MET: The Four Ds of Effective Teaching and Successful Learning
by Inez De Florio

Abstract
The MET is a teacher-proofed *Model of Effective Teaching and Successful Learning* which is based on newer research findings of educational psychology (cf. De Florio 2016). Above all, it integrates the four most relevant aspects of teaching and learning, i.e. curriculum design, instructional systems development, backward design and lesson plan design in a way that leads to better learning outcomes for all students.

1 Introduction

Ever since teaching has existed, educators have asked the same questions: What should we teach? How should we teach it? **Curriculum design and instructional design** are inextricably entwined. Nevertheless, during the long history of teaching and learning, sometimes the prevalent focus was on content and sometimes on methodology. The connectedness of learning content and teaching strategies does not dispense us from the obligation to separately examine the curriculum items before coming to terms with instructional design. That is to say, only when teachers and other education professionals are convinced of the usefulness of the teaching content for their students, they are able to choose the appropriate methodology.

On the other hand, teaching and learning strategies do not result inevitably from specific curriculum items. Newer research findings show that – considering the teaching and learning context – there are more or less effective teaching and learning strategies. In order to decide in favor of an instructional design teachers have to consider a great number of pros and cons which have to be examined in detail.

But there is more to effective teaching and successful learning than curriculum and instructional design. The third D to be taken into account is **backward design.** Teachers have to be well aware of the possibilities and limits of their individual learners, before going ahead with both curriculum design and instructional design. They must exactly know what to achieve for their students and in which ways the learners should demonstrate the required knowledge, skills and attitudes. Thus, backward design is the basis of standards-oriented movements all over the world.

Putting the three Ds together, you think you are ready to impart your lesson? Not yet! There is a last indispensable D missing, i.e. **lesson plan design** which dates back to M. Hunter in the 1970s. It fixes the main parts of a lesson and especially the sequence of the single steps. Without a scrupulous lesson plan the most appropriate content delivered with science-proofed teaching strategies based on backward design will not lead to the best possible outcomes for all students. Presenting the 30 steps of the **MET** (**Model of Effective Teaching**), it is my intention to summarize the above claims in a teacher- and learner-friendly way. Based on *Interactive Whole Class Teaching* (cf. Petty 2009, pp. 103-114), the MET is a research-oriented model that enables all educators to make informed choices to the benefits of their students.

2 Curriculum Design

Many of you will remember *The Saber-Tooth Curriculum* published by Harold R. W. Benjamin under a pseudonym of J. Abner Peddiwell in 1939. It is an allegoric, satirical comment on **curriculum design** which shows amazing parallels with today's curriculum debates.

New-Fist, a stone-age doer and thinker, invented the first systematic educational system based on three activities which were very useful for his tribe. The tribe prospered because the children did no longer play for mere fun but got involved in learning for their future and the well-being of their community. All went well until, long after New-Fist's death, the living conditions of the tribe changed dramatically. The old curriculum items became more and more useless. But there were men who invented new strategies to catch animals, to get pelt to cover their bodies and to scare the dangerous bears which had replaced the saber-tooth tigers.

Some of the new thinkers dared to ask why these new activities which were indispensable to modern existence could not be taught in school. But the old wise men of the tribe answered: "What have these practical activities got to do with schools?" Furthermore, they added that teaching these activities would not be education, but mere training. One among the new thinkers insisted:

> "But – but anyway," he suggested, "you will have to admit that times have changed. Couldn't you please try these more up-to-date activities? Maybe they have some educational value, after all."
>
> Even the men's fellow radicals felt that this was going a little too far.
>
> The wise old men were indignant. Their smiles faded. "If you had any education yourself," they said severely, "you would know that the essence of true education is timelessness. It is something that endures through changing conditions like a solid rock standing squarely and firmly in the middle of a raging torrent. You must know that there are some eternal verities, and the saber-tooth curriculum is one of them!" (https://cse101.cse.msu.edu/visitors/saber.php; last accessed June 2016)

Benjamin alias J. Abner Peddiwell does not come up with answers to the questions *The Saber-Tooth Curriculum* poses. His intention is to encourage thinking. Every teacher has to ask him- or herself which curriculum items to keep, which ones to modify or adapt, and which ones to let go. "And what about educational standards?" you may ask. Many of them are unchallenged; others are so vague that they call for specification or adaptation. In my view, the problem does not consist in finding an authentic detail connected to real life that may attract the attention of the majority of the learners. For me, the choice of curriculum items is also connected to the overall question: What world do we want to live in? In any case, as a teacher as well as an educator in general, you have to specify what you mean by content: That what is or that what you present to your learners? Or is it simply that what has to be learned? (Petrina 2007) Whatever the answer to these queries may be, it has to take the students' needs and interests into account.

