harmonious coexistence with a tolerant, enriching and motivating school welfare which gives support and stimulates teachers’ training with enthusiasm in order to obtain a good quality education for their community and for the Canary Islands. Thus, the School Board of the Canary Islands Government has acknowledged the centre because of its educational quality.

-We are going to talk to Principal Edelweis Monreal. Edelweis, good evening.

-Hello, Good evening from Tenerife.

-Congratulations. This is a very important recognition for your centre. What do you think?

-Yes, it is. It is a very important recognition but it is mainly a recognition for the educational community involved in this task.

-In its beginnings, your centre applied professor Ballester’s E-book. What did this book mean to the centre?

-It was a real discovery. It was like meeting our match. We were having some difficulties; we tried to apply different methodological lines, project working, etc. However, it didn’t come off easily and the discovery of Ballester’s book shed light on us. No sooner said than done and it worked out really well.

-And, why did you decide to put meaningful learning into practice?

-Actually, we did not discover the book. We were imposed the book somehow since we belonged to a school board program of the Canary Islands Government, that is, the educational program for Centros de Atención Preferente. The program has been institutionalized for the improvement of
school achievement and coexistence and it implies the commitment of the whole educational community, especially of the teachers. On the other hand, there was a need for us to find a reference model adaptable to our needs.

- How was it carried out?

-First of all, strictly following the book guidelines. It became our Bible. During the first year, exclusively dedicated to teachers training, we improved rigorously all modules month by month. And each tutorial presented a product every month following the guidelines, from kindergarten to the last grade of primary school. Besides, teachers had meetings to solve possible doubts. The success lied on the fact that nothing was assumed. It was a really interesting success.

-You are talking about success. I guess putting meaningful learning and concept maps into practice in the classroom has many advantages. Did you notice those advantages?

- Of course, I did. Otherwise, it would not have worked out. We have been doing it for more than six years. Concept mapping and meaningful learning make students the main characters in their own learning. This is the key fact. Nevertheless, when teachers observe, they are able to say if the student is learning by himself. The learner knows more than we think which is very stimulating. But not only at a class level. At a centre level, we observed how it allowed us to anticipate the basic competences. We got closer to them in an indirect way. We found out that with meaningful learning we were along the lines of learning competences. Once LOE was implemented, and with the need to include it, our technical team head of the Centro de Atención Preferente, Cristo Alonso, carried out some adaptations. In fact, there is a re-adaptation of the book following the same direction of the book which can be downloaded from the same website.

- Is it a difficult process?

- Not at all. It is very easy. However, it is very important to follow all guidelines included in the book.

-What do we have to take into account when applying the book?

-You have to read the book since it provides you with specific instructions, use team work, make open questions, use concept maps and once you get into the technique, everything comes together.

-And what do teachers think about this fact?

-Basically, what I have previously stated. Actually, when teachers realize that students are able to learn on their own, which demands a little bit of an effort, and that kids know more than we think, is when learning truly starts. If we are aware of what students know, it is time to relate it with what they are going to learn.

-We were talking about the teacher’s opinion. In the case, for parents...
- It is excellent because families are directly involved because it requires complicity with it. After each module, we may elaborate a product. Family’s aid is needed in order to get this product. After that, a very useful climax of understanding and necessity is created for familiar relationships between the centre and the family.

- What is the classroom atmosphere like?

- The atmosphere in the classroom is completely modified because we have lively, creative and lit classrooms, that is, they are not in total silence. This is not a monotonous classroom, but a lively place. The word is lively.

- You, Edelweis, as a principal of the centre, jointly with the teachers, must be very happy with the results. What would you tell an educational centre interested in putting meaningful learning into practice in the classroom?

- Go on. Apart from being very easy to put into practice, the results are visible and fast and we do not need more. When the first module is implemented, then, everything comes straight. The product is easily sold.

- Wow! I hope your words are listened to this evening on our program. Thank you very much Canary Islands. Greetings from Majorca.

- First of all, I would like to congratulate Antoni Ballester for his work and thank him for giving us the opportunity to be involved in this experience. It is a real honor. We are at your entire disposal.

3.2. Opinions of the coordinators of Centros de Atención Preferente when applying the seminar in their centres/classrooms.

I don’t want to say that I did not do open works before. I just never considered if they were open or not. However, I think now that works must be open in order to reach basic competences: close works can be used to practice some skills but these competences are not achieved. Being aware of this when planning tasks makes this training very beneficial.

(CEIP ALMÁCIGO)

The ‘Meaningful Learning Seminar’ gave me the possibility of organizing the centre in a dynamic, active, creative and practical way, the good use of teaching hours (…) the good response in teachers’ participation and involvement and the personal enrichment and satisfaction.

(CEIP BUZANADA)

Students have been more motivated with the work; all proposed activities have been done with a lot of interest (sometimes they were too enthusiastic). Some of them have learnt that in every unit a concept map is done with different results…

(CEO MANUEL DE FALLA)
Motivation is something that is rapidly seen in learners with the methodological change. After the initial uncertainty, every work has been a challenge for the vast majority, that is, intrinsic motivation.
(CEO PRÍNCIPE FELIPE)

Open working, magic questions, a variety of resources, contact with the environment, family collaboration, curricular adaptation and creativity are joined in order to make the students that attend school both motivated and enthusiastic.
(CEP LA VERA)

I get a little bit bored with these lessons because once I have explained what I want them to do, I have practically nothing to do.
(CEO MANUEL DE FALLA)

I could check that children were able to organize themselves, once they obtained a certain degree of experience and skills.
(IES BENITO PÉREZ ARMAS)

The fact that they could talk to each other, stand up, participate…was something that grabbed their attention. Learners managed to have more independence; they felt useful, motivated and independent (with a few exceptions, of course.)
(IES BENITO PÉREZ ARMAS)

They are in charge of their own learning, they feel important. What we study, learn and know is related to them and it is useful for them. They have everything they need to learn by themselves.
(CEP LA VERA)

They were not used to it and there were groups of four seated in rows. Those in the corners could not properly hear. (SECONDARY)
(CEO PRÍNCIPE FELIPE)

Students seem not to be used to working in teams, thinking and expressing their ideas out loud in class. They were also not used to independently and critically processing all the information. Most of the times, I was asked to explain and concentrate on notes. (BACHILLERATO)
(IES SAN MARCOS)

Kids work properly, they focus on their task and amazing things happen.
(IES CRUZ SANTA)

We obtain more explicit information from team work rather than with the student and the team’s individual work at the same time.
(IES ALCALÁ)

However, there were two important factors which meant a change in my class: open work and team work.
(CEIP ALMÁCIGO)
They know how to look for information and summarize it. They have started working and learning how to work in teams. They showed interest in knowledge, they involved their families while they looked for information and while they prepared materials, etc. (CEP LA VERA)

They became more critical and demanding with themselves and with others. They value the effort behind their work and sometimes they are not satisfied with their results and correct themselves as we go along. (CEP LA VERA)

We cannot state that a permanent anticyclone prevails, but squalls, heavy showers and strong winds have been followed by stable, mild weather; with winds that make us change direction to keep moving on.

At least once a day, black storm clouds appear in the sky- due to both the dramatization of the event to see it objectively. The verbal mediation that allows us to look for answers for the conflict that are an alternative to violence- become a light rain and we admit that it is better this way. Therefore, we will act the same way next time. (CEIP REPÚBLICA ARGENTINA)

In this group, we can say that there has been 90% success, even though the students are not very bright. (IES SAN MARCOS)

On the other hand, with this new strategy I managed to get to all students in all of my classes. In one of these classes I have three special needs students and two foreign students with difficulties concerning language. (IES LAS GALLETAS)

Teachers training: this was a great challenge to me and I did not know how to deal with it. (IES ALCALÁ)

From the very beginning, there was a bad disposition. One of them asked me why they had to change his methodology and where it was stated that his was wrong. (IES ALCALÁ)

Once the period for adaptation passed by, modules were given, despite teachers’ reticence, which is why we should remember the commitment acquired by the centre when applying the curriculum. (IES GUAZA)

As I stated, there was a prior and later moment in my teaching practice during this year and my students were the first to understand this change. (CEP LA VERA)

The great satisfaction in this process comes from students because they are motivated and devoted to work. From the very first day, they understood that
they were the main characters in all this process. I do not think they were aware of it and that they could explain it. However, they put it into practice with their dedication and critical attitude towards themselves and their classmates work. (CEP LA VERA)

It is a really interesting time for teachers who are immerse in a personal evolution process, they overcome all initial fears and they start to make changes. (CEIP BUZANADA)

The earthquake is already here and we must be aware that the change should be personal. We need to make the necessary changes in our teaching practices, adapting it from the previous one. What we have is very complex. (CEP LA VERA)

At an educational centre, we talk about almost everything, except classroom experiences, methodologies, activities, feelings of doubt, didactic supports, educational ramblings and everything related to your professional work. (CEO PRÍNCIPE FELIPE)

It is paramount in the task for classmates to have the support and the conviction from the HEAD TEAM and that we are doing a good job. Without it, the coordinator task is limited to his closest environment. (CEO PRÍNCIPE FELIPE)

In order to carry out this methodology in the class, we need time and peace to think, investigate, read, prepare materials, innovate activities... Do we have enough time taking into account the excess of responsibilities teachers and tutors have...? (IES SAN MARCOS)

The ‘I didn’t know’ is not acceptable anymore. Now you do know, and ‘you want to or not’. (CEP LA VERA)

...they think that as I am working ‘like this’ the group can deal with anything and that they have improved considerably thanks to this way of working. This is such an accomplishment. (CEIP TEOBALDO POWER).

