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Strengthening teachers' formative assessment literacy with SMART

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Teachers' formative assessment literacy

Formative assessment has been proven to be a valuable approach for students to benefit in their learning. By regularly assessing students' performance and progress, teachers are able to adjust their teaching to the needs of their students, for example by focusing individual misconceptions. This leads to a more effective and efficient learning experience, ultimately contributing to improved academic achievement (Andrade & Heritage, 2018).

However, for formative assessment to be truly effective in the classroom, teachers must be literate in the process. This means that they need to have a deep understanding of what formative assessment is, why it is important, and how it can be effectively implemented in their teaching. Teachers who are proficient in formative assessment are better equipped to implement assessments that accurately measure student learning, provide relevant and meaningful feedback, and promote student growth and development (Yan & Pastore, 2022).

Despite its numerous benefits, formative assessment literacy remains a challenge for many teachers. Even though formative assessment has been widely researched and recognized as a valuable approach for student learning, there is still a gap in research when it comes to strengthening teachers' formative assessment literacy. Many teachers continue to struggle with effectively integrating formative assessment into their teaching, which can result in an ineffective and inefficient use of the approach (Harrison & Howard, 2009).

The potential of SMART to professionalise teachers

SMART is a digital assessment tool that can help teachers to develop and deepen an understanding of formative assessment in mathematics and what aspects make the assessment truly formative. This tool consists of numerous checks in several mathematical topics and provides teachers with a wealth of information and resources that can help them to diagnose students' understanding, misconceptions they may still have and provide them with teaching suggestions and supporting materials that link to students' understanding (Price et al., 2013).

One of the key features of SMART is its ability to provide automatically evaluated feedback on student performance and misconceptions, which enables teachers to quickly identify areas where students may need additional support. This is particularly important for a digital formative assessment system, as it allows teachers to address misunderstandings or difficulties before they become more deeply entrenched (Pellegrino & Quellmalz, 2010).

However, while SMART is a useful tool for formative assessment, many teachers may not yet be literate in the process of formative assessment. This can result in an ineffective use of the tool, as teachers may not fully understand the potential of formative assessment or may not know how to use

the information provided by SMART to support student learning, which may lead to a reluctance to change their (assessment) practices or conceptions of assessment.

Research aim

In order to address this issue, teachers may need additional support, such as attending professional development (PD) classes. These classes can provide teachers with a deeper understanding of formative assessment and the role it can play in student learning. They can also help teachers to develop the skills and knowledge needed to effectively use SMART and other formative assessment tools to support student learning.

One research aim of our study is to examine the extent to which teachers become more literate in formative assessment through the use of the SMART checks or through additional training. To achieve this aim, we used the Teacher Formative Assessment Literacy Scale (TFALS) developed by Yan and Pastore (2022) to measure formative assessment literacy in two groups of teachers:

1. The *SMART* group, consisting of teachers who only use the SMART check system (N=14).
2. The *PD* group, consisting of teachers who receive additional professional development classes accompanying the SMART check system (N=10).

The TFALS questionnaire was surveyed as a two-dimensional model (practice and socio-emotional dimension) before and after the use of SMART, respectively after having participated in two PD courses. We compared the groups with a mixed ANOVA and t-tests for independent samples. Results indicate that SMART has the potential to professionalise teachers regarding their formative assessment literacy. Both groups experienced a significant main effect for the time regarding the practice dimension of TFALS ($F(1, 28) = 4.181, p = .05, \eta^2 = .126$) and the PD group had significantly higher results in the post test scores in the socio-emotional dimension ($F(2, 28) = 3.307, p = .05, \eta^2 = .191$). These results suggest that regardless of the group, practice literacy of FA improves over time for both interventions – meaning that the PD had no greater effect than just SMART here – but that the participation in PD increases the socio-emotional literacy of FA more than just SMART.

References

- Andrade, H. L., & Heritage, M. (2018). *Using formative assessment to enhance learning, achievement, and academic self-regulation*. Routledge.
- Harrison, C., & Howard, S. (2009). *Inside the primary black box: Assessment for learning in primary and early years classrooms*. GL Assessment.
- Pellegrino, J. W. & Quellmalz, E. S. (2010). Perspectives on the integration of technology and assessment. *Journal of research on technology in education*, 43(2), 119–134. <https://doi.org/10.1080/15391523.2010.10782565>
- Price, B., Stacey, K., Steinle, V. & Gvozdenko, E. (2013). SMART online assessments for teaching mathematics. *Mathematics Teaching*, 235(4), 10–15.
- Yan, Z. & Pastore, S. (2022). Are teachers literate in formative assessment? The development and validation of the teacher formative assessment literacy scale. *Studies in Educational Evaluation*, 74. <https://doi.org/10.1016/j.stueduc.2022.101183>