

Self-assessment for learning in vocational education and training

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### **Abstract**

Self-assessment is a crucial skill that students need to develop during their educational years, especially at those educational levels where the curriculum leads to future jobs. By being able to assess their own performance, students can become self-regulated learners and continue their professional development throughout their careers. This chapter will explore what is known about self-assessment through an updated version of the state-of-the-art. Firstly, it will be defined what self-assessment is, the different forms it can take, and which of those forms are most conducive to enhancing students' learning. Secondly, it will be explored what is the relationship between self-assessment and academic achievement, between self-regulated learning strategies and self-efficacy. That section will also present an overview of the learning and psychological effects of self-assessment to conceptualize the internal cognitive, motivational and emotional processes that are involved. Thirdly, extracted from the research literature, it will be explored what are the best instructional methods to train students to develop their self-assessment skills. In that section, both recommendations on how to help students develop the requisite skills and recommendations for teachers' training will be presented. Lastly, we will build from best-research examples on vocational education and training to consider how self-assessment can best be implemented and extract practical implications and recommendations.

*Keywords:* self-assessment, self-regulated learning, professional development.

### **Self-assessment for learning in vocational education and training**

Most teachers will agree that one of the main skills students need to develop is their capacity to reflect, evaluate and, if needed, improve their own work. This skill is known as **self-assessment**. Unfortunately, it is not so well known how self-assessment works or what to do to help our students develop their expertise in such skills. This chapter will present the state-of-the-art knowledge on student self-assessment, answering those questions while providing examples of vocational education and training research and examples of practice on self-assessment.

#### **Self-assessment history**

Self-assessment in education has been studied for a long time. Topping (2003) mentioned George Jardine from the University of Glasgow (prof. 1774 to 1826) as probably one of the first to include self-assessment in his instructional plan. Throughout the 20<sup>th</sup> century there was an increasing interest in the topic, with some articles published as early as 1954 to the boom of the field by the 1990s (Sitzmann, Ely, Brown, & Bauer, 2010). In 1989 two crucial reviews gave a major push to the field: the meta-analysis by Falchikov and Boud (1989), which focused on scoring accuracy in self-assessment, and the more narrative review by Boud and Falchikov (1989), also revolving around matters of accuracy. Importantly, the seminal work by Black and Wiliam (1998), which launched the formative assessment movement, had self-assessment as one of the key pieces for students' learning. Consequently, self-assessment has been key for the formative assessment field.

The first two decades of this century have seen two main branches of educational research into self-assessment. Firstly, self-assessment accuracy has continued as an area of research with no major changes, hence no great developments in our understanding have been gained from an educational perspective (Panadero, Brown, & Strijbos, 2016). Secondly, increasing effort has been made to use self-assessment for formative purposes, with a relevant

focus on self-assessment connections to self-regulated learning (Andrade, 2010; Panadero & Alonso-Tapia, 2013). Additionally, noteworthy research conducted in medicine (Eva & Regehr, 2005) and social psychology (Dunning, Heath, & Suls, 2004) has moved the field forward. If we consider all these approaches to self-assessment, we are in an interesting phase in the field, putting together new pieces of the puzzle.

### **Purpose of assessment**

As mentioned earlier, in the last two decades there has been a growing interest in how the use of self-assessment for formative purposes can enhance student learning, in contrast with **summative self-assessment**, which focuses mostly on the accuracy of the self-grading. Though there were some previous publications about **formative self-assessment** (e.g. Boud, 1995; Goodrich, 1996), the interest grew exponentially after the publication of the review by Black and Wiliam in 1998 (Wiliam 2011, 2014). What is this summative–formative comparison? Wiliam (2014) explains it as follows:

Where the inferences are related to the student’s current level of achievement, or to their future performance, then the assessment is serving a summative function. Where the inferences are related to the kinds of instructional activities that are likely to maximize future learning, then the assessment is functioning formatively (p. 6).

Therefore, when the assessment information serves the purpose of enhancing students’ learning, then it is formative, and when the assessment includes elements of grading, selection, etc. it refers to summative purposes. As mentioned above, self-assessment is considered one of the key formative assessment processes (e.g. Andrade, 2010; Black & Wiliam, 1998). One of the arguments is that students need to be able to monitor and evaluate their work to be autonomous and self-regulated learners (Paris & Paris, 2001). As those

authors and many others claim, teachers need to provide the context and instructional scaffold for students to develop their self-assessment skills.

