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Sense of Belonging at School as a Quality Measure of Inclusion: Comparing the Inclusive Experimental School *Laborschule Bielefeld* with Regular Inclusive Comprehensive Schools and Investigating the Determining Factors

Abstract

Sense of belonging at school (SoBaS) is a basic requirement for every student and a major inclusivity goal for educational institutions. In the present study, we report on a self-evaluation of the Laborschule Bielefeld (LS; Germany) covering SoBaS. LS is an inclusive experimental comprehensive school with more than forty years of experience concerning a non-segregative and diversity-friendly school culture. Based on propensity score matching, the study investigated whether the SoBaS scores of the students at this inclusive experimental school (N=115) differ from the students visiting inclusive classes in regular state-run comprehensive schools (N=2376). Furthermore, we examined the factors in the students' educational environment at LS that may potentially influence their SoBaS. The results indicate that the students attending the LS experienced a higher SoBaS. In addition, certain aspects of LS's teaching and interaction culture were identified as auspicious factors for accomplishing high levels of students' SoBaS.

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Keywords

sense of belonging, inclusive education, secondary school, social-emotional needs

Das Zugehörigkeitsgefühl zur Schule als Qualitätsindikator schulischer Inklusion: Ein Vergleich der inklusionserfahrenen Versuchsschule Laborschule Bielefeld mit inklusiven Gesamtschulen des Regelschulsystems und eine Analyse möglicher Prädiktoren

Zusammenfassung

Das Gefühl von Zugehörigkeit zur Schule ist ein grundlegendes Bedürfnis von Schüler:innen und dessen Vermittlung ein zentrales Ziel inklusiver Beschulung. Der Beitrag ist Teil einer internen Evaluation an der Laborschule Bielefeld (LS; Deutschland), einer inklusiven Versuchsschule (Gesamtschule) mit mehr als vierzigjähriger Erfahrung mit nicht-segregativer Beschulung und diversitätsfreundlicher Schulkultur. Auf der Basis eines Propensity Score Matchings wurde untersucht, ob sich Schüler:innen dieser inklusiven Versuchsschule (N=115) im Vergleich zu Schüler:innen, die inklusive Klassen in regulären staatlichen Gesamtschulen besuchen (N=2376), in ihrem Zugehörigkeitsgefühl zur Schule unterscheiden. Darüber hinaus wurde überprüft, welche Faktoren der Unterrichts- und Schulkultur an der LS das Zugehörigkeitsgefühl ihrer Schüler:innen beeinflussen. Die Befunde deuten darauf hin, dass Schüler:innen der LS über ein höheres Zugehörigkeitsgefühl zur Schule berichten. Zudem werden Faktoren der Unterrichts- und Interaktionskultur an der LS identifiziert, die das Zugehörigkeitsgefühl zur Schule ihrer Schüler:innen positiv beeinflussen.

Schlagworte

Zugehörigkeitsgefühl zur Schule, Inklusion, Sekundarstufe I, sozial-emotionale Bedürfnisse

1. Introduction

Establishing an inclusive educational system that adheres to the specified quality standards and requirements remains a challenge for many countries (Ainscow, 2020). Reports on this matter consistently emphasize the need for significant changes, including “structural changes to, for example, organization, curriculum and teaching and learning strategies” (UN-CRPD, 2016, p. 3). Even highly developed countries like Germany encounter difficulties in implementing fundamental reforms, as segregation continues to be a prominent feature of its secondary school

system, with inclusion-oriented school cultures being more prevalent in comprehensive schools than in academic grammar schools (Klemm, 2022).

Besides organizational and structural aspects, questions concerning teaching and learning in heterogeneous groups of learners and psycho-emotional factors such as social participation, well-being, or sense of belonging at school (SoBaS) have become significant topics in the discourse on inclusion (e.g., Prince & Hadwin, 2013). These factors are considered to provide a cognitive and emotional foundation for the developmental and learning-related objectives of schools (Baumeister & Leary, 1995; Booth & Ainscow, 2016; OECD, 2019). As they represent the basic needs of every student, SoBaS and related variables serve as important quality measures for the success of inclusion in educational institutions.

To acquire a deeper comprehension of the factors that significantly contribute to the SoBaS for all students in inclusive schools, we conducted a study focusing on two different levels of school development: the school level and the classroom/teacher level. The study presented in this paper is part of an evaluation project conducted at one of the most experienced schools in inclusive education, the Laborschule Bielefeld (LS, Germany). This experimental comprehensive school is looking back on more than forty years of fostering a non-segregating and diversity-friendly school culture.