...it is true that every teacher has his own techniques. Some of them have a textbook as a reference and they do not abandon it even if an earthquake happens. (CEP LA VERA).
3.3. What do students say? Students say:

‘I like it so much because I do not forget what I study’.

‘I found lessons very interesting since we have worked in teams and we have learned a lot working like this. One of the most useful things has been the elaboration of concept maps because I did not know how to do them properly. Besides that, we also learned how to write what we already knew and I did not manage to do this before.

‘In this school year, we have learnt how to work in teams, share things and help each other. It has been a new way of studying and learning history. Thus, lessons are less tedious and better’.

‘I personally enjoyed lessons because we learned a lot without being overburdened. I found it very interesting to do work with mural cards and changing partners. Now, I know my classmates better and I would be able to make a small description about everyone. I was not able to do that before. Looking for information on the Internet was also a very good idea because I learned a lot. Now I always read the texts that I looked for and I reconsider if pictures are appropriate or not’.

‘Concept maps help us think’

‘I liked this school year’s lessons very much, and above all, we worked a lot in groups, which has made our achievement and coexistence improve. I learned how to make concept maps and how to use them. They can be very useful, though, I find exams very long, and sometimes I did not have time to finish them even though I knew all the content. My lessons’ assessment is positive’.

‘Concept map help us to summarize texts and solve mathematical problems’.

‘This school year had good and bad moments. I think that all stress resulting from exams disappeared when we got into the class and felt more relaxed. The tools used in this subject have been very useful to develop our own concepts about different issues, especially concept maps. They have been very helpful to learn. I liked working in teams, I met more people and I am friend with all my classmates. I am proud of being in these classes and I hope they remain the same.

‘Concept maps help us to read’.

‘Lessons have been very interesting and I really liked them, I really enjoyed working in teams because I have learned a lot. I also liked doing concept maps because I did not know how to do them before.’

‘Lessons have been very practical except for the exams where we had to write a lot. The album task has been the best task for me because we learned to work in teams and because it is very nice. With concept maps, we learn better and fast. We get to the point and we learn the most important things. In general, concept maps are a good method to learn’.
‘Lessons have been amazing, nice, great, fun and amusing. We have learned a lot doing concept maps and we are very prepared for next year’.

‘Works have been very didactic and we met new people from the class thanks to the groups’.

‘Lessons have been beneficial and even funny. It is another way of learning, doing work in teams, concept maps, etc. The work that I like the most is the album because I have become comfortable with my group. It is a different way of working and very good to obtain results’.

‘I like lessons because we worked all together. Otherwise, it is likely that people would not work’.

‘We are about to finish this year and from the very beginning social science lessons have been a really good technique in which we have learned to do work. We have learned to work in groups, to be more responsible with our work and to be more organized. The subject improves and it is noted that there is a more achievement in other subjects. We also have fun but with a limit. In case we need something, we can rely on our teacher to whom we respect and love’.

‘I think this is a good way of joining two things that are completely different: learning and working with fun and amusement. It will help us prepare work to look for a job in the future. It will be helpful to be close and respect each other as a team as well as to get to know each other better than before. This kind of work helps us prepare drafts, works, presentations, summaries, etc.’

‘I like this way of working because it is so fun. I like to work in groups since two different things get together: fun and work. We can exchange ideas so we learn many new things. Concept maps and research is fun: we learn a lot, we are more confident in exams because we really know the topic and we are not worried about failing the exam’.

‘This way of teaching is much better. I think that team work is better because in the future we will have to work with more people and we have to adapt ourselves to it. Besides, we can have fun and learn a lot with these works because when we structure information we study harder and marks are higher’.

‘I like this way of working because we are taught to share things among teams and we are more mature. Concept maps are much better when they are done in teams because we can find appropriate words and better ellipses’.

‘These activities seem very didactic because they are a good way to learn, have fun with classmates, exchange ideas, materials, etc. This kind of work is fun and didactic and also really nice because we learn a lot without stress and wasting time studying ideas by heart that we do not even understand. We should do the same with the rest of subjects, but it mostly happens here. I have heard good things about concept maps, I agree they are a very useful, easy tools that can be applied in all fields, because they are a way of structuring ideas easily and we learn a lot. I personally believe that in all educational
centres this way of studying should be implemented because we, handicapped or not, boys or girls, children or adults, all need concept maps independently of sex, age, personal situation, race, language, etc.’

‘I really like working together, sharing opinions and discussing questions, I find it very fun and at the same time we learn to respect the rest of people in the group. Without respect, the relationship can be a disaster and we could be in a bad mood and have a bad atmosphere. Thus, we learn how to share tasks and be organized. What I do not like is that sometimes people talk loudly’.

‘I really like what we do this class. It is a very useful way to learn. It would be a great idea to continue this until the end of the school year. Our album is really cool’.

‘We have also learned how to make concept maps. Lessons have been very fun and instructive’.

‘The school year has been really surprising, in other words, ‘great’. Working in groups has improved our coexistence and we leave our differences aside’.

‘Lessons have been very good, fun and I think they have helped improve the classroom atmosphere. I really enjoyed the way of teaching and the time spent in the class was really good and I learned many new things.’
4. PRACTICES
4.1. PRACTICES AND OPINIONS OF TEACHERS FROM THE MEANINGFUL LEARNING SEMINAR

RESULTS FROM WORKING MEANINGFULLY

Aina M. Jiménez Vidal*

Now I am going to talk about some observations in the classroom as a result of working meaningfully:

Students are aware and responsible for their own work. They know that this work is their responsibility and not the teacher’s.

December

We can observe some social and attitude skills in students. However, when they start working and collaborating, appraisal and esteem increase amongst them. Afterwards, the classroom atmosphere is good and conflicts stop because they always have to be busy.

December

Working meaningfully allows students to be free to talk. The lack of inhibition is lost in adolescence.

January

In the classroom there is always a willingness to use the English language in real situations in the classroom. Learners need to ask a friend in English for a pen or to go to the toilette. As soon as they start using English in the classroom, they become more polite.

February

If the main goal is to obtain a positive outcome with regard to English in primary school, why don’t we do it in a meaningful, positive and fun way in secondary school?

February

*Aina M. Jiménez Vidal is an English teacher at Instituto de Educación Secundaria Baltasar Porcel in Andratx (Mallorca).

THE PIRATE’S GAME COMIC

Pedro Barceló Ascolies*

The idea was to write a comic from the reading of the same title as an activity for Spanish Language and Literature lessons in the third year of secondary school. It was proposed by the teacher. Once we discussed the plot,
a description of the characters and environment, we sketched the sort of shot, text and respective observations to graphically produce the comic.

Once the sub-groups and sketches had been distributed one by one, we drew continuously worked outside and inside the classroom for several weeks. Next, the original was made with prior supervision following the agreed format and the pictorial technique that the sub-group chose, including software procedures.

As a result, we had ‘heterogeneity in the unit’. Every sub-group had its own way of drawing and freely expressing themselves with their own personality resulting from the team working but without losing the sight of guidelines established by the group and teacher to conclude the unit.

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¡AL CABO DE UN AÑO!

GRACIAS A LAS CUATRO PERSONAS QUE DESCUBRIÓ LA CUEVA, ESTAS MONTAÑAS SE DECLARARON MONUMENTO HISTÓRICO Y NO SE PUDO CONSTRUIR EL AEROPUERTO.

COMO EN LA INFANCIA YA NO HABÍA RAZÓN DE QUE PROTESTAR SE APUNTÓ A OTRAS COSAS.

LOS ESTUDIOS DE HISTORIA LEVARON A CONSIDERARLA EN UNA TÁRSA ANTROPOLOGICA.
MOTIVATION

Immaculada Cortés Cuart*

Motivation is a good word; in fact, it is an attitude both from the teacher and students. In order to have a miracle, I think that we should consider it as an external fact but one more variable that we worked with.

From the point of view of a kindergarten teacher, students are eager to learn at school. What teachers should do is to consider kids as people with basic needs and foster their willingness to learn (we should not lose them during our educational life).