### **What is self-assessment?**

A recent state-of-the-art review explored the different types of self-assessment that have been studied in research. Panadero, Brown and Strijbos (2016) found five taxonomies with twenty different categories of self-assessment. Importantly for our purposes, these authors provided their own definition of self-assessment as involving ‘a wide variety of mechanisms and techniques through which students describe (i.e., assess) and possibly assign merit or worth to (i.e., evaluate) the qualities of their own learning processes and products’ (p. 804). And this ‘wide variety’ implies, as was expressed at the beginning of the paragraph, that there are different practices that are labelled as self-assessment. For example, out of the five taxonomies that were found in that review, the one by Panadero and Alonso-Tapia (2013) proposed three types of self-assessment practices based on the presence and form of the assessment criteria: (a) **standard self-assessment**, with no explicit criteria (i.e. just asking the students to self-assess); (b) **rubric self-assessment**, in which more clearly defined criteria are provided; and (c) **script self-assessment**, which includes criteria presented as questions that the students need to answer for themselves. Taken together, this demonstrates that self-assessment is a complex process that can take several forms and, therefore, can be implemented in different ways in the classroom.

Depending on its implementation features, self-assessment can serve summative or formative purposes (Andrade, 2018; Panadero & Alonso-Tapia, 2013). Picture a continuum with summative on one end and formative at the other. At the summative pole would be the type of self-assessment in which students are asked to estimate a grade for their performance with neither further instructions nor any request to generate more informative feedback. This is called self-grading and is probably the least optimal form of self-assessment

implementation to enhance students' learning (Boud, 1995). The reason for the limited effects of this type of self-assessment is that it does not ensure a deeply engaged reflection on the performance. If students are only asked to provide a grade, unless they are given advanced tools to calculate it, they usually just make a guess with no further reflection (Andrade, 2010). At the other end, the formative pole, would be a type of self-assessment that asks the student to extract conclusions from his or her performance, provides opportunities for practice and provides modelling and feedback on the self-assessment itself. In other words, self-assessment here is a crucial skill to be developed, one central to the curriculum, not a side activity (Brown & Harris, 2014; Panadero, Brown, & Strijbos, 2016; Tan, 2012). This approach also gives its incorporation into the labour market a high level of importance (Clayton et al., 2003). Obviously, the effects for learning of the latter type of self-assessment are greater.

As with many other things, we get what we aim for. If we implement more shallow approaches to self-assessment aiming at the grade level—e.g. merely asking students to guess their grade—that is what the students will perform. On the contrary, if we aim for a deeper type of self-assessment, then the students will utilize our instructional scaffold and the effects of the self-assessment will have a greater impact on learning. Teachers can have several reasons for choosing one approach over the other, and of course there are plenty of types of self-assessment in between those two extreme poles. What is crucial is that the teachers make an informed decision on why they are using a particular type of self-assessment. The pedagogical recommendation, to be sure, is to aim for the highest level of formative self-assessment possible because that will provide for more learning insights for the students.

### **Self-assessment effects on learning variables**

All that we have explained above would be pointless unless self-assessment had a positive effect on students' academic success. There are two meta-analyses that have explored the effects of formative uses of self-assessment. Brown and Harris (2013) explored the effects

of self-assessment on students' academic achievement. These authors found 24 effect sizes ranging from -0.04 to 1.62, and reported that the median effects lay between 0.40 and 0.45. They concluded, using Hattie's (2009) 0.4 effect size crosscut, that in light of the reviewed empirical evidence it could be maintained that self-assessment can improve academic achievement across different grades and subjects. Though Brown and Harris also explored self-assessment effects on self-regulated learning, the more recent meta-analysis that will be presented next is more comprehensive.

Panadero, Jonsson and Botella (2017) reviewed 19 studies that had explored effects of different self-assessment practices on **self-regulated learning** and **self-efficacy**. Though self-regulated learning theory contains self-efficacy within it (e.g. Zimmerman, 2000), these authors decided to review the concepts separately because the explored research had differentiated these effects. Importantly, the authors also separated self-regulated learning into three different types of measurement, according to how this construct had been explored in research. They found that self-assessment intervention's effects on self-regulated learning were 0.23 (Learning SRL), -0.65 (Negative SRL) and 0.43 (SRL measured qualitatively), respectively, and for self-efficacy 0.73. It was concluded that self-assessment interventions enhanced both students' use of learning strategies (i.e. self-regulated learning) and their levels of self-efficacy.

