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Formative Assessment in the German Student-Teacher-Conference Format: Student Perceptions and Implications for Motivational Aspects of Learning

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Abstract: Lernentwicklungsgespräche (LEGs, a German format of student-teacher-conferences; translated literally: learning development conversations) are meetings between a teacher and student in the presence of at least one parent or guardian about the current status of a child's learning, learning development and learning process. Students and teachers identify learning goals and assess progress and next steps to support the student's learning. This article proposes that LEGs can align with the key components of formative assessment (e.g. learning supportive feedback, self-assessment or clarity about learning goals) and therefore can support student motivation (willingness to invest effort, academic self-concept), depending on how they are implemented. To examine this connection, we conducted a pre-post-follow-up study with 185 children in grade 2 in Germany. The children filled out questionnaires before and after their LEG and also four months later at the end of the school year. Our findings show that children generally experience LEGs positively in ways that are consistent with formative assessment, although significant variance is present. Further, we noted short-term and long-term associations between LEGs and motivational aspects of learning, depending on how students perceived the LEGs; in particular, the perceived quality of learning-supportive feedback and agreed-upon goals proved significant. We discuss how the findings identify areas of further research needs in relation to the associations uncovered.

Keywords: Lernentwicklungsgespräche, Student-Teacher-Conferences, Formative Assessment, Academic Self-Concept, Willingness to Invest Effort

1. Introduction

Elementary school is the first common school for (almost) all children. They arrive at school with a wide range of prior experiences both at home and in school in areas such as competencies, linguistic background, and motivation. It is therefore essential that, in order to provide learning experiences that meet children where they are, elementary teachers need to learn about students' interests and experiences so that they may provide ongoing support for students' learning, both in terms what the content they are intended to learn, as well as to support their motivation to meet learning goals.

Formative assessment is a common process by which elementary teachers can learn more about students and help them engage with and improve in school. Numerous research findings on feedback and formative assessment conducted in a variety of countries [6, 29, 37, 38, 39, 51] have shown that assessment conducted by teachers while learning is in progress and, in particular, the associated feedback on learners' performance can boost both performance and motivation. By providing teachers and

students with information about learning goals and the status of their current learning, formative assessment is a key mechanism to build on students' prior experiences and to support them as they advance in their learning [44, 47]. As early as Ingenkamp, we have known that grades expressed in letters or numbers alone cannot provide feedback in ways that promote or support future learning [43]. Instead, teachers' informal and daily assessment and feedback are more effective at promoting learning [30].

While many studies of formative assessment practices are situated in classroom settings, there are many other contexts in which student progress can be assessed and feedback may be provided to learners [40]. In this study, we are interested in the particular context of the student-teacher-conference, to which we will refer in what follows as "LEG", the abbreviation for its typical German term, Lernentwicklungsgespräch (translated literally: learning development conversation). A LEG supports individual learning processes by enabling students to "develop a realistic sense of their performance, take responsibility for their learning and gain motivation for learning on an independent basis" ([5], p. 107; translated by authors). LEGs have the potential to communicate learning goals, student progress, and associated feedback in an individualized manner that harnesses positive motivation for learning. This capacity is related to the design of the conferences, such as learner self-appraisal, informative feedback that provides guidance for future learning, and agreement on clear goals going forward, with reviews of their attainment during the remainder of the school year [19]. In this way, the enactment of LEGs align with several aspects of formative assessment and, in a sense, could be considered a formal, pre-planned instance of formative assessment within a school year.

That said, the ways that teachers facilitate LEGs with students can vary, just as teachers' enactment of formative assessment also varies [15]. As such, the quality of these components' realization in LEGs and the extent of their effects on students' motivation and its relationship to their learning progress remains unclear. In this paper, we present a framework that articulates the ways in which LEGs align with criteria for quality formative assessment so that we might better understand the ways in which LEGs support student learning. Then, we examine whether the student-evaluated quality of LEGs correlates with the advancement of motivational aspects of learning (willingness to invest effort in learning and academic self-concept).

