International Journal of **Human Sciences Research**

ASSESSMENT AS LEARNING: FUNDAMENTALS AND DESIGN OF FORMATIVE ASSESSMENT IN THE APPROACH TO MAKE VISIBLE LEARNING AND METACOGNITION MEDIATED BY DIGITAL TECHNOLOGY[1]

Júlia Pinheiro Andrade

---

1 Originally presented at Web Curriculum Conference at PUC Sao Paulo in 2020 in portuguese.

Abstract: We propose the conceptualization of assessment for and as learning through the theoretical debate of formative assessment and the analysis of some metacognitive assessment specialization courses in the Approach to Make Learning Visible, a theoretical-practical proposal to Teacher Professional Development in active methodologies, Thinking Routines and documentation strategies for the development of teaching skills. The theoretical foundation is state-of-the-art studies on formative assessment, Project Zero's Visible Thinking Routines research, John Hattie's Visible Learning research and Dylan William's concepts of assessment for learning and assessment as learning by Lorna Earl.

Keywords: formative assessment, teacher professional development, thinking routines, metacognition

INTRODUCTION

We presented the fundamentals of formative assessment in the Approach to Make Learning Visible (ATIVA): assessment with the function of supporting and expanding learning in process, designed and implemented from the beginning of the formative path. As it was presented in Web Curriculum congress (ANDRADE, 2019; 2021), ATIVA (Approach to Making Learning Visible) is a teaching professional development proposal entirely based on active methodologies and digital portfolios that, in homology of processes with the classroom practices, make learning visible and allow teachers in double conceptualization (SCHÖN, 1998), build active and meaningful learning "through the eyes" of students (HATTIE, 2017) and plan how to transfer studied strategies to their school realities. Experienced as an active methodology, assessment as learning makes visible the discussion on teaching self-efficacy and the development of competencies, especially communication, collaboration, (self)assessment and metacognition.

ABOUT ASSESSMENT FOR ASSESSMENT AS LEARNING

The evidence base on formative assessment goes back to the state-of-the-art classical research by Paul Black and Dyllan William (BLACK et al 2019; WILLIAM, 2018):

> Assessment for learning is any assessment for which the first priority in its design and practice is to serve the purpose of promoting students' learning. It thus differs from assessment designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence. An assessment activity can help learning if it provides information that teachers and their students can use as feedback in assessing themselves and one another and in modifying the teaching and learning activities in which they are engaged. Such assessment becomes "formative assessment" when the evidence is actually used to adapt the teaching work to meet learning needs.(BLACK et al, 2004, p.10)

Formative assessment is defined by the authors for its function of supporting and deepening learning, including to make possible to use summative assessment instruments with a formative function: to bring out questions, listening, reflections and production of pedagogical documentation that support the continuity and foster the deepening of learning. Lorna Earl (2013; 2003) systematized a conceptual distinction that deepens the vision of formative assessment: assessment of, for and as learning (chart 1):

Approach	Focus	Purpose	Comparison Points	Key Figure
Learning assessment	summative results Metaphor: It's like a photo	Judgments about each student's position, promotion, and credentials	Other students; Curriculum Standards and high-stakes assessment (eg SAEB, PISA)	Teacher
Assessment for learning	Learning process Metaphor: It's like a documentary film	Information for adjustments in decisions, didactic instructions and engagement; Pedagogical Feedback	Curriculum learning standards; Feedback from the teacher and peers	Teacher, class/ student groups
Assessment as learning		self-monitoring, Auto correction and self-tuning	Personal goals and curriculum standards	Student

Table 1: Distinction between the assessment concepts of, for and as learning adapted to the Brazilian context.

Source: Own elaboration based on EARL (2013;2003).

Assessments for and as learning aim to improve and support the development of learning itself. The metaphor associated with these assessments are like a movie of the teaching and learning process, not a snapshot of a final moment. Its purpose is to bring information to adjust and improve both the teaching process (instructions, challenges, proposals for interactions, support materials and documentation) and the learning process of all (whole class) and each one (identifying needs for personalization of the teaching so that learning is more effective for each one).