I think that if the topic is not so interesting for the children, we could try to make it attractive and motivating. Consequently, they will be interested in what we do. We can attract their attention and, on the other hand, achieve our main objective. It looks like a war but it is our daily routine.

If we get to know learners with whom we work, it would be easy to deal with the curriculum topics and with those which we consider necessary. We may have a range of resources, with the diversity of materials, using different techniques, technical resources, change of settings, dealing with forms and to be open to new changes and proposals during our task. The more variety, the more interest. We have to know how to get our own goals. The question is: Do we have an active, interested, renewed, participatory attitude for being teachers and why do we need to change the world in which we are working and living as much as possible?

All we have to do is be eager, renew knowledge, learn how to use new technologies, search for different resources, share experiences and take into account what we already have. It is not about doing extraordinary activities but making class interesting day by day…

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MUSIC AND MEANINGFUL LEARNING

Josep María Corró Galán*

Musical discipline, as any other subject in secondary schools, is difficult at the moment to be properly and meaningfully taught. It is obvious that one of the obstacles with which teachers have to face is student’s general lack of motivation to learn. While thinking about this evidence, I had the chance to consider the possibility of changing the field in which I am teaching in a methodological and pedagogical way in order to improve my own work and consequently get closer to the aim all teachers want and expect from their professional task. This consists of making sense of the career, getting positive feedback from students and get results due to their effort.
Attending the seminar on ‘Meaningful learning’ has cleared up many doubts about the possibility of getting expected results.

As time passes by, I can say that music, due to its own nature, has all the characteristics to perfectly fit within the methodological framework proposed by meaningful learning. Its practical budget comes from the idea of working with pedagogical products with the following characteristics: open, motivating, environmentally related, creative, concept mapping and curricular adaptation. Fortunately, all these words sustain the essence of music: ‘open’ because of its flexibility, ‘motivating’ with regard to the fact of building a sound-symbolic language that enables to communicate and express, ‘environmentally related’ because of its constant presence in daily life and ‘creative’, which is a given. We can also use concept mapping in music in order to provide concepts with coherence and connection and curricular adaptation for those students with learning difficulties.

Thus, there is no doubt in the fact that by sharing all these characteristics we can manage to clearly obtain appropriate bonds between meaningful learning and music. The elaboration of meaningful products obtains results that otherwise we could hardly obtain without effective learning.

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**CONCEPT MAPPING**

**Pedro Barceló Ascolies**

When I started putting concept maps into practice, I suddenly realized that they were not just schematic summaries of the topic but they were also used as a helpful tool for teachers to easily organize, connect and give all concept and proposals to be developed in the classroom. On the other hand, they are very useful for learners to make a difference between meaningful and trivial aspects, know itineraries and link concepts, and at the same time, allowing them to connect new concepts with the previous ones. They are used to check the efficiency, both for special needs students with hearing problems and psychomotor retardation, and for their interpreter.

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**PRACTICES ON THE ‘MEANINGFUL LEARNING SEMINAR’**

**Margalida Ferrer Andreu**

As a kindergarten teacher, I made a goal to do work by planning real and practical activities, where learning is meaningful, that is, the student must give a sense to what he or she has to learn, based on their interests and experiences.
Afterwards, when everything was already planned, I thought that we could be more ambitious in research and experimentation:

1. Plan and organize a task for the youngest at school (3 year-old) with the aid of the oldest at school (16 year-old).

   This has been a really good experience of innovation.

2. Breaking from our daily working routine at school and doing a big scale work which means more people, material, resources … implied

   This has been a different and fostering source of learning.

3. I offered ideas and proposals which enrich professional work to my colleagues from school, seminars and other interested people.

   Learning satisfaction is increased.

4. Controlling meaningful learning variables, being an open, motivating, environment-related activity, using creative thinking from students’ interests, concept maps, etc.

   This shows that we are doing a great job in kindergarten: we work with clear, exciting and stimulating examples.

Reference point

   Rabelais said in the 17th century that ‘a child is not a glass that we fill, but a fire that we set’ and I thought:

   Stimulate children’s knowledge concerning the topic and prepare some activities:
   . tell the facts but with a tale for three-year-old kids
   . dramatization
   . songs
   . a presentation of historical characters.
   . Free games and guided games.

   Involve students in their own learning process. They are the main characters in this process:
   They paint clothes, houses, walls, churches, etc. (paper made). They can play a role during a photo shoot. Oral and artistic language is the tool for communication, representation and knowledge throughout work.

Final point

All finished work has a product: the photonovel: “El nostre Firó”. 51

For students

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51 Translator’s note: Traditional festival held in Sóller (Mallorca).
Kindergarten students are the main characters in this photonovel which tells the story of our village. They could bring it home, or keep it in the classroom library in order to look at it whenever they want.

For the teacher

Meaningful learning is very gratifying.

Annex 1

Pictures. Paint supplies (payés-payesas\textsuperscript{52}, Moor clothes, houses, pirate ships…). A photo shoot to set the photonovel.

Annex 2

Photonovel: ‘El nostre firó’

‘EL nostre firó’: Traditional festival of Moors and Christians in Sóller (Mallorca).

*Margalida Ferrer Andreu* is a kindergarten teacher at Col.legi Sagrats Cors in Sóller (Mallorca).

\textsuperscript{52} Translator’s note: Majorcan country people.
TOURIST GUIDES IN SECONDARY SCHOOL

Antoni Rosselló Nadal*

Relate the student environment, that is, everything which forms his daily routine. What they see, listen or eat, with any activity in the classroom which is compulsory need rather than personal option for the teacher concerning daily classroom planning. We have tried to include the outside world within the classroom activities, one of the main aspects of meaningful learning when sequencing tourist guide activities in foreign language lessons.

Through some materials from different sources like: the Internet, tourist guides, tourist information offices, textbooks, etc, students in the third year of Secondary School are able to make a description about the place where they live using linguistic aspects (i.e. adjectives) or vocabulary to talk about the weather as well as organizational aspects of information from an initial guideline. By working with students’ self-experiences, which includes their environment, we make the activity more motivating and students can use their skills within the task done inside and outside the classroom.

The result of the stated above can be seen in the guides presented by students. When it comes to the art presentation, they show different ways of working from their own skills. This is the way they can present excellent guides and comics where the use of new technologies is shown.

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MEANINGFUL LEARNING, COMMUNICATION WITH THE STUDENT AND THE TEACHERS’ ROLE.

Luís Rullán Hens*

In my opinion, meaningful learning is a different way of getting along with students. Society has suffered a great change. Teenagers are not submissive and obedient anymore as in years passed. They want to participate in the learning process; they want to live while learning and learn while living and they reject the idea of learning in a passive way.

Our students want to live in the present and they can do so because a society with a lack of values has given them the power and a lack of manners. However, they are sincere and, as a new generation, they are asking for changes.

Thus, meaningful learning helps them to meet their urgent needs: they become the main characters who build their own knowledge. Besides, they are witnesses of their effort in a physical support; something that can easily put an end to conflicts in the classroom. They may feel their effort is useful and completed. The teacher may accept the new challenges, that is, he must act as a mediator by coordinating and helping with their learning but without imposing which cannot be held anymore.

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CURRICULAR ADAPTATION

Margalida Quetglas Vicens*

I could check the importance of curricular adaptations when I started teaching in secondary school but I did not exactly know how to carry them out.

I changed the concept of curricular adaptation when I realized that I had the following two cases in my class:

We were doing a song book with a computer where we were writing and working with traditional songs from different reference sources with the students in the third year of secondary school. When I was checking one of the student’s work, I observed that instead of producing songs, he was creating his own compositions and he was successful in creating harmonious melodies. I had my doubts because of my attitude towards the student but I decided to let him free create his compositions. I did not regret this because the results were excellent.

In another class of the same level, students were doing the same tasks, except for a student, Iván, who was undisciplined, continuously interrupting the teacher and has very little success in school. After checking that his behaviour was not appropriate, I decided to seat him close to me and talk to him. He told
me that he thought this work was very boring and that he preferred to do another activity. From that moment on, I told him to do other tasks in order to extend the curriculum, for example, some works and summaries about music from an encyclopedia. The results were wonderful. I was really surprised by his knowledge about the Viennese school and other aspects of the history of music.

I have mentioned these two cases in order to express that not only curricular adaptations must be taken into account for students with learning difficulties and those who do not achieve planned goals, but also for those students who easily achieve the goals.

On the other hand, we may bear in mind that the teacher must be open if diversity with good results wants to be achieved. It is possible to plan work that later does not meet the needs and interests of the whole class. So, it is good to act openly and offer other activities.

In the first case, the student chose a more creative and personal activity and in the second one, we had a synthesis activity for a more advanced student.