2. LEGs and Formative Assessment

2.1. LEGs

A LEG, in the German context, is a fifteen- to thirty-minute meeting between a (elementary) student and their teacher, with at least one parent or guardian in attendance, to discuss the student's current performance, learning process, and the development of their learning [5, 10, 75]. The meeting's focus includes discussions of students' areas of stronger and weaker performance and the ways in which they might improve and advance their learning [5, 10, 75]. In some German states, such as Bavaria (where the present study was conducted) and Baden-Wurttemberg, the meeting replaces a progress report at the midpoint and/or at the end of the school year; in others, such as Hamburg and Thuringia, they supplement in-class learning. As a rule, government guidelines limit LEGs to organizational matters such as who attends the meetings and set forth requirements regarding documentation and general guidelines on content, such as areas of competence where the student is doing well, and other areas where they might improve.

Nevertheless, LEGs tend to incorporate particular elements [25] such as a) learner self-assessment prior to the meeting using a questionnaire or instruments suitable for the reflection of the competences; b) teacher completion of a form assessing the student's performance and skills, which then serves as a basis for documentation during the meeting itself; c) delivery of feedback to the student on their performance in the course of the meeting; d) agreement between student and teacher, either during the meeting or at its conclusion, on goals going forward; and e) review and adjustment of agreed-upon goals following the LEG.

While student-teacher-conferences are common in schools in many German federal states [10], to date there have been few empirical investigations into these conferences and their effects on learning within the school setting. In Germany, Bonanati und Mundwiler have used conversation analysis to explore the structure of the LEG dialogs, as well as individuals' participation [10, 58]. The quality of the LEG process from learners' perspective was at the center of research conducted by Häbig at German academic high schools (Gymnasien) [35]. Our preliminary findings indicate agreement between parents, teachers, students, and external observers that the meetings are overwhelmingly supportive of learning, despite substantial variations from case to case [16, 17, 27]. Initial findings [18] indicate significant variance in the extent to which the elements of LEG outlined above are realized, a tendency likewise noted by Betz and colleagues ([4], pp. 67ff.). Other work has uncovered links between the extent to which motivational aspects of learning come to fruition and learners' perceptions of the quality of LEG in practice [25]. However, to date, studies have not yet explored LEG from a formative assessment perspective that considers students' learning after the meeting. The present study responds to this research gap, centering on two key motivational aspects of learning (summarized in Grassinger, Dickhäuser and Dresel): a learner's willingness to invest effort in the learning process and their self-concept as a student in school, also known as the "academic self-concept" [33].

2.2. Formative Assessment

Formative assessment is the process by which teachers and students together gather information about the nature and status of student learning in order to provide feedback to modify instruction and increase students' opportunities to

learn. In a systematic review, Black and Wiliam found that formative assessment has positive effects on learning and can assist lower-performing students to reach learning goals [7]. Studies of formative assessment have been conducted in a variety of content domains, grade levels, and across international settings, and resting on a variety of assumptions about learning [28, 61]. The relationship between various aspects of formative assessment enactment and student motivation has also been investigated [9, 40, 79], identifying the ways in which teachers' enactment of classroom assessments can positively influence students' motivation to learn.

Wiliam articulated five key strategies for formative assessment, including that teachers and students set learning goals; students and teachers participate in classroom discussions around tasks that elicit student thinking; feedback is provided to move learning forward; students work as resources for each other; and students engage in self-assessment [76]. These strategies can be incorporated in a wide variety of classroom settings, from formal, embedded moments in which teachers plan to pause in the course of instruction to assess student progress and provide written or oral feedback to learners, or in informal, daily settings in which teachers ask questions of students to understand their learning progress; students can also work alone or together to assess their current progress [1, 71].

A key element of formative assessment's influence on student learning is feedback that provides information to help learners improve their performance [40, 46]. In fact, Wiliam argued that without feedback, an interaction should not be considered formative, as it does not serve the function of informing subsequent learning [76]. However, the quality and nature of feedback provided by teachers and students varies, as does the degree to which students use this information to improve their performance. Feedback has been identified as the most challenging element of the formative assessment process for teachers to enact, as it involves not only successful diagnosis of students' current state of learning, but specific steps students might be able to complete in order to improve their learning [42]. In addition, one of the most effective processes of formative assessment has been identified as learners' ability to self-assess their own performance [50].

The key components of formative assessment, then, are comprised of setting goals, assessing the current state of learning, and providing feedback. Taken together, these components have been identified as the process that positively influences student learning [8].