All in all, the conclusions of these two meta-analyses support the idea that self-assessment interventions do have a positive effect on students' learning, self-regulation and self-efficacy. It is now important to explore what are the characteristics of VET and how these might affect the implementation of self-assessment.

### **Vocational education and training features and their implications for self-assessment**

Vocational education and training presents some distinct features from other types of educational levels and systems. Probably the most relevant one is that in most countries VET

educational systems organise students' learning around two contexts with different requirements and conditions: the vocational school and the workplace (Schaap, Baartman, & de Bruijn, 2012). In vocational schools, teachers are devoted to implementing and formally assessing learning goals established in the VET curriculum, and they must generate a summative assessment. In contrast, in workplaces students during their internships engage in dialogue and many informal assessment situations with their instructors while performing daily activities related to their occupation (Sandal, Smith, & Wangensteen, 2014). This underlines the relevance of self-regulated learning for students' integration against these two complex and evolving learning scenarios in VET.

Three implications for student **self-regulation** emerge from those contexts. First, in both vocational schools and workplaces, teachers and instructors should develop a strong learning environment of coaching and promoting students' self-regulated learning to support the acquisition of knowledge and skills (Bruijn, Leeman, & Overmaat, 2006, cited in Geurts & Meijers, 2009). As in any other field, VET teachers and instructors need the ability, not only to intervene actively to deliver essential knowledge, but also to take a back seat and allow learners to become more self-directed and learn through collaboration with their peers (Searle, 2009). As Höpfner (2009) points out, 'the teacher/instructor in technical and vocational education and training is no longer a master who gives all the information, demonstrates everything that has to be done and explains every detail' (p. 1702).

Second, **summative assessment** is still present in VET schools, influencing students' goal orientations. That means that students might be focused, not only on learning, but also on their grades, which would generate types of goal orientation that are not conducive to learning outcomes (Montero & Tapia, 1992). In order to alleviate this influence, it is recommended that schools implement authentic assessment scenarios which increase the likelihood of achieving learning goals and also promote higher-order thinking skills (Rojewski, 2009). In



these scenarios, with a focus on self-assessment activities, students have to demonstrate their comprehension of knowledge and skills within a real context (Boud & Soler, 2015).

Third is the need to integrate and build more meaningful relations between the knowledge and the skills developed in the VET school and those utilized in the workplace learning environment (Baartman & de Bruijn, 2011). In practice, the contradictions between vocational schools and workplace learning environments challenge students' adaptation to their future work. The school-based model sometimes demands assessment procedures that are disconnected from everyday life, activities and experience in the workplace, and the students may assume a dichotomy between 'practical knowledge' and 'school knowledge' (Sandal, Smith, & Wangensteen, 2014; Schaap, Baartman, & de Bruijn, 2012). For this reason, VET teachers and workplace instructors should have a close collaboration to identify learning needs, mainly at the workplace, and thus optimize the teaching processes to solve students' educational needs. Through this collaboration, students will be better guided to take responsibility in their learning so they can develop, organise and use professional knowledge more effectively (Placklé et al., 2014) and identify the possession of skills demanded in the labour market (Clayton et al., 2003). Therefore, it is essential that students be able to identify the workplace learning needs and fulfil them, that is, to self-regulate and to respond to their initial lack of knowledge when they arrive in their new workplace (Munby, Hutchinson, & Chin, 2009).

The use of self-assessment procedures covering general and specific competences is a way to develop VET students' self-regulation skills and to help them integrate their learning in workplace environments. The next section will explore what is known in the VET literature about self-assessment will be explored.

### **Studies using self-assessment in VET**

Even though many authors and professional organisations defend their importance (e.g., Baartman, Gulikers, & Dijkstra, 2013; Clayton et al., 2003), within the VET literature, studies reporting the use of self-assessment tools to promote self-regulated learning are scarce. One area that has interesting studies within the VET literature in relation to self-assessment, however, is the use of **self-report instruments** that measure **general competences**. Two of them will be presented in detail here.