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MATHS IN PRIMARY SCHOOL

Guillem Vicens Xamena*

Maths in primary school allows for the construction of meaningful learning, facilitating meaningful relationships between new knowledge and previous experiences present in students’ cognitive structure. Daily life related activities can be proposed in a recreational and attractive way which will lead to the enrichment of personal training as well as the development of students’ comprehensive learning potential.

The experience is developed in the state school “Els Molins” in Búger (Mallorca), a unitarian school, that is, students from different levels in the same class. The selected group includes only older students, but it is only applied in the last year of primary school. The didactic unit of areas will be studied and everything related to them. So we will study:

Area units
Agricultural units
Local area units
Geometric significant areas.

The subject of areas is not only included in the Maths curriculum but also related to the rest. This relationship must be fostered with meaningful situations and show what they have in common. In every curriculum block we will study:

Numbers and operations: solution of problems.
Measurements: area, positional notation charts, agricultural units, change of units, local use units, geometric figure areas, direct and indirect measurements of areas.

Geometric figures and space organization: factorization and composition of geometric figures, study of polygons and equivalent areas.

Organization of information: drafts or pictures to see data.

Transversal approach: relation with all different curriculum contents.

First, the teacher checks students’ knowledge as well as the procedures used to solve situations in daily life. Everything will be carried out through an initial assessment which will help us to place students.

As we work in groups, in the case with students from the last grades in primary school, who are heterogeneous, all constituents will be complemented and they may exhibit all their ideas, first individually and then together. Later on, they will create a unique and adopted concept map which will provide them with a clear and exact view about all aspects concerning the topic, from the most general to the most specific.

We pretend the student is able to use non conventional area units to compare areas. Once the concept has been assimilated, they will work on conventional area units from the basic unit. Subsequently, learners must observe the equivalence between the different areas as well as the equivalence with agricultural units and, obviously, with local area units. Afterwards, plane figures and their area will be identified and calculated.

The student puts everything he has in the class into practice, recognizing any figure and calculating its area. Immediately afterwards, he goes out of the classroom and uses the school, streets, his own house and even media information to put all he has studied into practice through an analysis to calculate any area in his environment later on. Finally, any school trip (excursion, camp…) is used to put what they studied into practice.

The activities are:

- Every student, with a notebook (different sizes) as a non conventional area unit, shall calculate the area of the blackboard, checking how many times the notebook fits on the blackboard.
- Elaboration of one squared metre using continuous paper. Once we have obtained the area basic unit, they shall calculate both the area of the classroom and playground in order to see how many times the squared metre fits in the classroom and playground.
- Using the previous squared metre, they shall divide it into small parts observing the equivalence within other units. Every side of the squared metre may be divided into ten equal parts, getting 100 squared decimetres. Every squared decimetre is divided into ten equal parts and we have 100 squared centimetres.
- From a land property deed, we have to check the units used to measure the area. These can be national or local agricultural units in Majorca. We will look for the equivalence with conventional area units.
- Looking for real estate advertisement in newspapers…observing the area and value and comparing with other advertisements. Thus, we can calculate the squared metre value concerning a flat or house, the value of a hectare if it is land...
- Comparing different countries surface on a map and taking into account the scale.
- Comparing islands’ surfaces, providing results in agricultural units.
- With a tape measure we can measure the desk, the blackboard, the classroom, the playground, the block where the school is, ... to write down all data in a notebook. Afterwards, we shall calculate the area of a geometric figure. In the case of obtaining unknown geometric figures, the student shall split them into known figures in order to obtain their calculation by adding up the area of resulting figures.

At the end of the experience, it is showed that the student has assimilated all concepts and he is able to calculate the area of any figure.

*Guillem Vicens Xamena is a teacher at Educación Primaria del Colegio Público Els Molins in Búger (Mallorca).
REFLECTIONS ON MEANINGFUL LEARNING

Josep María Corró Galán*

Without a doubt, nowadays secondary school teachers in highschools are disconcerted with how to deal with their teaching tasks. Students have changed and having a solid and reliable knowledge seems to be a difficult goal to attain. However, it is not all lost.

The solution lies on the fact that educational intervention requires a new approach, a new way of intervening in the teacher-student relationship. Nowadays, a methodological change different from the old concept of 'spare the rod and spoil the child' is needed and we have to be more confident in what we call it. I am talking about meaningful learning. It is very important to witness, through assisting a specific seminar, how the student can become the main character of his own learning. It is important for the student to have real, evident and obvious progress of knowledge without the teacher having to carry out his task.

This new approach requires an initial effort by the teacher to adapt himself to a new way of intervention. Nonetheless, the result offers excellent advantages which become something very positive such as an increase in professional self-esteem, a clear vision of students' progress and the avoidance of a devastating mental weakening in teachers which can provoke an significant decrease in their pedagogical task.
*Josep María Corró Galán is a music teacher at Instituto de Educación Secundaria Son Rullán in Palma de Mallorca.

ELABORATION OF A MAGAZINE ON NAVIGATION, FISHING AND SEA TRANSPORT

Antoni Riera González*

This is a task done by students from Grado Superior de Navegación, Pesca y Transporte Marítimo within the training module of working environment relationships. The idea arose from the discussion with the centre’s teachers about the meaningful learning seminar which I had the chance to hold. It is the theoretical support and the framework of open and meaningful working in which, on one hand, students will get caught up with their interests and, on the other hand, functional contents can be worked.

This has been an intensive activity of research, negotiation, motivation, finding out ideas, clarifying them and carrying them out, and also fulfilling assumed commitments as well as working with procedural competences.

I am very pleased with this work, not only for what is seen (which is the smallest part (magazine, product)), but also what is not seen. I am also happy with the students’ task because they are creating, designing and making difficult decisions.

It has been a task where most people at the centre (students in training schools, secretary, head of the department) have participated. It has been a rewarding task for students. They are really proud of the product and the experience.

*Antoni Riera González is a teacher of Formación y Orientación Laboral at Instituto de Educación Secundaria Son Ferrer in Calviá (Mallorca).
Posición: 1° 39'32",8 N
L: 002°37",5 E

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4. Pesca marítima y biología de las especies de interés comercial (250 horas)
5. Seguridad, prevención y supervivencia en la mar (135 horas) Atención sanitaria de urgencia a bordo (115 horas)
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7. Relaciones en el entorno de trabajo (65 horas)
8. Formación en centro de trabajo (710 horas).

OPERACIÓN, CONTROL Y MANTENIMIENTO DE MAQUINAS E INSTALACIONES DEL BUQUE (Grado Medio)

PERFIL PROFESIONAL
THE ANIMAL WORLD IN THE FIRST YEAR OF SECONDARY SCHOOL

Lourdes Soler Riera*

The following experience has been carried out in the first year of secondary school at Instituto de Educación Secundaria de Castellbisbal and it is a work about animals within the curriculum of natural science. The works often make students not respond to meaningful learning, they just copy some information that they do not understand.

The approach in the elaboration of this work has been very different, although motivation has been increased.

First, they had to work in pairs and these were the same as in the lab (pairs are changed every three months), except in some cases. We agreed. The follow-up of work production was done in the centre using all split hours and it was concluded with an oral presentation of the work in front of the class.

Work has been open regarding the selection of animals, sources of information and presentation (written or typed, pictures, drafts or photos). However, the index and final products were fixed from the very beginning.

As a final result of the process, the student should hand in a written work (written or typed), a card with the most important aspects of the animal, do an oral presentation in front of the class and create a file with the most important data to keep it in the class.

The experience has been very positive because students’ motivation is higher due to the topic and being part of a team. Writing is done very well and they are not related with the previous ones. On the other hand, attention to diversity can be properly worked because they all are able to create a product and a presentation.

Methodology

We thought about the index during the first days, every group chose an animal and looked for information at school and at home. They read, highlighted, selected and wrote it on the corresponding index point during the following days. Only a few decided to type the work. Many of them chose pets to make specific observations.

Oral presentations took at least five to ten minutes, and at the end, people could ask questions and speakers answered back. If there was some question without an answer, we wrote it down and someone was in charge of looking for that information and explaining it to the class the next day.

The elaboration of murals was very nice, they used the outline from the oral presentation and they were hung on the classroom walls so they can be informed about the animals.
With the elaboration of files according to the model, we decided what was used to make a file box for the classroom with the most important data about animals that could be looked up by students.

It is worth mentioning that some teams were so involved in the elaboration of the work that they introduced a certain level of research, different from reference research, like visiting some place where animals lived in order to extend the information. In case of those groups choosing a pet, they talked about animal behaviour in some circumstances.

The only negative aspect of this experience has been that in one of the classrooms, some pairs argued due to reasons unrelated to school during the task. It was not easy to find a partner for two or three students and throughout the task there were two couples that were changed. A good tutorial and dynamic groups should be recommended to avoid such a problem.*

*NOTE: When we find such a problem, that is, the project has worked out in all classes except for one, it is necessary to find out what makes this class different so we can detect the reason why there is a problem. In this case, it is important to discuss with students the cohesion and partnership to encourage working together.