2.3. LEGs and Formative Assessment

Given the preceding description, we posit that LEGs can be considered as formal, pre-planned instances of formative assessment within a school year in which teachers and students work together to formatively assess students' progress and to set future learning goals together, learners self-assess, teachers provide feedback, and students and teacher together engage in iterative cycles of improvement.

On the basis of these similarities, we have formulated the following framework for LEGs centering on the ways in which they support individual learning processes through formative assessment [18, 19]. In doing so, we draw on the preceding features of formative assessment [8, 52, 68] that may help us to evaluate the quality of LEG in general, and the ways in which they advance student learning and motivation in particular [18, 19] (see Table 1).

Table 1. *Criteria of Formative Assessment and LEG.*

Formative Assessment [8, 52, 68]	LEG [10, 36]
Recording of actual performance, learning development, and process using individual and criterial reference standards	Assessment by teacher
Self-assessment	Self-assessment (before or in the conference)
Learning-supportive feedback using comments and qualitative statements	(Learning-supportive) feedback in the conference
Clarity about learning goals and criteria of achievement and assessment	Agreement on goals for further learning
Diagnostic cycle for monitoring and reflection of the learning process	Review of agreed goals in the way of diagnostic cycles

2.3.1. Assessment by Teacher

Recording and documentation of the student's current performance and the development of their learning as measured against individual and criterial reference standards (summarized by Köhler; Mischo and Rheinberg): Numerous research findings have confirmed the positive effect on learner motivation of using an individual reference standard [49, 54, pp. 140f.].

2.3.2. Self-Assessment

An important quality of LEGs is the inclusion of the student's self-assessment and their reflection on their performance and learning in the discussion. In this way, the teacher's perception of a student's ongoing performance is not the only evaluation considered, but the learner's own perspective is a key aspect included in the ongoing assessment process. An LEG that takes the result of a process of student self-assessment into account will involve the student being asked specifically for their view of their performance, but will go beyond this by taking it up and commenting on it, which may entail initiating a conversation if the teacher's or parent's view diverges. Prior studies have indicated positive effects of self-assessment on student motivation, self-efficacy and performance [2, 69].

2.3.3. Learning-Supportive Feedback

Learners receive feedback that supports their learning: In the first instance, feedback supportive to learning [37, 40, 48] involves providing information to the student on the

current status of their learning process and its development. Feedback relating to prior performance is likely to center effort as a path to promote learning and direct the attention away from weaknesses in performance, which may appear in sharp focus when the comparison being made is with other students. Another important element of supportive feedback is the discussion of strategies for promoting the student's learning process going forward (summarized in Kollar and Fischer), which helps nurture independent learning on the student's part [48]. Furthermore, different studies show that feedback from important caregivers (reference persons) and comparison processes has effects on the development of motivational aspects of learning [14, 32, 56, 62, 72].

2.3.4. Agreement of Goals for Further Learning

Student and teacher agree on clear, quantifiable goals for the student's further learning, and both parties understand the criteria for meeting the goals: Researchers consider agreement on appropriate and helpful goals which look forward as well as back (as "feed-forward" by Hattie and Timperley) to be crucial elements of a successful process of learner feedback [40]. Work in this area (see the summary in, for example, Brandstätter and Hennecke) identifies favorable factors in this regard as the setting of goals which learners consider appropriate in terms of both their content and their difficulty, learners' positive motivation to try and meet the goals, and their awareness of what they need to do to be successful in their attempt [11].

2.3.5. Regular Diagnostic Cycles to Review and Adjust Learning Goals

Learning goals are incorporated into the student's learning in the classroom, subject to regular review be adjusted if required: If we are to sustain learners' motivation as they work toward their own or other goals, we need to provide them with feedback on their progress, particularly of the qualitative and informational type, which will include giving them formats for self-administering a progress check [40, 45]. Further, it is important that goals remain activated in the student's memory, even at times without opportunities for action or when a sequence of action is interrupted ([11], p. 333, drawing on [31]).

As the preceding sections show, individual elements of formative assessment which are represented in LEGs are also related to the development of motivational aspects of learning. We describe these aspects in greater detail in the next section.