Deepening this self-conscious formative purpose, in assessment as learning, the key figure is the student himself: how he gains self-knowledge, self-monitoring and self-regulation capacity and expands his capacity to reflect on what and how he is learning - connections with previous experiences, latent doubts and how to unfold your own learning in new questions, in curiosity, in new investigation. In this learning spiral (BRUNER apud RICHHART et al 2011) it is a "realization" of both the study content and the strategies that help to better understand oneself, the objects of knowledge and the world. Therefore, the essential difference between assessment for learning and assessment as learning is that in the latter one

seeks to strengthen metacognitive knowledge: knowing and thinking one's own thinking and feeling.

RESULTS: ASSESSMENT AS METACOGNITIVE LEARNING

Research on teaching strategies and competencies assessment (OECD, 2020) point out to metacognition as a key competence or umbrella competence for the development of other competencies, that is, teaching that is based on reflection strategies and metacognitive documentation scaffolds student learning in all subject areas and objects of knowledge and practice. At ATIVA (as Approach to Making Learning Visible), we articulated different assessment practices with a metacognitive approach:

1. The visible spider chart of collective-self-assessment method (ANDRADE, 2019; 2021);

2. Thinking Routines (ATIVA 2021; RICHHART et al, 2011; 2020) specially those focus on metacognitives balance;

3. Holistic and analytic rubrics (WILLIAM, 2018; LUCAS et al, 2013; ANDRADE, 2000);

Articulated, those three strategies provide clear criteria to concretize the performance

in competencies, helping to create disposition and attention to expected procedures and objectives. They thus integrate means and ends on formative assessment (OECD, 2020) as they scaffold key questions to become visible, concrete and operational for each learner: where am I, where do I want to get to (what I want to achieve?), how will I get there? (WILLIAM, 2018, p.20).

As an example, we mentioned the formative (training) itinerary using the strategies above in the ATIVA 2019 specialization course at Instituto Singularidades, in which padlet you can find the rubrics, Thinking Routines and self-assessments strategies, available at <http://bit.ly/AVL2019> (password#Ativa20). In this reflective portfolio there are concrete examples of implementing visible self-assessment with rubrics and various metacognitive Thinking Routines: simple, easy-to-remember verb structures that scaffold and structure different types of thinking developed in over 60 years of research by Project Zero, from Harvard Graduate School (RICHHART et al, 2011; 2020). The most well-known Routine for promoting metacognition is KWL – Known/Want to learn more/Learnt, that self evaluate "what did I already know? What did I learn? what do I want to know more?, in which students record metacognitive learning balances (that can be made individually or collectively).

There are Routines to establish comparisons between what was known and what was learned, such as 321 (3 words, 2 questions and 1 image) which, when done as "321 bridge 321", at the end of a study sequence, compares the initial and final representations and builds a comparative bridge (analysis) over its own learning.

Another example of this formative view is the "I used to think…/now I think …/so I ask…" Routine. This is a typical metacognitive balance to close a reflective investigation sequence:

> Previously, I used to think that visible learning was a strategy focused on student assessment and a superficial awareness of what they were learning. NowI think that making learning and thoughts visible goes beyond content; it connects with skills necessary for an integral human development: making visible what one thinks and how one thinks. Today, it seems fundamental to me so that we can create internal resources that allow us to make better choices in different personal areas and extend our own learning - not just content school learning. So now, I ask myself: how can I intellectually act so that my awareness of learning and visible thoughts becomes present in my daily life? I believe that to be able to work on this kind of conception with our students, we need to live/practice these skills in our daily lives. (Learning balance at the end of the course of a teacher, a graduate student in Active Methodologies at Instituto Singularidades, cohort 2020)