First, Khaled et al. (2014) published a self-report tool that, according to the authors, is still in an exploratory phase. The instrument includes items regarding four competences — deciding and initiating actions, cooperating, applying perspective, planning and organising— with 4 to 9 items per competence. Two examples of items for the competence of planning and organising are: ‘During the preparation of an assignment, I consider which results I want to achieve first’ and ‘I put the tasks to be performed in a logical order’. The validity of the instrument was tested with 351 VET students from the field of health sciences, who had to rate their agreement with the items using values between 0 (‘not at all applicable to me’) to 10 (‘completely applicable to me’). The results of the study showed that it is possible to identify competences and indicators applicable to different educational settings. Nevertheless, some parts of the questionnaire were not entirely valid, and the authors recognized an important limitation: they noted that specific items could be too abstract for students because it was difficult to find particular indicators aligned with the variety and complexity of learning situations that VET students face in their daily activity. Nevertheless, this questionnaire represents a valuable effort in designing a standardized self-assessment tool with an emphasis on general competences that can be related to self-regulatory strategies.

Some of the difficulties identified by Khaled et al. (2014) were overcome in the study by Kydnt et al. (2014). Following a complete and complex mixed-method testing process,

these authors developed an instrument for secondary vocational education to explore students' perspectives on generic competences applicable to every occupation. The study included 826 students from many different VET fields (e.g. child care, auto mechanics, organisational assistance) to validate the instrument. The self-report includes eight general competences organised in two sections. The division of communication covers the competences of empathy, active listening and assertiveness, whereas the section of professional conduct involves the competences of professional attitude, cooperation ability, problem-solving, diversity attitude, and planning and prioritising (Table 1). Students self-assessed these competences by answering 44 items on a five-point Likert scale, from 1 ('completely disagree') to 5 ('completely agree').

This instrument shows that it is possible to generate reliable and valid self-reports to help students self-assess their levels in general competences. However, it is important to note, as Kyndt et al. (2014) argue, that competences are a complex learning outcome, so it is better to use this standardized self-report as a starting point to assess general competences.

Indeed, as some authors have maintained, the assessment of competences must take into account that they are also context-dependent (Baartman, Gulikers, & Dijkstra, 2013). This means that, as well as assessing general competences with several instruments, VET teachers and instructors should assess and promote the self-assessment of specific competences that are appropriate to their VET field.

### **How to implement self-assessment to help our students to develop this skill**

Before presenting the list of actions that we can take as teachers, it is crucial to consider what Panadero, Brown & Strijbos (2016) called a 'developmental approach to self-assessment'. There are three premises here. First, self-assessment in itself, like any other skill, needs practice. Teachers should not assume that their students will know how to self-assess if they have not been given opportunities and supported instructionally. Second, self-assessment

requires expertise in the task at hand. It is extremely difficult to self-assess with a task in which we barely have experience. And third, we need to consider the developmental phase of the student and ensure that the level of self-assessment we ask of the students is realistic for their level of maturity. Importantly, though more empirical work remains to be done on this point, research on teachers' assessment practices supports this developmental approach. For example, one study found that, among the five identified predictors of teachers' use of self-assessment in their classrooms, the highest one was previous experience in implementing self-assessment interventions; thus, teachers also need instructional practice (Panadero, Brown, & Courtney, 2014).

Regarding what teachers can do to **implement formative uses of self-assessment**, a number of papers have explored this. Panadero, Jonsson and Strijbos (2016) reviewed and combined two previous lists of instructional recommendations as presented by Andrade and Valcheva (2009) and Ross (2006). The list combines six recommendations:

**1. Define the criteria by which students assess their work.** It is important that students know what the assessment criteria are so that they can establish goals aligned with those of their teachers and monitor and evaluate them more precisely (Andrade & Valcheva, 2009; Panadero & Alonso-Tapia, 2013). One approach that has been turning mainstream in recent years is the use of rubrics. These tools provide students with clear assessment criteria and also different achievement levels that can be used to structure the performance. The formative use of rubrics has been found to have positive learning effects (Brookhart & Chen, 2015).

Additionally, the negotiation of assessment criteria is also a productive way to help students internalize it by, for example, co-creating rubrics (Fraile, Panadero, & Pardo, 2017).

**2. Teach students how to apply the criteria.** It is not enough to offer students the criteria; teachers also need to model how they should be used. This might seem quite an obvious recommendation but, unfortunately, it is a much-needed one, and here also we can learn from

research on rubrics. Just handing out a rubric does not have the same potential as teaching the students how to use it.