3. Motivational Aspects of Learning

3.1. Willingness to Invest Effort

Willingness to apply effort to processes of learning in school is a central facet of motivation to learn and perform well in the classroom [74]. Rollet and Rollet define effort as "the mobilization of the resources of energy that are necessary to conduct an activity" ([67], p. 8; translated by authors). One model of motivation for performance and learning ([21], pp. 86f.) defines willingness to invest effort as a tendency which manifests as a motivation for this specific act of learning in the moment, thus giving rise to increased effort. It is therefore of substantial relevance to conducting and completing of that act of learning ([33], p. 209). Motivation has also been investigated as an underlying mechanism for student learning through participation in formative assessment, although a clear effect has not been established [79].

Much research has confirmed the importance of willingness to apply effort for learning and performance in school. This work includes the finding by Müller that it represents an important predictor of academic outcomes around the conclusion of elementary school, with its effect continuing to radiate into the student's secondary school career [57]. In school systems in German-speaking regions which practice selective secondary education, both teachers and parents include a child's willingness to expend effort on their schoolwork among the factors considered in the process of deciding which type of secondary institution is most suited to the child [73]. As a result (see the summary in Rollet and Rollet), effort avoidance on the part of learners has a negative and consequential impact on their learning outcomes, even where correlating variables such as fear of failure are considered ([67], p. 10).

In the school context, assessment and feedback using individual reference standards comparing a student's performance with their previous attainments can lend additional support to this process ([12], p. 208). Research has found that agreeing upon appropriate goals with the student is also an important characteristic of teaching that supports learners' motivation, as it harnesses the regulating effect on effort observed when goals are in place ([11], pp. 339ff.). With reference to expectancy-value models [22], this means that students need to view the goals as both meaningful on a personal level and as manageable and achievable ([33], p. 221). Grittner emphasized that, "in view of motivational factors [,] internal feedback [is] important for launching and maintaining learning activity. This will be particularly successful when [the student] notes their own strengths and weaknesses and adaptively assesses the results of their learning" ([34], p. 165; translated by authors). Thus, self-assessment is also related to a learner's willingness to expend effort, in additional to setting learning goals and reflecting upon their own learning progress.

3.2. The Students' Academic Self-concept

In the terms of the expectancy-value models referenced above, a person's willingness to put effort into an activity is dependent in part on the degree of their confidence that they will be able to successfully tackle a given task. One influential factor in the formation of such confidence is a person's self-concept, which we define here as a person's ideas of their abilities and capabilities [55, 56]. It is a hierarchically structured entity which is divisible into an academic and a non-academic self-concept, each of which comprises further facets [70]. The average trajectory of an

academic self-concept is a journey from "optimis[m] to realis[m]" ([41]; translated by authors), with an increase in stability commencing in a child's time in elementary school [41, 63].

Researchers assume the causal link between self-concept and performance is related to the self-enhancement approach, which describes the influence of self-concept on performance, and the skill development approach, which describes the impact of performance on self-concept [55, 56]. Scholars do not entirely agree on the extent and relative significance of these processes in elementary schooling. Some findings (see Renner et al. for an overview) suggest of an initial tendency at the outset of elementary school for the self-concept to have a dominant influence on performance, with a reversal occurring as the child passes through the elementary grades [66]. A mathematics-focused study [63] corroborates this work for the first-grade context. Ehm et al., in contrast, called the existence of such reciprocal effects into question, at least for the context of elementary schooling and the supposed reversal of the effect's direction in its course; their research suggests that differing methodologies give rise to divergent findings [23]. This matter aside, it is desirable for students to attain a reasonably strong self-concept, and for teachers to support them. An underdeveloped academic self-concept correlates with lower willingness to invest effort and an impaired level of stamina in tackling challenges in the classroom (a summary is in Moschner and Dickhäuser [56]).

The receipt of feedback and exposure to instances of comparison to other students are vital to the development of a robust and realistic academic self-concept [56]. Research has found the feedback and views of parents [62] and teachers [72] to play a notable role in the emergence and advancement of elementary students' self-concepts, in which learners operationalize a number of frames of reference, as described in the internal/external frame of reference model (I/E model) [53], when self-assessing their abilities and skills. Wolff et al. extended the model (2I/E) by adding a temporal dimension to its existing social (comparison with fellow students) and dimensional facets (comparison with performance in other subjects) [77]. This supplementary comparison with the student's own previous attainments allowed the researchers to identify evidence of all three comparative processes in students' accounts of their self-concepts, with the strongest effects manifesting through social and moderate effects arising from dimensional comparison, while temporal comparison occasioned more modest effects [77, 78]. The researchers suggest that the relatively short period of time in school on which younger elementary students can look back is a causal factor in the dearth of temporal comparisons in evidence in this group [77].