3 Instructional Design

Instructional design aims at creating teaching and learning experiences which render the acquisition of knowledge, skills and attitudes more effective and more

efficient. Effectiveness refers to the quality of the achieved goals whereas efficiency means that the goals are reached without waste, in the case of education without the waste of precious lesson time.

Instructional design (ID) or rather instructional systems development (ISD) dates back to the 1950s. It was developed on the basis of behaviorism. Programmed learning is perhaps the best known example of the origins of ID. As many other teaching and learning models, ID passed through various developmental stages during the past decades. A great number of important thinkers and scientists, especially educational psychologists, have contributed to the development of ID (for a detailed overview see Landriscina 2015).

In my view, it was Gagné's instructional theory ([4]1985) to make the decisive change to cognitive psychology leaving behind stimulus-response theories. The complex nature of the multiple learning processes and above all the active role of the learner came more and more to the fore. Today's ID models quite often refer not only to cognitive psychology but also to constructivist approaches. Conceived for adult learning most of them can also be applied to teaching and learning in primary and secondary schools.

A very influential elaboration of ID is the ADDIE Model of the Florida State University. In its best known version it consist of five phases which build on one another:

Analyze: The analysis refers to all parameters that are relevant for the planned teaching unit or lesson, i.e. the objectives, the content, the prior knowledge of the students, the learning activities as well as the evaluation tasks. It is within the responsibility of the teacher to connect the gathered information in order to create the best learning experiences for all students.

Design: The second phase of the model aims at creating the pedagogical design of the whole teaching unit. Based on important research results and models of ID, the teacher plans the learning activities taking the special teaching and learning context into account.

Develop: What follows is the planning of the concrete learning activities and their sequence considering the particular learners.

Implement: The whole instructional design, i.e. the integration of all steps and materials gathered during the phases 1 to 3, is put to the test of effectiveness and efficiency.

Evaluate: This last phase ensures that the targeted objectives are really reached. The evaluation consists of forms of formative and summative feedback.

4 Backward Design

Important educational scientists engaged in research into ID dealt with **backward design**, e. g. Mager (1962). Furthermore, the first phase of the above ADDIE Model refers explicitly to backward design. Nevertheless, I would like to underscore the importance of this third D. Teachers tend to fix important goals and to choose appropriate learning activities for their learners without thinking too much about evaluation forms. Perhaps a presentation or a written test as summative feedback at the end of the unit? What about formative evaluation during the lessons?

Backward design means to have clear ideas – especially for the learners – what is expected of them during the lessons and at the end of a unit. In which way and by which means will and can the students show if or to what extend they have reached the goals? Attaining the objectives does not refer only to subject matter content but, moreover, to critical thinking and higher level attitudes such as respect for people originating from other backgrounds and cultures.

In a top-down approach backward design descends from reflected personal attitudes and effective thinking strategies to the automatization of knowledge and skills. Froelich (www.lookingatlearning.org ; last accessed June 2016) puts it as follows:

> **Effective lessons focus on students' thinking as the most important goal:** High performing classrooms primarily engage students in activities where they are asked to think about concepts and essential truths, extend their thinking to new situations, practice expressing their thinking and develop the several cognitive processes required to continually interact with new materials and situations. Thus the goal of instruction is to get the students to analyze, think and extend their thinking.

> **A second lesson goal is one that gives students practice developing skills to automaticity:** Developing skills to some level of automaticity is often important if students are to attain some level of efficiency. However, it is important to not confuse the two goals: developing thinking skills and practicing automaticity. While they are both important, they are not interchangeable. That is to say, practicing skills to automaticity does not necessarily lead to understanding (the ability to think coherently about a subject), nor does understanding concepts necessarily lead to automaticity. (Froelich 2009: 1; emphasis added by the author).

With regard to backward design, that is to say that evaluation forms of formative and of summative feedback have to be quite different for showing critical thinking and other higher-level attitudes than for the display of knowledge and skills. Furthermore, teachers and other education professionals have to plan the necessary feedback and evaluation activities in advance.

5 Lesson Plan Design: the Model of Effective Teaching and Successful Learning (MET)

In order to give teachers of all subject matters and grades a useful tool for their concrete lesson planning at hand, I have created the MET, mostly on the basis of the work of Hunter (1984), the DISTAR Model (cf. Engelmann and Carnine 1991), and the research findings of Hattie (2009; 2012). I would like you to understand the MET as a proposal which enables informed autonomous teachers to decide for themselves. Neither are all 30 steps intended as a prescription nor is the sequence of the steps unalterable. The affective empathy, the teaching experience and the overall responsibility of education professionals will help them to adapt the single steps to their contexts. But even if they rather discard them, the MET (for details cf. De Florio 2016: chap. 7-11) would enable them to enhance their own skills and knowledge and to contribute to the multiple identities of their students.