In this exemplary case, the Thinking Routine provides an structure of comparative self-assessment reasoning, a scaffolding for his own learning, revealing the metacognitive awareness of the change not only on a conceptual approach about the teaching tool, but also of his own formative vision about what is teach and learn. This methodology of metacognitive learning balance is recurrent in the Project Zero research (RICHHART et al, 2011; 2020), revisiting learning and expanding it through reflective comparisons and feedback (conception that is on the basis of WILLIAM, 2018 and HATTIE 2017 proposals). For students, this procedure increases interest, understanding of the course's objectives and methodological paths/choices and, therefore, increases engagement. In the words of teacher Amábile Bianca, in a metacognitive learning assessment of the module on visible learning in the specialization course in active methodologies at Instituto Singularidades:

It was only in the middle of the module

that I realized the teacher's intentions: from the first class we recorded our entire learning trail through different routines: we were making our learning visible and this happened individually and collectively. In the end, it was possible to clearly see how much I had learned, since (...) all my evolution and (...) the evolution of the class was recorded. The wealth of records was proof of the importance of making learning visible. The last class of the module was exactly to, through metacognition, recall the process. (...) My classes changed significantly after this module. Nowadays, I consider it essential to make students' thinking visible. It is essential for them, because it enables more engagement. Isn't it motivating to realize how much we can learn? Keep track of our achievements? It is essential for me, as I can follow the learning process very closely both collectively and individually. It is possible to intervene earlier - this decreases "summer classes" (or "recovering students"), for example. (BIANCA, 2020, s/p)

FINAL CONSIDERATIONS

The foundation of formative assessment in visible learning is to actively engage students in their own learning process and provide evidence of how and when it occurs. The formative design of an assessment process lived as learning always involves the following steps, facilitated when structured by Thinking Routines: 1) initial self-assessment and record of previous knowledge or hypotheses about what the study´subject is; 2) expansion of the repertoire through practices of experimentation and interaction in groups to emerge individual perceptions and their expansion through collective intelligence; 3) deepen learning through theory reading and development of pedagogical intervention projects with visible learning success criteria; 4) experimentation, debate and feedback between peers on the developed projects;

5) final co-creation of didactic proposals; 6) resumption of initial records and self-assessment and metacognitive comparison on the expansion of knowledge and skills produced by the study. In the process, all experimentation is documented in a portfolio visible to all and revisited several times, expanding learning.

Thinking Routines are powerful tools for structuring and making assessment visible as learning and, in particular, for strengthening the metacognitive competence of observing oneself in the process. This self-monitoring (metacognitive balance) is recorded using digital tools (just like padlet-portfolio, google jamboards or google slides). Thus, this formative assessment methodology can occur both in face-to-face and remote teaching. Associated with analytical rubrics, which describe degrees or levels of proficiency (from the most novice to the most advanced), the routines allow students to name their thinking moves, skills, abilities and dispositions, making them visible and self-aware. According to `Project Zero research, naming and perceiving one's own thinking and when it occurs is a condition for controlling and modulating it" (RICHHART et al 2011, p.33). With more than 600 teachers "trained" by ATIVAand thousands by Project Zero, making learning visible process gathers useful practice´s evidence for structuring formative assessment for analytical, critical, and metacognitive thinking.

REFERENCES

ANDRADE, J.P. (2021)."The Approach to Make Learning Visible and the Centrality of Digital Technology". In: Journal of Modern Education Review, v.10, p.531 - 536.

ANDRADE, J.A.(2019). "A abordagem para tornar visível a aprendizagem e a centralidade da tecnologia digital" In: Anais do VI Seminário Web Currículo, v.1. p.1050 - 1055. Pontifícia Universidade Católica de São Paulo.

ANDRADE, H. G. (2000). Using rubrics to promote thinking and learning. Educational leadership. Disponível em:<https://www.semanticscholar.org/paper/Using-Rubrics-To-Promote-Thinkin g-and-Learning.-Andrade/8ea5836dc2c3b476d2fbc7eafc 541a03f5b8060d>. Último acesso em 10/08/2021.