These findings support our assumption that LEGs may have an effect on the development of children's academic self-concept, due in part to the feedback received from an individual relevant to the child's learning journey and in part to the comparison they enable, involving both the teacher's view of the student and the student's view of their own performance. The lack, for the most part, of social comparisons in LEG, as noted by an observational study currently in preparation [26], is an opportunity for lower-performing students in particular to access a more positive academic self-concept via dimensional and especially temporal comparisons.

We are able, then, to observe that a student's academic self-concept and the level of their willingness to invest effort generate effects on their learning and the outcomes it produces, and in turn are influenced by processes of learner´s self-assessment and reflection, of comparison with prior attainments and those of other children, and particularly by feedback from important adult figures in the learner's life. The setting of goals with personal meaning to the student are amenable to the emergence of willingness to make an effort. The intentions and design underlying LEGs have the potential to promote the advancement of the student's academic self-concept and their readiness to engage in effort by 1) focusing on the child's learning journey and in this way on the effort they have already undertaken; 2) avoiding social comparisons which may damage the student's self-concept, particularly where their academic performance is not strong; 3) illustrating to students what learning is about, what its significance is, why it "makes sense"; and 4) providing a forum for the setting of appropriate goals which the student can regard as meaningful and approach with increased optimism.

The extent to which learners perceive feedback given and goals set as helpful is also a key factor in this context [37]. Therefore, in this study, we assess learners' perceptions of a quality LEG. Specifically, we examine all criteria, except the first one, due to their direct and specific relevance to the LEG setting and the goals agreed upon in the meeting's course. We left the first criteria aside because its attainment involves the use of assessment and self-assessment forms which the children in our study did not evaluate.

4. Research Questions

In the preceding sections, we have established that formative assessment criteria provide a framework for us to understand the quality of LEGs. In this study, we seek to determine the extent to which development of motivational aspects of learning is influenced by the quality of LEG. We pose the following research questions:

To what degree do students perceive elements of formative assessment implemented in LEGs?

What are the effects on students' motivation as measured by their willingness to invest effort and academic self-concept?

Our preliminary study on feedback supportive to learning [16, 17] suggests that we can expect learners, on average, to positively rate the quality of the LEGs; we also anticipate that children's perceptions will vary due to inherent differences in each LEG situation, even with the same teacher [27]. In terms of short- and longer-term effects, we anticipate results consistent with initial findings on short-term phenomena [25] and on formative assessment (cf. section 2 above), as follows:

a positive correlation between learner evaluation of the quality criteria (inclusion of the student´s self-assessment, feedback supportive to learning, agreement on clear, quantifiable goals) and the development of willingness to expend effort and of an evolved academic self-concept. In particular, we also anticipate a positive impact on long-term effects as students continue their learning journeys in pursuit of the goals agreed upon in the LEG context.

5. Methods

5.1. Study Design

The study uses a longitudinal pre-post-follow-up test design. Participating students filled out a questionnaire before the series of LEGs commenced in order to their willingness to put effort into their schoolwork and their academic self-concept. On the Monday following their LEG, they completed a further questionnaire on these two motivational aspects of learning, in which we additionally asked them to evaluate the LEG. A further questionnaire on the motivational factors took place about four months later at the end of the school year and also incorporated questions on learners' views of how they had been working in class with the goals agreed upon in the LEG.

5.2. Sample

The total sample of those surveyed at three points of the study comprised 185 children (100 girls and 85 boys) from a total of 34 different classes in grade 2 (aged around 7-8 years) in the German state of Bavaria. The LEGs were conducted by 31 elementary teachers, all of whom identify as female. Most of the teachers had done the LEGs at least three times or more (81%). Only two teachers were conducting LEGs for the first time.

5.3. Test Instruments

We used a four-point Likert scale (0 = disagree completely, 1 = disagree, 2 = agree, 3 = agree completely) to ascertain learners' views on the LEG, their willingness to apply effort, their self-concept, and their work with the goals agreed upon, and imputed missing values (for all items ≤ 2% at each point of the study) using the EM algorithm in SPSS.