*Lourdes Soler Riera is a Natural science teacher at Instituto de Educación Secundaria Castellbisbal (Barcelona).

MEANINGFUL LEARNING IN PROFESSIONAL TRAINING

Antoni Riera González*

Before getting deeper into the topic, I would like to clarify some points which I consider important about the utility of meaningful learning in teaching-learning activities in professional training.

First, specific professional training, being structured within theoretical and practical character modules, are designed based on the needs of the economic sector where professional families belong. It has a functional content in the career and skills acquisition.

Second, we have to bear in mind that professional modules which shape the professional profile are structured according to three criteria: a).- The first criterium is determined by those modules associated to a competence unit, with value and meaning in the labour market. b).- The second one is determined by those modules without a value and meaning. They aid the rest of modules and complement them. They are the so-called transversal modules, not associated to any specific competence unit (security, working relationships modules…). They establish a way of behaving. c).- And last, a common specific module to all professional cycles, Formación y Orientación Laboral, which also contributes to a specific behaviour.

Finally, it should be remarked that students are less motivated to learn what they choose (mechanic, computing, administrative, catering, fishing,
navigation, etc.). Thus, practical modules, associated to competence units, do not have many motivation problems for learning since they are functional.

There are other transversal modules like *Relaciones con el Entorno del trabajo* (R.E.T., F.O.L.), that, as we stated, pretend to teach students concepts and strategies which help them to behave at work.

And, it is in these modules where the student is not motivated, maybe, because he does not see the functional and useful part that may have, like strictly professional character modules.

Meaningful learning has a special relevance in this context, not exclusively but substantially. From my experience as a teacher, I think that knowledge transfer (concepts, procedures and attitudes) has an outstanding magnitude to change learning into the creation of a shared experience with the student.

In my opinion, meaningful learning strategies (mainly focused on procedures) are assumed to rely on students skills, delegating the student as an active individual in the educational environment and not only as a passive individual.

I had the chance to share learning experiences with other teachers from the meaningful learning seminar. I have been lucky because until this moment, my small and isolated contribution seemed to be random and from a good will like many teachers do and transmit in our daily tasks.

Sharing other experts’ experiences and works allowed me to gain confidence and security with a method that I am still not familiar with. Therefore, doing shared work allows me to have a broader view and interdisciplinary perspective as well as continuity and a leitmotiv.

Meaningful learning also allows obtaining a theoretical and practical basis that comes from a source of information and training.

I am convinced that meaningful learning is a useful and efficient working tool which requires a background, a characteristic which allows to teach the same but in a different way, and general results (not only the product) that substantially improve the students’ satisfaction (having created his learning experience as an active individual). And, of course, the pleasure of doing a job appreciated by students who, apart from being motivated, have the feeling of being an active individual. His self-concept and capacity of working in teams and his global achievement are improved.

I prefer this conclusion for meaningful learning. Meaningful learning makes us show our wisdom.

Putting meaningful learning variables into practice allows me to investigate prior knowledge at the beginning of the didactic unit. I am surprised by what students know, even though they are not aware of it and they have not considered that they know it. From now on, we may build this learning, shape it and allow creativity to arise.
Perhaps, the weakest point for me is the difficulty of the method. I am afraid that I do not know how to apply it and not obtain a result (product) that could be obtained through the traditional method.

And the fear of students is the lack of skills in open and participative work at the beginning. They require more directionality and more details about the work to which they are used to. They are insecure and they represent a challenge to think, create, work in groups, look for information, and face their own fears and insecurities to aim for their goal. These are competences required in the business world. They are meaningful capacities like team working, assuming responsibilities, working for objectives, creativity…

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MEANINGFUL LEARNING

Lourdes Soler Riera*

In Secondary school, most teachers are discouraged when we witness the lack of motivation in students concerning the subjects we teach. School failure is frequently high and learning is not meaningful. When it comes to this fact, we may think about our didactic strategy and bear in mind that concepts must be connected to students’ current knowledge. This is not easy. However, if we control the variables that may influence the process such as motivation, proposed activities (a little open where all students fit), relation to the environment, fostering team work and using some tools such as concept maps or Gowin’s V, we can obtain better results and our work will be more gratifying both for teachers and students.

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MEANINGFUL LEARNING AND DIVERSITY

Margalida Quetglas Vicens*

The most common fact among teachers is to complain about the bad behaviour of students, the lack of discipline, respect, motivation…

Nowadays, it is not possible to make students learn the same concepts at the same level: classes are heterogeneous and it is necessary to use different methodologies to help students from different levels.

The classical class consists of the teacher as the issuer and students as recipients. We all have to be recipients and issuers of information. Meaningful learning and team work is advisable in many aspects: a relaxed environment is created, an environment of conversation, of spontaneous aid in different curricular domains in order to work with some transversal topics such as coexistence or education of peace.
Students are enriched with different observations and knowledge that the rest of the group has about that topic. So, every group works at their own pace depending on concepts they have and elaborates a product according to their skills, having different and creative results.

Teachers prepare just one task, but the students work at their own level. They are busy with the task and do not disturb. The teacher’s task consists of aiding and coordinating. Thus, diversity is bearing in mind and teachers are not overloaded with work.

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**MEANINGFUL LEARNING IN PHYSICAL EDUCATION**

**David Balle Blanes***

In order to increase the control of variables mentioned in the modules where meaningful learning seminar is developed, we have been working in a thematic unit concerning games where transports, throwings and receptions have been included. We have analyzed them in physical education sessions to try to figure out the specific value that this control of variables has in our daily work.

We are highlighting intrinsic motivation for diversity in our own subject since recreational sense learning is more visible there. This intrinsic motivation for diversity is what makes students work with discipline in an area where material can be generated at any moment by applying simple contributions from the person who knows game-amusement.

If we could extrapolate the idea of ‘MEANINGFUL’ to every historical moment of learning, either academic or spontaneous, all senses could be stimulated by the brain to go through a new advance in any area.

Motivation, attractive materials (not necessarily old, many things are newer than the wheel), appropriate environment (we are so affected by the climate imperative if this implies to be included in a more hostile environment), teacher and student creativity, opening to genuine ideas that are easily applicable and controlled, and interconnection among teachers to take advantage of these magic moments. We do not have to limit learning, but better extend it by finding associate concepts in the learning process (since it is not advisable to learn every concept exclusively shut in their area until students do not reach higher expertise levels than we practice).

We may add to these comments, the observations of sessions regardless variables.

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REFLEXION ON MEANINGFUL LEARNING SEMINAR

What this seminar meant to me

Maria Antonia Ferriol Alomar*

In order to teach, being an expert on the subject and a good speaker is not enough. It is also necessary to know how to listen, to connect with students, and transmit respect, security, confidence, illusion... However, I do not consider that this range of virtues is a sort of ‘gift’. In my opinion, being a ‘good teacher’ is more than the special skill of teaching. For me, being a ‘good teacher’ is above all an attitude, a commitment and wanting to be there to teach and learn. How can we transmit to our student the willingness to learn if it is dead within us?

The classroom should be a place of meeting to share knowledge and a place to enjoy the inner capacity of human beings to learn and create.

Only when we create things from what we know, we are really aware of it, because it is ours. That is what we get from Meaningful Learning.

The person builds his own knowledge from what he already knows, relating ‘old’ concepts, those which belong to oneself, with ‘new’ concepts that come to his mind for the first time. In order to obtain learning, there must be an accommodation between one and another, having a new structure of knowledge. It is like a big puzzle where new units of information change the previous ones and the structure they are included in.

According to David P. Ausubel, Novak and Hanesian:

‘In meaningful learning, the same process of getting information, produces a modification either of the acquired information or cognitive structure aspects with which it is related’.

By learning, we do not only modify our old concepts, which evolve towards a new knowledge, but also cognitive structure used to get the new information is changed. Everything increases at the same time.

This seminar on meaningful learning has been the confirmation of something that I already knew: learning is exciting and fun. Thanks to this seminar I have connected with my own creativity. Creativity is not just a source of pleasure for human beings but the way they connect with themselves, to feel undivided and connected to the universe.

The modern human being lives in a society which splits him up. He is a small piece of a whole machine where his work is daily lost. He has lost the contact with finished work. He has lost the power to create: the joy of imagination, developing and finishing something specific; with which he feels identified and satisfied.

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* AUSUBEL, NOVAK and HANESIAN: 62.
With this seminar, I had the chance to experiment this, that is, my capacity to create.

It is sad to assume, without even questioning it, that creativity belongs to a privileged few: artists and geniuses. Mainly when this is not true, creativity is a human inner quality. We all have the capacity to create, we just have to reach it and develop. In this sense, the Meaningful Learning Seminar is the way to get it.