Of particular interest during the evaluation process was a comparison between the LS and schools within the regular school system. We aimed to explore the extent to which students at this state-run inclusive experimental school differ in their SoBaS compared to students attending inclusive classes in regular state-run comprehensive schools.

In a second study, we examined factors that can theoretically be attributed to either the classroom/teacher level or the school level, based on their impact on the SoBaS of students in inclusive classes at the LS.

2. Sense of Belonging at School

Students' SoBaS is commonly defined as "the extent to which students feel personally accepted, respected, included and supported by others in the school social environment" (Goodenow & Gardy, 1993, p. 60). While the operationalizations vary in detail among studies, social relationships and experiences and feelings toward school are generally used to investigate students' SoBaS (Allen et al., 2018; Baumeister & Leary, 1995; Bossaert et al., 2013b; Graham et al., 2016). In addition, terms such as school connectedness and school relatedness are used to describe a very similar concept, differing only slightly in their respective operationalization from SoBaS (e.g., Korpershoek et al., 2020).

Accordingly, the concept of SoBaS explored in our two-partite study presented below comprises aspects such as the students' self-perception of their social relationships and experiences at school, for example, feeling like an outsider, as well

as different aspects of satisfaction with the school, for example, feeling happy at school. The respective operationalization has been previously employed in international and national studies of school quality (i.e., OECD, 2013; Stanat et al., 2016).

SoBaS and similar concepts showed positive links not only to student well-being (Arslan, 2018; Kröske, 2020; Marksteiner & Kruger, 2016) but also to a range of educational outcomes, such as school-related motivation (Goodenow & Grady, 1993), academic self-efficacy (McMahon et al., 2008) and academic achievement (Huang, 2022).

As outlined above, the implementation of inclusion within school systems has substantially increased the relevance of school quality measures that are not directly linked to students' cognitive abilities in a narrow sense, such as their performance in standardized tests. Due to theoretical reasoning, such measures are not regarded as valid indicators of inclusion by some authors since any test standard might not be a fair and adequate means of measurement for at least some students in inclusive classrooms (e.g., Kullmann et al., 2014). Additionally, with regard to including students with Special Educational Needs (SEN), high stakes testing poses specific methodological challenges concerning reliability and validity (Heydrich et al., 2013).

In their elaborate review, Prince and Hadwin (2013) bring out the significance of SoBaS in SEN students by stressing its role as an important factor that helps to understand the linkage between structural aspects, such as school placement, and the different developmental outcomes of this group of students. Studies investigating emotional and social experiences in inclusive classrooms often focus on students with SEN compared to their peers without SEN. However, the role of other aspects of heterogeneity, such as gender or migration background, in contributing to SoBaS is also researched. In the context of a broad understanding of inclusion, these factors are also of high relevance.

2.1 SoBaS With Regard to Students' SEN, Migration Background and Gender

Since SoBaS is sometimes operationalized similarly to the self-perception of social participation and occasionally categorized as being an element of the latter (Bossaert et al., 2013a), the respective corpus of research articles is of high interest in the context of this paper. A notable proportion of studies correspondingly report the disadvantage of SEN students in terms of having friendships and participating in peer groups (Bossaert et al., 2013b; Schwab, 2016; Schwab & Rossmann, 2020; Zurbriggen et al., 2021).

A lack of social integration usually poses a great threat to a student's participatory needs and, therefore, their SoBaS (Ainscow, 2016; Henke et al., 2017; Schwab, 2016). Students with SEN are more likely to become victims of bullying at school compared to their peers without SEN (Kavanagh et al., 2018; Simpson et al., 2016). Disadvantages are predominantly found in students with difficulties regarding emo-

tional and social development (Kröske, 2020). However, some studies did not identify any differences in SoBaS or self-perception of social participation between students with SEN and their peers without SEN (DeVries et al., 2021; Zurbriggen & Venetz, 2016).

Moreover, the position of some SEN students as outsiders in sociometric measurements did not always result in lower individual ratings on factors such as SoBaS or well-being by the same students (e.g., Schwab, 2016). At least some SEN students held a certain degree of resilience against feelings of social disclosure as well as constraints with regard to their SoBaS.