5.3.1. Perceived Quality of LEG

In developing the questionnaire for learners' evaluation of their LEG, we employed three distinct sub-scales aligned with our quality criteria. The first of these, "Account taken of learner self-assessment" (α = .60, r_{it} = .39-.45), comprised four items (example item: "During my LEG, my teacher asked me what I'm good at"). The second, "Feedback supportive of learning" (α = .79, r_{it} = .47-.58), had six items (example item: "Now I've had my LEG, I know exactly why I have gotten better or worse [in school]"). The third, "Appropriate and helpful goals" (α = .65, r_{it} = .36-.43), had five items (example item: "[The goals] we have agreed on will help me in my learning"). These three sub-scales show a significant rate of reciprocal correlation, with a high level of correlation between "Feedback supportive of learning" and "Appropriate and helpful goals" (r = .586), and moderate correlations of each of these two with "Account taken of learner self-assessment" (r = .236 and r = .284). We ran confirmatory factor analysis in order to determine whether it made sense to consider these three sub-scales separately or whether using one or two scales only, combining "Feedback supportive of learning" with "Appropriate and helpful goals", would be more representative of the data. The analysis unambiguously revealed that the three-factor model attains robust values (CFI = .95; RMSEA = .035; SRMR = .049; Chi2/df = 1.48), while the single-factor version performs noticeably more poorly (CFI = .83; RMSEA = .058; SRMR = .064; Chi2/df = 2.34). The values generated by the two-factor model, while acceptable in the main (CFI = .93; RMSEA = .041; SRMR = .053; Chi2/df = 1.48), were consistently weaker than those achieved by the three-subscale solution. We therefore retained the three subscales, to which clearly distinguishable specific content was assignable in each case.

5.3.2. Continuation of Student`s Learning Journey Toward the Goals Agreed in the LEG

We developed a further questionnaire to determine whether and how learners continued with their school-based learning toward the goals agreed in the LEG. Once again, we used a 4-point Likert scale, this time comprising six items (example item: "My teacher has reminded me of what I agreed to."). Reliability was satisfactory, attaining Cronbach´s alpha of .73 (r_{it} = .22-.57).

5.3.3. Willingness to Invest Effort and Academic Self-Concept

Recording of learners' willingness to undertake effort took place via a nearly complete version of the Questionnaire for the assessment of emotional and social school experiences (FEESS, translated by authors) [64, 65] for the measurement of children's emotional and social experience in school; an adapted scale served to ascertain their academic self-concepts [59].

Reliability for both scales was acceptable to good (willingness to invest effort: 11 Items; $\alpha_{MZP\,1}$ = .71, r_{it} = .26-.48; $\alpha_{MZP\,2}$ = .76, r_{it} = .36-.52; $\alpha_{MZP\,3}$ = .79, r_{it} = .26-.62, example item: "I give up easily when I run into problems", inverse-coded; academic self-concept: 10 Items; $\alpha_{MZP\,1}$ = .67, r_{it} = .27-.48; $\alpha_{MZP\,2}$ = .73, r_{it} = .18-.58; $\alpha_{MZP\,3}$ = .79, r_{it} = .33-.62, example item: "I can successfully manage tasks, including difficult ones.").

5.4. Analysis

We determined learners' estimations of the quality of their own LEG by calculating mean values from each of the four scales ("Account taken of learner self-assessment"; "Feedback supportive of learning"; "Appropriate and helpful goals"; and the scale measuring continued learning toward the goals agreed on), establishing intraclass correlations in order to identify variance among the students' classes. We

also calculated mean values on the scales about "Willingness to invest effort" and "Academic self-concept". We checked significant changes via t-test. To check the extent of the short- and longer-term associations between the learner-perceived quality of the LEG and the development of students' willingness to expend effort and of academic self-concept, we ran regression analyses using Mplus [60]; the analysis took account of the "clumped" distribution of the sample by including the students' class as a cluster variable (type = complex), a procedure for which the intraclass correlation coefficients we found also advocated (see below). Alongside the predictors of LEG quality, we controlled for the learners' gender as an additional independent variable, and incorporated the pre-test value for each case into the model.