When students explore their own creativity, they rediscover the pleasure of learning and recover their human inner curiosity.

It seems to be that we all have forgotten what learning means. Learning is not just answering some test questions. Learning is believing. It means to be more skilled, to increase security and confidence in our capacities, to feel the power of knowledge which allows us to build and destroy, it allows to transform and improve our lives and others’.

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THE MUSICAL CHRISTMAS TREE

Luís Rullán Hens*

The musical Christmas tree is an open practice where students work the musical language and their vocabulary, the elaboration of a melody and the capacity of improvisation to create lyrics for a song. In addition, we worked on attitudes, values and rules related to students’ improvements in communication, motivation and team work to aim for a goal, creativity and tolerance.

Students had to draw a Christmas tree with ‘musical’ decorations such as instruments, notes, silences, clef, staves, etc. It was all up to their imagination: They had to feel free but at the same time complete the task according to the guidelines.

The work had to be done in pairs (previously formed) of balanced teams. For instance, a student who always responds would be the partner of a more passive student.

The work had to be done in three or four sessions. In the first session, the draft had to be elaborated and in the rest of sessions it had to be passed to a DIN A-3. They were given colour pencils and they could also use their own materials.

Apart from the Christmas tree, they had to write a melody in a big stave which would be placed with the drawing. Below the melody, they had to create some lyrics concerning Christmas time, but freely. On the other hand, they had to make a list of all the musical elements used for tree drawing and the definition. They were obliged to think about the meaning of every single decoration in this part of the task. A Christmas carol was played in order to establish an appropriate atmosphere.
The results were satisfactory. At the end, all works were exposed in the highschool hallways for people to see them and students felt that this experience had been useful. The experience was also very positive for me, since I could see a different relationship among students. They were more relaxed, closer, natural and did not have the need to keep their established roles, etc.

When they made questions about the work, I answered back and tried to provide them with the whole responsibility and prominence of their work.

I could keep writing about this experience and its results. I am pleased with this creative and nice way of working. Now that we know it, the responsibility and challenge is open to all of us.

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Reloj de Navidad

Reloj de Navidad nos espera. [Handwritten]

SARN BONJIN fe
PRIMARY SCHOOL GAMES

Joana María Payeras Aguiló*

In the first years of our lives, games are an important part in the construction of learning. As time passes by, games become purely recreational activities.

Why don’t we keep using this resource so that students can learn through games? Why don’t we try to make curricular learning be a challenge and become immersed in the process?

Thus, teachers decided to look for a way of learning while teaching.

First, we thought about elaborating games related to the contents of science. The result was that many skills were shown. Other areas contents and transversal subjects were included.

Students, divided into groups, elaborated different games designing the rules and thinking about the necessary material (board, counters, solutions, etc.). Once the game was finished, it was presented to their classmates, inviting them to participate and to give an opinion. The group reelaborated the game, taking into account all provided instructions.

This innovative experience has been totally gratifying for students and teachers because it allows us to have a global approach, adapt it to each child’s personality, foster teamwork and this also helps to distinguish what is fundamental or additional.

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THE COLOUR IN ARTS: THE SELF-PORTRAIT

Belén Olivares Bohígues*

Colour is one of the main visual elements because it provides us with a lot of information. Colours influence one’s mood, some of them mean hot or cold, tense or quiet situations and others the feeling of proximity or distance. We can stress the picture’s message by consciously using its different characteristics.

Our activity consists of the expressive use of colour in the elaboration of the students’ self-portrait through the use of photographs with a slide support.

This activity is designed for students in the third and fourth year of secondary school. This activity is included in the contents concerning the study of colour within the second semester. It is an activity of consolidation since aspects like the range of colours and their qualities have been studied.

The teacher’s role has consisted of giving visual information to stimulate students’ creativity through slides, paintings, advertisements, drawings, etc. Giving clear and flexible guidelines about how to do the process, which is even more important than the final results, is necessary in order to obtain a good outcome.

In the first session, students take pictures like in a photo booth from a slide film. If there are few students, we have taken pictures from different perspectives: full-faced, profile, etc. We can get expressive pictures by using a spotlight which illuminates the face in different ways, depending on the position.

During the second session, we have developed the photo film. We can show the pictures on a mural card so students can check the results of the experience and copy the virtual image on the card, engraving the most important lines and dividing the images into darker and light parts (concept of shot).

The rest of the sessions have been dedicated to doing the most important colour aspects: thermal feeling for all the shots in which the image has been divided into cold and hot colours and contrast with the use of complementary colours.

The objective of this activity is to consider the different feelings that colours cause, to keep in mind how they are influenced, to take into account the colour expressiveness and the relationship between visual and artistic language elements.

The activity has been very positive. Students showed a lot of interest to have their photograph taken and work on their own picture. In my opinion, working on the wall and with an uncommon format has been very stimulating. We may also keep in mind the collaboration amongst students.

This activity has also been done with students in the first year of secondary school but the difference is that they brought their own pictures.
enlarged with a Xerox. Those who did not have any pictures were provided with an advertisement.

*Belen Olivares Bohigues is an art teacher at Instituto de Educación Secundaria Sa Blanca Dona in Ibiza.
FAIRY TALES IN PHYSICAL EDUCATION

David Balle Blanes*

It should be highlighted that personal contributions, within a broad range of teachers, cannot have a meaningful value but are an experience because all expected changes have an intrinsic need for expansion in our task.

We have to keep applying our own creativity and make it extensive to all teachers. Working in an isolated laboratory is not the same as working in groups even where there are two or more members collaborating for research of effective results of this task. During the tutorials, we mentioned the motivational constant feature among teachers: Is your system working? - Yes, but discipline, attention and motivation difficulties are alien to my task and I cannot control them. Nothing is alien to our task, and even less so for task done in another classroom, highschool or school.

We are aware that we cannot have a specific motivation, we cannot have regret and say that they are not motivated because it is Monday. We have to look for alternatives in and outside the student which can make them participate in an action where a concept map has been developed (sometimes it is discussed if we may call it procedural). It will be presented as something attractive. It is not worth to say that the thematic is arid and we cannot obliged students to make it by themselves. It is in their nature. We may just present the problems which they recognize as such but in which they are happy to be involved with and from which we expect them to collect some concepts included in their registers, sometimes without a meaning.

It is true that there are students who enjoy football. However, they do not relate it to the word sphere. So it is not meaningful. But they know that the word spherical means ball. They did not learn that in maths lessons but by watching television and listening to the commentators.

Stressing the importance of the control of variables and elaborating concept maps for a program, we continue experimenting the satisfaction that once was seen so far (not only with the control of some variable, the results can be seen) and the joy of witnessing the progress of students in different fields.

We are specific about an experience in the elaboration of some activities stressed by the context in which we are working –students in the 3rd, 4th, 5th and 6th grade of primary school work on the skills block in order to chronologically fit our curriculum, trips, transports and driving. These didactic units are common and new competences are added throughout the curriculum. The proposal to work during cultural week, within the framework in which the works are presented, is to do traditional fairy tales.

We propose older students, who know a big range of activities, to define a specific activity for groups to do. This activity may be attractive. The youngest are required to remember and choose tales that have meaningful patterns. For instance: little red riding hood, White snow, Puss in boots, Ali Baba, etc. Middle-school students propose models of implementation and distribution for practice.
The older implement them with a critical point of view regardless of the content and implementation, whereas the youngest highlight the recreational aspect.

Consequently, with our aid, we can rule out some activities, tales and ways of implementing them, with all available material. Students are able to make, for instance, cards with flowers to be picked up by little red riding hoods, flags with representative anagrams, performances of the tales, groups, availability, etc.

The result is a different, motivating, self-guided approach for students. Otherwise, they are tired of repetition hindering the meaningful progress in their learning.

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READERS?
Antoni Rosselló Nadal*

One of the practices of the English department is the reading of a short story adapted to the class level, the so called graded reader. These activities are a great aid to improve reading skills and very important in foreign language learning. However, the most difficult situation teachers have to face when assigning such an activity to their students is the lack of motivation for reading, despite having done a good selection according to their interest topics. The question is whether or not to put additional readings to the textbook’s.

We start from a positive response because, as we stated before, we value that these readings are positive concerning language learning. Thus, we may think about how to create this interest for reading and imply possible activities that can arise from it. Once the reading has been selected, the teacher’s task will consist of controlling several variables included in every learning process. These variables may foster the involvement and interest of students for the activity. For instance, one of these variables could be the link of the external context outside the classroom, the environment, or with some of five senses. Our activity should have as a starting point some experience, or object, outside the classroom, linked to the students, and based on sight, hearing, touch, smell and taste for the activity to be done in the classroom.

The practice exposed below was carried out by highschool students who did a double activity from a downloaded reading on the Internet which consisted of selecting one part of the text and illustrating it. Second, they had to make an interview and description from the reading.