**3. Give students feedback on their self-assessments.** Teachers need to give information to the students about how well they are assessing their performance. For example, teachers can provide feedback on the self-assessment *content accuracy* (Panadero, Brown, & Strijbos, 2016), in other words, how close the qualitative information in the self-assessment is to what a teacher would give. Giving feedback about self-assessment turns the latter into a reflective action.

**4. Give students help in using self-assessment data to improve performance.** Teachers also need to provide models and scaffold students on how to apply their self-assessment to enhance their learning.

**5. Provide sufficient time (*and opportunity*) for revision after self-assessment.** As clearly argued by Goodrich (1996), students need opportunities for improvement after having self-assessed. Otherwise, they do not fully internalize the application of self-assessment to improve their work and their motivation to perform self-assessment might decrease.

**6. Do not turn self-assessment (*only*) into self-evaluation by counting it toward a grade.**

This is a controversial issue. As mentioned earlier, teachers might have different reasons for wanting to implement summative self-assessment alone or in combination with formative uses—i.e. students would generate both qualitative self-generated feedback and a self-awarded grade. As discussed by Panadero, Brown, & Strijbos (2016), there is still plenty of room for innovative research about self-grading. However, if self-evaluation is the only type of self-assessment implemented, then the teacher is not exploring the full potential of self-assessment as a learning activity.

## **Conclusions**

An initial conclusion is that there are a number of future lines of work directly related to VET literature. Firstly, there is a need for more research on self-assessment in VET environments. In comparison with other educational levels and systems, especially higher education, self-assessment publications in VET are extremely scarce. Additionally, it would be interesting if that forthcoming research had a focus on the formative use of self-assessment, as the educational value of this approach is stronger, or explored different approaches to summative uses of self-assessment (for recommendations, see Panadero, Brown, & Strijbos, 2016). Secondly, future research needs to continue defining what are the specific characteristics and needs of VET contexts when it comes to self-assessment. The key is probably the one outlined in this chapter: VET schools have a number of educational goals and constraints that make them different from workplace settings. Importantly, self-assessment is crucial in both environments but, for obvious reasons, the first place to teach how to self-assess is in the VET schools so that the students have developed this skill to a point when they reach their workplace. Logically, when those students start working, they will have to adapt to that new environment and therefore will have to tailor their self-assessment knowledge and skills. But this is already something that can be taught in VET schools. Thirdly, in a similar fashion, it is important that those self-assessment interventions be linked to the development of self-regulated learning skills. This framework also has implications for the relationship pointed out just before: workers are supposed to be able to have regulatory strategies, and VET schools are the ideal place to start developing them.

In conclusion, self-assessment is a crucial skill to develop over the educational years. It seems even more relevant in VET contexts where the connection to the workplace is constant. As one of the key skills for every worker is being able to conclude whether his or her performance has reached the needed goals, VET educators should have self-assessment as a key goal in their curriculum. Unfortunately, research seems to be lacking in this area, which

might be a reflection of the lack of permeability of the formative assessment ideas in VET education. Therefore, this chapter has as a goal to issue a call to transfer over some of the relevant conclusions about the educational influence of self-assessment that have been found in other educational levels. Hopefully, this chapter will be a modest contribution in that direction.

### **Cross-references**

#### Section 5:

Evans K. Fresh Perspectives on Vocational Learning: Introduction and Overview

Gustavsson M, Thunqvist D. Students' Vocational Learning: Enabling Conditions for Putting Knowledge to Work

#### Section 7

Coates H. Assessing Learning Outcomes in Vocational Education.

Seeber S, Michaelis C. Competence-based Tests: Challenges of the Diagnostic of Competence Development in Vocational Education and Training

Van Loon M. Self-reflection to Measure and Improve Self-regulated Learning in the Workplace