ATIVA EDUCAÇÃO (2021). Rotinas de Pensamento Visível: uma seleção para sala de aula. e-book Ativa Educação. São Paulo. Disponível em: <https://read.bookcreator.com/cLurUlYlpHXH9nS0URBqzYoSiLu1/vA89w9VsR- iXp3Sb9puXWg>. Último acesso em 06/10/2021.

BIANCA, A. "Rotinas de pensamento: como deixar o pensamento dos alunos visível?"In: Blog da Professora Amábile, 09/10/2020. <https://profamabilebianca.blogspot.com/2020/10/rotinas-de-pensamento-como -deixar.html>. Último acesso em 10/08/2021.

BLACK, P.; WILLIAM, D; LEE, C.S; HARRISON, C; MARSHALL, B.(2019).Trabalhando por dentro da caixa preta: avaliação para a aprendizagem na sala de aula. Cadernos Cenpec| Nova série, v. 8, n. 2, 2019. Disponível em: <http://cadernos.cenpec.org.br/cadernos/index.php/cadernos/article/view/445>. Último acesso em 21/11/2019.

BLACK, Paul et al (2004). Working inside the black box: Assessment for learning in the classroom. Phi delta kappan, v. 86, n. 1, p. 8-21.

EARL, L (2013). Assessment as learning: Using classroom assessment to maximize student learning. 2th Edition. Corwin Press,.

Earl, L. (2003). Assessment as Learning: Using Classroom Assessment to Maximise Student Learning. Thousand Oaks, CA: Corwin Press.

HATTIE, J. (2017). Aprendizagem visível para professores. São Paulo: Penso.

LUCAS, B.; CLAXTON, G.; SPENCER, E.(2013). Progression in student creativity in school: First steps towards new forms of formative assessments. OECD.

ORGANIZAÇÃO DE COOPERAÇÃO E DE DESENVOLVIMENTO ECONÓMICO (OCDE) (2020). Desenvolvimento da criatividade do pensamento crítico dos estudantes: por que significa na escola. Centro de pesquisa, inovação e educação. São Paulo: OCDE/Instituto Ayrton Senna/Fundação Santillana.

RITCHHART, R; CHURCH, M. (2020).The power of making thinking visible. Practices to engage and empower all learners. San Francisco: Jossey-Bass.

RITCHHART, R; CHURCH, M; MORRISON, K.(2011). Making thinking visible: How to promote engagement, understanding, and independence for all learners. San Francisco: Jossey-Bass.

SCHÖN, D. (1998).El profesional reflexivo. Cómo piensan los profesionales cuando actúan. Buenos Aires: Paidós.

WILIAM, D. (2018). Embedded Formative Assessment. Bloomington/IN: Solution Tree. LUCAS, B.; CLAXTON, G.; SPENCER, E. Progression in student creativity in school: First steps towards new forms of formative assessments. OECD. 2013.

ORGANIZAÇÃO DE COOPERAÇÃO E DE DESENVOLVIMENTO ECONÓMICO (OCDE). Desenvolvimento da criatividade do pensamento crítico dos estudantes: por que significa na escola. Centro de pesquisa, inovação e educação. São Paulo: OCDE/Instituto Ayrton Senna/Fundação Santillana, 2020.

RITCHHART, R; CHURCH, M. The power of making thinking visible. Practices to engage and empower all learners. San Francisco: Jossey-Bass, 2020.

RITCHHART, R; CHURCH, M; MORRISON, K. Making thinking visible: How to promote engagement, understanding, and independence for all learners. San Francisco: Jossey-Bass, 2011.

SCHÖN, D. El profesional reflexivo. Cómo piensan los profesionales cuando actúan. Buenos Aires: Paidós, 1998.

WILIAM, D. Embedded Formative Assessment. Bloomington/IN: Solution Tree, 2018.