The title was The Man Who Planted Trees and we thought that April was the perfect occasion to discuss our transversal topic related to environment because the book dealt with it and mainly because of Earth Day and International Book Day were held at the end of the month. We started from the sense of smell, touch and sight for the presentation and prior activity to reading. From a selection of plants which appeared in the book, students had to identify the plants by the sense of smell and touch. The following step was to relate
some images (sense of sight) distributed on the classroom walls and students had to select some adjectives and nouns linked to the image and belonging to the vocabulary of the reading. Finally, the first paragraph was jointly worked which summarized the plot of the reading.

We could say that this previous preparation is important for the reading to be successful in and outside the classroom. Controlling the variables of the meaningful learning process has allowed students to enjoy and take advantage of reading, the most important goal of any activity. The final work presented by students is an evident sample that it has been successfully done. This activity is illustrated with some pictures from previous works exposed during the International Book Week in the highschool hallway.

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PEACEFULLY HE CONTINUING HIS WORK, IGNORING THE WAR OF '39 AS HE HAD IGNORED THAT OF '14
MEANINGFUL LEARNING IN PRIMARY SCHOOL

Antonia Vilafranca Sorá*

In my experience with primary school learners, sometimes developing the task of learning concepts, procedures and attitudes is complex because it creates dissatisfaction and discouragement. It is essential to consider this task from a constructivist and active point of view, based on practice and related to the closest environment to childhood.

Meaningful learning set us free from students’ failure by not taking advantage of lessons and their feeling of stress. The interrelation atmosphere among students or between students and the teacher, as well as learners’ task is so positive.

I would recommend all teachers to do this sort of learning in practice. We should be more daring, organized and joyful because success is ensured.

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RONDALLES MALLORQUINES IN KINDERGARTEN

Immaculada Cortés Cuart*

As a kindergarten teacher, I am more aware of the importance of meaningful learning, because if I do not connect with the kids, I do not manage to get their interest and motivation to carry out any kind of learning. It is not about doing spectacular things, or living strong emotions but reconsidering my attitudes as a teacher, being implied within the teaching-learning process as an active part. We have to look for the best way to attract their interest and ensure that they are happy with our task.

This seminar has made me think about how to carry out the contents of the curriculum within the classroom in such a way that it will be easy for children to get excited. This year I am working as a support teacher which allows me to learn from my colleagues (manners, strategies, organization, resources…) and by combining it with meaningful learning tools, I manage to create educational strategies to carry out our work.

Thus, in a kindergarten classroom, we can see the result of this work from meaningful learning seminar. Every week, we spend some time to tell rondalles mallorquines54. Afterwards, they make an art project based on them in order to have a meaningful and close book where the contents, plot and expressions are reflected. It is a book that make them come back to the magic world of the rondalles.

In order for children to be involved in the task and that the rondalles will not be monotonous, I started thinking about the topic and the tutor agreed to work with rondalles’ characters and convert them into puppets. Later on, children will

54 Translator’s note: Fantastic and legendary short story or with real elements focused on children’s and characteristic of the Majorcan cultural Heritage.
perform the *rondalla* while the teacher tells the story. Afterwards, children will manage to tell the story.

From one’s point of view, meaningful learning to be carried out by the teacher is successful if it is supported by the teacher and schedule. The short term result is a very gratifying experience and it is a pleasure to share with the rest of teachers. See you at the next Seminar!

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GAMES AND MOTIVATION IN GERMAN CLASS

Francisca Bover Pol*

During the last years, I have experimented and checked the importance of games in German classes at secondary school. We cannot deny the motivating power of the game, with motivation as a key variable of meaningful learning. The game has an influence on students’ personality and teachers’ work.

As far as students’ personality is concerned, the game facilitates relationships within the class, cooperation among students increases and it fosters empathy, creativity, fears and inhibition when using another language. The game helps students to overcome reality, for instance, through a role game.

With regard to teachers and their lessons, we can say that they are free from the continuous need to correct. So the student-teacher role and function change. In groups with different level students, the game has a remedial role because lower-level students can also play and they do not need to ‘show’ their maximum capacity.

All in all, games motivate students and their attitude towards the subject and the classroom atmosphere improves.

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MEANINGFUL LEARNING IN KINDERGARTEN

Immaculada Cortés Cuart*

As a result of the seminar we did with Antoni this winter, everything we were taught at university when we were studying to become kindergarten teachers came to my mind. We were told a lot about meaningful learning but we did not have the opportunity to go into this topic in depth and ‘experiment’ within the classroom with the theory.

Now that we could deepen into the topic and carry out products where meaningful learning is a main objective in the classroom, I could see that children learn fast, without too much repetition since they pay attention to the topic from the very beginning. If the topic was not of their interest, the way we dealt with it was very useful as well as the material we used, the place or even including external people in school and managing to increase the children’s involvement.

That means:

- If the topic was interesting enough, such as the ‘rondalles’ (Balearic Islands short stories), in order to keep this interest high all throughout the year, we did an art activity in a DIN-A5 format after telling the ‘rondalla’ and trying to change the technique. We made a book to bring home. We also created puppets and perform the story. Children told, performed, etc. At the beginning they had some help but afterwards, it was more complicated. Their leading role was more important and they were more independent. Evolution.

- If the topic was not of their interest, the topic was presented with a story, they received a letter, the activity was carried out in a different place, pictures from our environment were provided and we used different art techniques. Diversify.

We exposed the recycling issue as a school interest with the slogan: My paper is important. We started visiting ‘Mallorca recicla’ (a recycling company), then we told the story of ‘Pepet’ (a sick garbage can) at the school kitchen where there is a huge can that we painted together in the school dining room.

We talked about the different containers and we put our own bins in a corner of the classroom.

We used different colours and provided different uses for the bins so that children did not lose the interest for the recycling issue which is not very attractive to them. The question is: What can I do, as a three-year-old person, concerning this issue?

We have to bear in mind that this is a more attractive way of learning both for children and teachers. I could check what they were learning and the interest for any topic. Children are lively and eager to learn.
Working with meaningful productions in the classroom is more practical and positive since meaningful learning is better developed.

From my point of view, teachers must try to maintain the willingness to learn. The educational system could be made for young children to solve most of problems in our classes, either learning or respect problems. Children would be motivated to attend lessons and consequently, 50% our work will be solved and we could focus on contents.

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THE URBAN STUDY OF THE NEIGHBOURHOOD

Pilar Gayoso Enrique*

Students enjoy their learning. They have experimented with the city, focusing on their own neighbourhood to study the urban area. As they stated, ‘it does not seem that we are studying’.

This aspect has been very important in order to motivate them. They have been close to their own environment, school, and highschool. They did not build a different being and isolate themselves from their own reality.

Consequently, we manage to integrate school in their daily environment. We can reaffirm the learning function and we find it useful for their development as citizens.

With this practice students have built their own learning.

Regardless of the specific activity, the neighbourhood study as an individual task has allowed them to approach the urban area. It has been very motivating and students have managed to present several works highlighting very different aspects. Some of them have focused on the road and service network, others on cultural investment, amusement parks for kids, young and old people; others on buildings characteristics, area planning and management etc. All of them agreed that they see the urban area in a different way and from another perspective.

From a scientific and disciplinary point of view, their productions are a combination of written and visual information (images), pictures and plannings. They worked on scientific research techniques (investigation, field work, conclusions with critical assessment…) and geographic techniques. The information sources have been very different: discussions with parents and neighbours, visits out of school to different organizations which offer social services, material from the textbook, Internet, etc.

As they stated while doing the work, the practical character of discipline fosters professional training required in any discipline at secondary school.
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‘MEANINGFUL LEARNING IN PRACTICE’

Carolina Caballero Garmón*

The reading of this book has not been difficult. The concepts developed reminded me of what we learned in college. When I started working, I could see how everything included in textbooks changed. Year after year I must try to make students learn, or what it is more important, help them to maintain their willingness to learn. This is the moment when school work is meaningful: ideas which arise in the classroom, teachers’ aid, creative working, etc.

Active teachers look for the highest number of resources because it is difficult to find them in our ideas in order to continue with our task. The rest is students’ responsibility. In my opinion, the book ‘Meaningful Learning in Practice’ will be very useful due to several aspects: it refreshes outstanding ideas and concepts, introduces practical situations adaptable to any level, and it also includes the opinion of teachers.

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SCIENCE IN PRIMARY SCHOOL

Guillem Vicens Xamena*

Meaningful learning in primary school is a reality and provides excellent short and long-term results. It has been easier to work with students in the third grade of primary school than with the rest because they are able to work independently without the teacher’s aid. However, in younger grades, teachers are needed to guide them. Meaningful learning is very important in primary school to foster learning and avoid discipline problems.