### **References**

- Andrade H (2010) Students as the definitive source of formative assessment: Academic self-assessment and the self-regulation of learning. In Andrade HJ, Cizek GJ (Eds.) Handbook of formative assessment. Routledge, New York, p. 90-105
- Andrade H (2018) Feedback and self-assessment. In Lipnevich AA, Smith JK (Eds.) The Cambridge handbook of instructional feedback. University Press, Cambridge.
- Andrade H, Valcheva A (2009) Promoting learning and achievement through self-assessment. *Theory Pract*, 48(1): 12-19. doi:10.1080/00405840802577544
- Baartman, L, Bruijn E de (2011) Integrating knowledge, skills and attitudes: Conceptualizing learning processes towards vocational competence. *Educ. Res. Rev.*, 6: 125–134
- Baartman L, Gulikers J, Dijkstra A (2013) Factors influencing assessment quality in higher vocational education. *Assess Eval High Educ*, 38(8): 978-997
- Black P, Wiliam D (1998) Assessment and classroom learning. *Assess Educ Princ Pol Pract*, 5(1): 7-73. doi:10.1080/0969595980050102
- Boud D (1995) Enhancing learning through self-assessment. Routledge Falmer, New York

- Boud D, Falchikov N (1989) Quantitative studies of student self-assessment in higher-education: A critical analysis of findings. *High Educ*, 18(5): 529-549. doi:10.1007/BF00138746
- Boud D, Soler R (2015) Sustainable assessment revisited. *Assess Eval High Educ*, 41(2): 400-413. doi: 10.1080/02602938.2015.1018133
- Brookhart SM, Chen F (2015) The quality and effectiveness of descriptive rubrics. *Educ Rev*, 67(3), 343-368. doi:10.1080/00131911.2014.929565
- Brown GTL, Harris LR (2013) Student self-assessment. In McMillan J (Ed.) *The SAGE handbook of research on classroom assessment* (pp. 367-393). SAGE, Thousand Oaks, CA, p. 367-393
- Brown GTL, Harris LR (2014) The future of self-assessment in classroom practice: Reframing self-assessment as a core competency. *Frontline Learning Research*, 3(2014): 22-30. doi:10.14786/flr.v2i1.24
- Clayton B, Blom K, Meyers D, Bateman A (2003) *Assessing and certifying generic skills: what is happening in vocational education and training?* NCEVER, Adelaide
- Dunning D, Heath C, Suls JM (2004) Flawed self-assessment: Implications for health, education, and the workplace. *Psychol. Sci. Public Interest*, 5(3): 69-106. doi:10.1111/j.1529-1006.2004.00018.x
- Eva KW, Regehr G (2005) Self-assessment in the health professions: A reformulation and research agenda. *Acad Med*, 80(10): S46-S54
- Falchikov N, Boud D (1989) Student self-assessment in higher education: A meta-analysis. *Rev. Educ. Res*, 59(4): 395-430. doi:10.3102/00346543059004395
- Fraile J, Panadero E, Pardo R (2017) Co-creating rubrics: useful or waste of time? The effects of establishing assessment criteria with students on self-regulation, self-efficacy and performance. *Stud Educ Eval*, 53: 69-76. doi:10.1016/j.stueduc.2017.03.003
- Geurts J, Meijers F (2009) Vocational education in The Netherlands: In search of a new identity. In Maclean R, Wilson D (Eds) *International Handbook of Education for the Changing World of Work*. Springer, Netherlands, p.483-497
- Goodrich HW (1996) *Student self-assessment: At the intersection of metacognition and authentic assessment*. Dissertation, Harvard University
- Hattie J (2009) *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge, London
- Höpfner HD (2009) Action-based TVET. In Maclean R, Wilson D (Eds) *International Handbook of Education for the Changing World of Work*. Springer, Netherlands, p.1699-1710
- Khaled AE, Gulikers JTM, Tobi H et al (2014) Exploring the validity and robustness of a competency self-report instrument for vocational and higher competence-based education. *J. Psychoeduc. Assess*, 32(5): 429-440
- Kyndt E, Janssens I, Coertjens L et al (2014) Vocational education students' generic working life competencies: Developing a self-assessment instrument. *Vocat Learn*, 7(3): 365-392
- Montero I, Tapia JA (1992) Achievement motivation in high school: Contrasting theoretical models in the classroom. *Learn Instr*, 2(1): 43-57.