6. Findings

6.1. Learners´ Evaluation of LEG

Overall, learners had positive impressions of their LEG, as reflected in the fact that the mean values for all scales were significantly above the theoretical midpoint of 1.5. Children reported having felt their self-assessment to have received appropriate attention and consideration in the course of the meeting ($M = 2.2$; $SD = 0.7$; $t(184) = 14.69$, $p < .001$), having been given feedback that supported their learning ($M = 2.6$; $SD = 0.5$; $t(184) = 28.87$, $p < .001$) and having agreed with their teachers upon goals for future learning that were apposite and helpful for their situation ($M = 2.6$; $SD = 0.4$; $t(184) = 32.99$, $p < .001$), and were of the view that the goals largely maintained relevance to subsequent work in lessons ($M = 1.7$; $SD = 0.8$; $t(184) = 4.17$, $p < .001$).

Intraclass correlations (ICC) revealed values of .064 ("Account taken of learner self-assessment"), .080 ("Feedback supportive of learning"), .015 ("Appropriate and helpful goals") and .191 ("Continued work on the goals set"), pointing to a degree – albeit a small one – of variance among the learners' classes and in turn to systematic differences among teachers' approaches to conducting LEGs. At the same time, we noted marked differences between evaluations by children from the same class. There was only one class within which students' responses covered the complete scale, from 0 to 3, in relation to one of the criteria; there were instances for all criteria, however, of the ratings given by some classes diverging by > 2.

Overall, we noted a generally positive appraisal of LEGs by learners, with some differences from class to class and from child to child.

6.2. How Do Learner Evaluations of LEG Interrelate with Motivational Aspects of Learning

The findings shown in Table 2 are suggestive of small changes, on average, in motivational facets of learning, although students' academic self-concept ($t(184) = 2.29$, $p < .05$) increased from pre- to post-test significant, across the entire sample.

Table 2. *Mean values for the scales relating to motivational aspects of learning: pre-, post- and follow-up-test.*

	Pre-test *M* (*SD*)	Post-test *M* (*SD*)	Follow-up-test *M* (*SD*)
Willingness to invest effort	2.57 (0.39)	2.52 (0.46)	2.53 (0.45)
Academic self-concept	2.03 (0.43)	2.10 (0.45) *	2.07 (0.46)

*p ≤ .05, two-tailed, paired t-test, *M* = mean, *SD* = standard deviation.

The question at the heart of the study concerns the extent of the interconnection between changes in motivational aspects of learning and learners' evaluations of their LEG. Table 3 gives an overview of findings relating to short-term effects. In each case, the table shows the values from the overall model, incorporating learners' views on the quality criteria Q2 to Q4 outlined above while considering the structure of the student's class and controlling for pre-test values and gender.

Table 3. *Beta weights for the link between learners' ratings of their LEG and the motivational aspects of learning studied (post-test).*

	Willingness to invest effort	Academic self-concept
Pre-test	.509***	.557***
Gender	-.002	-.184
Account taken of learner self-assessment	-.105	-.129
Feedback supportive of learning	.371**	.432**
Appropriate and helpful goals	.453**	.132
R^2	.452	.409

**p ≤. 01; ***p ≤ .001, one-tailed test run in each case; gender: 1 = boys, 2 = girls; R^2 = explained variance.

The figures reveal associations, shown by regression weights to be substantive, between the extent to which learners felt they had received feedback supportive of learning and both the motivational aspects of learning we studied. The link between appropriate and helpful goals and willingness to invest effort is in line with our hypothesis; that is, learners who perceive the goals agreed upon as appropriate and helpful will be more prepared to put in effort in learning. No association was evident, however, for the "Account taken of learner self-assessment" scale, and none disclosed itself when we incorporated this value into a separate model without the two other scales relating to learner perception of their LEG.

Table 4. *Beta weights for the link between learners' ratings of their LEG and the motivational aspects of learning studied (follow-up-test).*

	Willingness to invest effort	**Academic self-concept**
Pre-test	.306***	.516***
Gender	-.021	-.170
Account taken of learner self-assessment	-.111	-.100
Feedback supportive of learning	.407*	.258*
Appropriate and helpful goals	.349*	.210
Continued work on the goals set	.078	-.035
R^2	.242	.335

*p ≤. 05, ***p ≤. 001, one-tailed test run in each case; gender: 1 = boys, 2 = girls; R^2 = explained variance.

The picture is similar for the model used to check for longer-term effects (see Table 4); the same configurations showed effects not explainable by chance, albeit they generally manifested more weakly than in the short-term context.