The experience has been carried out at Colegio Público “Els Molins” in Búger (Mallorca) with students in the second and third grade of primary school. It should be remarked that this is a unitarian school where students from second grade are in the same classroom.

This practice has consisted of knowing the closest environment, that is, the place where they live. Students, year after year, study their town when the topic is proposed and they say that they know everything. However, after an initial evaluation, they have to learn more about many aspects. According to the level of knowledge, we have assigned three blocks: study of the street, study of characteristics and study of outstanding things.

Every thematic block is related to one of the three groups in the class, formed by 4 members that are heterogeneous. Then, every student will elaborate a concept map to put it together with the rest of the team members, doing one concept map for each thematic block. Once objectives have been explained, the groups will make a complete illustrated report of slides with a
camera and they are going to visit their town. An exhaustive study of all samples has been made in the classroom.

The group which studies streets is required to analyze the name of the streets. Those that studies characteristics should analyze their function. Finally, the group studying outstanding things should find out more about it. Once the information has been collected, we have chosen what is really interesting and take into account that at school we have enough computers. We did a fresh copy to make it clear and concise.

Additional activities to show what has been learned:

- Presentation of the topic to the rest of students, using an overhead projector and making comments about them.
- Making routes over the town in different groups, providing some clues and using compasses to guess the way to follow every group.

As a conclusion, the teacher proposes a topic based on the students’ knowledge. After a project, we are successful with our contribution and they have fun and learn.

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5. APPENDIX
5.1. DIDACTIC RESOURCES

Didactic resources are tools used in teaching to facilitate learning. So they can be used in many ways. In order to foster meaningful learning it would be better to use didactic resources in a meaningful way, that is, connected and integrated within the didactic unit structure that will be worked on.

Giving connected and coherent information in a written, audible, tactile and visual way allows learners to integrate better concept coherence and connection within their mental structure which fosters long-term learning. Thus, the example of didactic units through diversified resources fosters meaningful learning.

In every thematic block, we should work with resources of different types in a balanced way which promotes illustration with guidelines of cohesion amongst concepts, i.e. a clarifying, hierarchical and meaningful concept map.

Diverse resources foster students’ positive outcomes in evaluation and stimulate the learning process. Here we encourage the use of resources by teachers in different ways. When there is a missing part of material, it does not mean that we are limited. Most of time, we may substitute, extend, reduce, multiply, divide, partially consider, change the position, think differently and change the regular point of view of that resource through creativity.

Now we are offering a list of didactic resources for the elaboration of meaningful products. If we combine two or more resources, we will obtain didactic units. It is certain that teachers could produce more resources, ideas and products in a certain context.

5.2 LIST OF DIDACTIC RESOURCES

- Press.
- Magazines.
- Textbooks.
- Adventures.
- Biographies.
- Tales.
- Stories.
- Novels.
- Reference research.

* Resources based on team working.

- Debates.
- Dramatization.
- Ideas.

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55 In this section, some didactic resources are provided to elaborate meaningful products based on BALLESTER A. “La Didáctica de la geografía. Aprentatge significatiu i recursos didàctics de les Illes Balears” Palma de Mallorca, Documenta Balear, 1999, 366.
Games.
Simulation games.
Round tables.

* Audio visual resources.

Tape recorders.
Radios.
Compact discs.
DVDs.
Films.
Television
Slides
Epidiascopes.
Overhead projectors.
Video recorders.
Graphics.
Concept maps.
Diagrams.
Charts.
Sketches.
Drawings
Sketches.
Plans.
Maps.
Atlas.
Blackboards.
Digital whiteboards.
Didactic boards.
Signs.
Murals.
Copies.
Sheets of paper.
Postcards.
Posters.
Caricatures.
Jokes.
Pictures.
Albums.
Leaflets.
Scale models.
Telephones.
Faxes.
Audio visual editing.
Slideshows.
Software.
CD-ROM
Multimedia presentations.
Internet.
* Environment resources.

Field work.
School trips.
Routes.
Educational services.

* Other resources

Oral presentations.
Conferences.
Surveys.
Interviews.
School mailing.
School exchange.
Reports.
Cutouts.
Statistics
Exhibitions.
Modelling.
Empathy.
Files.
Experiments.
Machine construction.
Collections.
Stickers.
Crosswords.
Museums.
School vegetable garden.
School journals.
Creative resources.

Most used resources:

Press.
Magazines.
Textbooks.
Tales.
Reference research.
Games.
Tape recorders.
Compact discs.
DVDs.
Slides.
Overhead projectors.
Video recorders.
Diagrams.
Drawings.
Sketches.
Blackboards.
Murals.
Copies.
Sheet of paper.
Pictures.
Albums.
Software.
CD-ROM.
Internet.
School trips.
Routes.
Educational services.
Oral presentations.
Conferences.
Reports.
Exhibitions.
Experiments.
Museums.
School journal.
5.3. ASSESSING IN AN OBJECTIVE WAY

Knowledge evaluation is the process where we obtain information for judgement that allows us to make a decision. Assessment is used to evaluate teaching and the learning process, the knowledge acquisition of the student and teachers’ efficiency. The assessment must evaluate contents, procedures and attitudes. It has to be initial to detect previous concepts that are formative during the learning process to serve as a guide summary or final assessment of learning.

In practice we think that teachers must spend time in the learning and teaching process rather than evaluating. So assessment in school should be objective, trustful, efficient and easy to correct.

The most complex assessment techniques, such as difficulty with elaboration and correction tests are mainly addressed to evaluating bodies or external evaluating teams.

We should remember that in order to get a positive assessment in the class, it is necessary to obtain the concept map variable and apply the proper curricular adaptation.

In practice teachers want to know through assessment if learners have interiorized and connected knowledge. The most important thing is to do objective, trustful and efficient tests, that is, these tests should provide accuracy when it comes to the result. Objective tests should be easy to correct and not to be a waste of time since teaching and learning tasks could not be done.

We are proposing some examples of summarized assessment questions that in practice have good results and with which we can assess meaningful learning.

1.- Defining concepts: it is likely that students, who learn concepts by heart, cannot really interiorize them. It is much better for them to define concepts with their own words, as if it was explained to others. They must show what they have understood from every concept, and check if they have really learned. We can ask simple, intermediate and other difficult concepts to know their level. For instance: stave, notes, silence, additional lines, intervals, etc.

2.- Open questions: we can ask learners to write all what they know about a certain topic or section. They are used to see the information structure of the student and how he or she reacts to information. They have many advantages to know what they have really learned. For instance: write what you know ...

3.- Making concept maps: they can be used as an assessment tool after teaching the technique to elaborate them. We can check hierarchy, differentiation and relationships between concepts by asking learners to make a concept map about a certain topic or issue. They can be easily corrected and are highly efficient. Example: Make a concept map about ...

4.- Transference situations: it consists of putting the student into a different situation from the one worked at school but about the same topic as the didactic unit to check if he or she can implement what they have learned in a different situation, check learning and know if it is meaningful. It is a good context if it appears in real experiences and practices of students (personal life, school life, work, hobbies...) Ex: solving a case, discussing about a piece of news, explaining a picture, solving a practical problem, etc...

5.- Checking procedures learning: They are questions used to check if the students ‘knows how to do’ and where the mistake is in order to improve learning and teaching. They are extremely useful and easy to correct. It is also useful to correct in a big group after making students aware of the need to improve through previous procedures such as a slide to improve elaboration technique. Ex: commenting a text, completing a map, doing graphics, etc.

6.- Attitudes assessment: attitudes assessment can be done with a register or attitudes observation. They can help students to know how they are progressing and this assessment does not overload teachers with work but it is a tool to complete the tutorial through reconduction. The most efficient thing is to move ahead difficulties derived from discipline putting meaningful learning into practice and when some problem arises we must recondit it using the conflict to teach through educational dialogues and tutorials. Ex: registered or observational sentence: ‘Students look after the material’ ‘He is always on time’ etc.
5.4. RECOMMENDED REFERENCES

These references can help to learn more about meaningful learning variables in practice and we believe that they should be part of the library for teachers and educational centres departments.

For open working variable:


For motivation variable:


For environment variable:


For creativity variable:


For concept mapping variable:


ESCAÑO, José; GIL DE LA Serna, María (1994) *Cómo se aprende y cómo se enseña.* Barcelona. ICE Universidad de Barcelona - Horsori. 163.


**For curricular adaptations variable:**


**For meaningful learning variables:**


Meaningful learning variables and basic competences


5.5. GENERAL REFERENCES


ESCAÑO, José; GIL DE LA SERNA, María (1997) *Cómo se aprende y cómo se enseña*. Barcelona. ICE Universidad de Barcelona - Horsori. 163.


la geografía en la enseñanza. Asociación de Geógrafos Españoles AGE Grupo de Didáctica - Universidad de Murcia 159-168.