- Munby H, Hutchinson NL, Chin P (2009) Workplace learning: Metacognitive strategies for learning in the knowledge economy. In Maclean R, Wilson D (Eds.) *International Handbook of Education for the Changing World of Work*. Springer, Netherlands, p. 1763-1775
- Panadero E, Alonso-Tapia J (2013) Self-assessment: Theoretical and practical connotations. When it happens, how is it acquired and what to do to develop it in our students. *Rev Electron Investig Psicoeduc Psigopedag*, 11(2): 551-576.  
[doi:http://dx.doi.org/10.14204/ejrep.30.12200](http://dx.doi.org/10.14204/ejrep.30.12200)
- Panadero E, Brown GTL, Courtney MGR (2014) Teachers' reasons for using self-assessment: A survey self-report of Spanish teachers. *Assess Educ Princ Pol Pract* 21(3): 365-383.  
[doi:10.1080/0969594X.2014.919247](https://doi.org/10.1080/0969594X.2014.919247)
- Panadero E, Brown GTL, Strijbos JW (2016) The future of student self-assessment: A review of known unknowns and potential directions. *Educ Psychol Rev*, 28(4): 803-830.  
[doi:10.1007/s10648-015-9350-2](https://doi.org/10.1007/s10648-015-9350-2)
- Panadero E, Jonsson A, Strijbos JW (2016) Scaffolding self-regulated learning through self-assessment and peer assessment: Guidelines for classroom implementation. In D. Laveault D, Allal L (Eds.) *Assessment for Learning: Meeting the challenge of implementation*. Springer, New York, p. 311-326
- Panadero E, Jonsson A, Botella J (2017) Effects of self-assessment on self-regulated learning and self-efficacy: Four meta-analyses. *Educ Res Rev-neth*, 22: 74-98.  
[doi:https://doi.org/10.1016/j.edurev.2017.08.004](https://doi.org/10.1016/j.edurev.2017.08.004)
- Paris SG, Paris AH (2001) Classroom applications of research on self-regulated learning. *Educ. Psychol*, 36(2): 89-101. [doi:10.1207/S15326985EP3602\\_4](https://doi.org/10.1207/S15326985EP3602_4)
- Placklé I, Könings KD, Jacquet W, et al (2014) Students' preferred characteristics of learning environments in vocational secondary education. *International Journal for Research in Vocational Education and Training*, 1(2): 107-124.
- Rojewski JW (2009) A conceptual framework for technical and vocational education and training. In Maclean R, Wilson D (Eds.) *International Handbook of Education for the Changing World of Work*. Springer, Netherlands, p. 19-39
- Ross JA (2006) The reliability, validity, and utility of self-assessment. *Pract. assess., res. eval.*, 11 (10): 1-13
- Sandal AK, Smith K, Wangensteen R (2014) Vocational students' experiences with assessment in workplace learning. *Vocat Learn*, 7(2): 241-261. [doi: 10.1007/s12186-014-9114-z](https://doi.org/10.1007/s12186-014-9114-z)
- Schaap H, Baartman L, Bruijn E de (2014) Students' learning processes during school-based learning and workplace learning in vocational education: a review. *Vocat Learn*, 5(2): 99-117. [doi: 10.1007/s12186-011-9069-2](https://doi.org/10.1007/s12186-011-9069-2)
- Searle J (2009) Literacy and Learning: Are TVET Professionals Facilitators of Learning or Deliverers of Knowledge and Skills? In Maclean R, Wilson D (Eds.) *International Handbook of Education for the Changing World of Work*. Springer, Netherlands, p. 1259-1270
- Sitzmann T, Ely K, Brown KG, Bauer KN (2010) Self-assessment of knowledge: A cognitive learning or affective measure? *Acad. Manag. Learn. Educ*, 9(2): 169-191

- Tan KHK (2012) Student self-assessment in terms of assessment Student self-assessment. Assessment, learning and empowerment. Research Publishing, Singapore, p. 15-28
- Topping KJ (2003) Self and peer assessment in school and university: Reliability, validity and utility. In Segers M, Dochy F, Cascalla, E (Eds.) Optimising new modes of assessment: In search of qualities and standards. Springer, Netherlands, Vol. 1, p. 55-87
- Wiliam D (2011) What is assessment for learning? Stud Educ Eval, 37(1): 3-14.  
doi:10.1016/j.stueduc.2011.03.001
- Wiliam D (2014) Formative assessment and contingency in the regulation of learning processes. Paper presented at the American Educational Research Association, Philadelphia, PA, April 2014
- Zimmerman BJ (2000) Attaining self-regulation: A social cognitive perspective. In Boekaerts, M Pintrich, PR Zeidner M (Eds.) Handbook of self-regulation. Academic Press, San Diego, California, p. 13-40