7. Conclusions

Overall, our findings support our hypotheses, indicating that the learners in our study gave a positive evaluation of their LEGs, although we also found differences from class to class and from child to child. This means that most of the children perceived the LEGs in ways consistent with criteria for formative assessment, indicating that they experienced the LEGs in ways that we would expect to support their motivation for future learning.

We have additionally observed associations between high-quality LEGs as rated by learners, and favourable developments in students' academic self-concept and in their willingness to invest effort in their schoolwork. These links were particularly notable in relation to learners' perceptions of having been given feedback supportive of their learning and set goals they felt appropriate and helpful. We were unable to identify associations in this regard with teachers' taking account of learners' self-assessment in their LEG, nor with the continuation of work in subsequent lessons that related to the goals agreed upon. Overall, we view these findings as justifying a categorization of LEGs as a type of formative assessment, particularly in light of their beneficial effect on advancing motivational aspects of learning. As in previous work on formative assessment [29], the present study has demonstrated the significance of feedback that supports learning as a factor in short- and longer-term effects on motivational aspects of learning.

On average, learners considered the realization of the quality criteria pertaining to formative assessment as detailed above to have been reasonably strong in their LEG. We simultaneously note the variance of this finding among individual classes and children, which is consistent with observational data [27] that indeed point to bigger differences, with ICC values of up to .64 indicating marked divergences among school classes in the realization of specific elements of formative assessment and among LEG as carried out by different teachers. These variations should not be surprising because there are no formal rules given for LEG conversations. The findings we present here add to a body of research on the significance of underlying structures of classroom teaching to the development of students' learning [20].

Our findings were not consistent with our hypotheses in relation to account taken of learner self-assessment in the LEG and learners' continuation of their learning journeys with the goals agreed upon; no model produced associations of these scales with willingness to expend effort or with academic self-concept that could not be explained by coincidence. One possible reason for this finding on learner self-assessment may be the use of LEGs in Bavaria as a substitute for a half-yearly report, meaning its significance in this regard may possibly loom larger for children than any expectations they might have of these meetings in terms of their autonomy as learners. If this is the case, it would increase the value attached to the other quality criteria, supportive feedback and sensible goals.

A possible interpretation of the lack of effect of continuation of work toward the learning goals set is, that there is a marked variation in the quality of these goals, a certain tendency for children to forget them soon after the meeting, and an omission, in some instances, of agreement on specific methods and strategies for ensuring the goals are met [18, 24].

We also identified key take-aways from this study for research and practice on formative assessment, which are usually carried out in a whole-class setting. While individualizing feedback for each student can be extremely time-consuming, teachers can collaborate with students – often around representations of learning goals, such as rubrics – to identify their own goals, and to assess their own progression of learning [3]. More importantly, it also establishes the benefits of students' own perceptions of experiences intended to tailor to and support their learning, suggesting that teachers' whole-class formative assessment practices might similarly be assessed from the students' perspective. Similar measures are being developed that can provide teachers with quick feedback on their students' own perceptions of their instruction [13].

The findings of this study also support greater inclusion of outside-the-classroom settings in studies of formative assessment. Particularly in elementary schools, where students have opportunities to participate in LEGs or similarly organized conferences with their teachers, students' ongoing learning and motivation can be monitored in longer cycles of collectively setting goals, appraising progress, and identifying subsequent steps for learning.

We conclude by noting a further crucial factor that requires further study: the extent of the influence exercised by teachers' professional skill set, particularly their knowledge of

pedagogical and psychological principles and their professional beliefs, on the quality of LEGs. As referenced above, teachers have great latitude in terms of how they realize the LEGs, which increases the potential weight of these factors. It would therefore be useful to consider possible benefits to the quality of LEGs that we might attain through continuing professional development for teachers on feedback that is supportive of learning and on how to set appropriate and helpful goals. It goes almost without saying in this context that initial teacher training should also take account of strategies for planning and conducting a quality LEG, in view of the rise in the practice's frequency and saliency. Researchers could study the kinds of resources and guides provided to teachers as they conduct LEGs or similar conferences, and how to best support teachers in realizing the formative function of these meetings in the development of student learning and motivation. Interdisciplinary training formats appear apposite here in light of the influential character of LEGs in terms of motivational development and with regard to diagnostic aspects of assessment of student performance [27].

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