MET – 30 steps to Effective Teaching and Successful Learning

Planning the lesson (see Chap. 7)
1. Choice of curricular goals linked to prior learning; goals, standards, and objectives should be motivating and relate to students' lives.
2. Explicit connection to students' existing knowledge; prior knowing consists of subject matter as well as of world knowledge.

3. Possibly subdivision of the goal(s) into several objectives; in most cases students need this fragmentation in order to grasp new knowledge and skills.
4. Thorough planning of content presentation and practice; presentation and practice have to fit the special subject matter content as well as the students' needs and interests.
5. Elaboration of alternative forms of content presentation and practice; it is important to plan and elaborate alternative forms to be prepared for students' learning difficulties.

Starting the lesson (see Chap. 7)
6. Explanation of the goals, the learning intentions and the success criteria; students need to be informed in advance of what respective knowledge and skills they should learn and why, and how they can evaluate the success of their learning processes.
7. Display of the values connected to the particular knowledge and skills; depending on the age of the students, explanations are often less effective than examples.
8. Encouraging students with regards to their possibilities of meeting the goals; student learning outcomes depend to a large extent on their self-confidence.
9. Promotion of students' commitment through motivating hooks or other hints; teachers should dispose of a variety of inspiring examples and short narrations in order to increase students' engagement.

Presenting knowledge and skills (see Chap. 8)
10. Comprehensible explanations or demonstrations of learning content; explanations, modeling, and demonstrations have to be in accordance with students' learning possibilities.
11. Redundant explanations; various formulations of content knowledge and/or skills help students to grasp the learning content and store it in memory.
12. Illuminating, student-centered examples; examples should be easy to understand in order to attract the attention of the students.
13. Exemplification and demonstration of knowledge and skills through visual/audiovisual aids; as visual memory plays an important role in storing knowledge, a display of different means such as pictures, tables, and especially different digital media could possibly be incorporated.
14. Presentation of the steps leading to solution through worked examples; not only in mathematics but in (almost) all subject matters, worked examples show students what to do in order to reach goals and objectives.

Questions and Answers (see Chap. 8)
15. Assertive questioning; during the whole lesson, but especially when presenting new content, teachers have to check through adequate questioning if and what students have understood.
16. Attentive answering of students' questions; students' questions should never be ignored, as they show if and how students have conceived the learning content.
17. Positive attitude toward mistakes; students need to know that mistakes are welcome, as they offer further learning possibilities.
18. Questions regarding the presented knowledge and skills; these questions should be formulated in such a way that all students have an opportunity to take part in the lesson.
19. Repeated presentation of the learning content; if it is found that the students did not comprehend the learning content on the whole or in part, it has to be re-taught.

Guided Practice (see Chap. 9)
20. Graded activities for practice including short self-assessments; under the guidance of the teacher, all students are enabled through practice to improve and evaluate their understanding of the learning content.
21. Further worked examples with explanations of the single steps leading to the solution; in this context the worked examples are part of student practice (see no 14).
22. Decision on the social setting; by agreement with the students it is decided whether guided practice takes place in seatwork, in tandem, or in small groups.

23. Formative feedback; it is (most of the time) up to the teacher to give feedback to single students in difficulty or asking for help.
24. Short explanations directed to individual students; the teacher should invite all students to seek help when their understanding of the new learning content is found to be insufficient during practice.

Independent Practice (see Chap. 9)
25. Thoroughly planned and elaborated activities that allow for deep learning and transfer; these activities are more complex and demanding, in order to further critical and creative thinking.
26. De-contextualization; the contexts in which the presented knowledge and the skills occur are varied so that students can transfer the learned content to relevant (new) situations.
27. Decision on the social setting; by agreement with the students it is decided whether independent practice takes place in seatwork/homework, in tandem, or in small groups (see Chap. 10)
28. Formative feedback; this time it should not predominantly be given by the teacher, but rather by peers (see Chap. 11).
29. Feedback through tests; besides grading, summative feedback possibly could take forms that lead to further learning.

Transition or Conclusion (see Chap. 9)
30. At the end of an important learning phase or at the end of the lesson, the teacher and the students summarize the learning processes so that the students can make sense of the passed learning experiences.

6 To Sum Up

Effective teaching that considers the four Ds can be summarized in three phases:

– The **introductory phase** comprises all steps up to the point where the students get into contact with the concrete materials and engage in the respective learning activities (MET steps 1-14).
– The **interaction phase** refers to student involvement with the learning content in different social forms (MET steps 15-19).
– During the **evaluation phase** the results of the various learning processes are continuously examined through formative and summative feedback.

As learning processes are far from being linear, the three phases can follow one another not only during the whole teaching unit, but even during single lessons.

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