The situation was similar for students with a migration background (see Will, 2019, for a discussion of this term). While most studies indicated that students with a migration background have lower levels of SoBaS in comparison to their peers (Ham et al., 2017; Schachner et al., 2019) others did not support such differences (Vitoroulis & Georgiades, 2017). This situation may be illustrated by the findings of the Program for International Student Assessment (PISA) in 2015 and 2018 (OECD, 2017, 2019). In both waves, differences in SoBaS between students with and without a migration background were observed in roughly 50 % of all the participating educational systems (OECD, 2017, 2019). In roughly 90 % (OECD, 2017) and 80 % (OECD, 2019) of the countries in which the group differences occurred, SoBaS was higher for students without a migration background. No group differences concerning SoBaS were reported in Germany for students with and without a migration background in both PISA 2015 and 2018 (OECD, 2017, 2019).

The large-scale German national studies, IQB Trends in Student Achievement 2015 and 2018 (Haag et al., 2016; Henschel et al., 2019), predominantly support the findings just reported from PISA. Regardless of whether they had a migration background or not, students at the secondary level showed fairly high ratings of either SoBaS (Haag et al., 2016) or social integration and school satisfaction, which were both used as alternative constructs (Henschel et al., 2019). In 2018, differences were analyzed among students without a migration background and three subgroups of students with a migration background. The former showed higher levels of SoBaS, but the divergence did not exceed a small effect based on Cohen's *d*. The maximum difference was $d = .36$ for social integration and $d = .30$ for school satisfaction (Henschel et al., 2019).

Regarding gender differences in secondary schools, the findings on SoBaS and SoBaS-related variables were inconsistent. While, in the international context, most studies reported higher levels of SoBaS among female students (Akar Vural et al., 2020; Gillen-O'Neel & Fuligni, 2013; Kuang et al., 2019; Niemi & Hotulainen, 2015), other studies did not confirm such findings (Cemalcilar, 2010; Pei, 2018). In PISA 2015 and 2018, significant gender differences in SoBaS were observed in 60 % and 70 % of all the participating educational systems. In approximately 60 % of the countries in which group differences did occur, SoBaS appeared to be higher in male students (OECD, 2017, 2019). In Germany, significant gender differences were reported only in PISA 2015, again in favor of male students (OECD, 2017). The

above-mentioned studies, IQB 2015 and 2018, do not provide data on gender differences (Haag et al., 2016; Henschel et al., 2019).

2.2 SoBaS With Regard to Factors at the Classroom and School Level

The interplay of various factors at the classroom and school level account for a school's culture, that is, its socio-emotional, pedagogical and didactical setup. Such factors determine the students' daily experiences and represent the points of reference when it comes to giving an account of their SoBaS. Several factors at the classroom level, such as social relationships, perceived academic and emotional support by others or classroom climate, have repeatedly shown positive connections to feelings of belonging at school, sometimes explicitly for students with SEN (e.g., Cemalcilar, 2010; Chiu et al., 2012; Dukynaitė & Dudaitė, 2017; Graham et al., 2016; OECD, 2017; Zurbriggen et al., 2021). On the other hand, destructive or negative social relationships, feelings of being bullied or neglected as well as perceptions of unfairness have negative impacts on students' affection toward their school (Mínguez, 2020) and are, therefore, negatively connected to SoBaS (Huang, 2022; OECD, 2017; Vitoroulis & Georgiades, 2017).

Sometimes, the culture of interaction at the classroom level appears to be linked to structural aspects, such as classroom organization. In a study on 117 Canadian students with learning disabilities from grades four to eight, Wiener and Tradif (2004) compared different types of educational placement, such as self-contained classrooms and inclusive classrooms. In this study, the students in inclusive classrooms reported better quality of friendships and fewer feelings of loneliness. When compared against such factors at the intersection between social cohesion and classroom management, demographic variables such as gender or migration background were linked to SoBaS only to a lesser extent (Chiu et al., 2012; Niemi & Hottulainen, 2015).

At the school level, positive social climate aspects such as positive contact and equal treatment by teachers and students or satisfaction with the school environment, when perceived as comfortable, stimulating, and safe, were shown to support students' SoBaS (Cemalcilar, 2010; Schachner et al., 2019). As expected from such findings, undesired school-level factors, such as the perceived existence or frequency of violent incidents, not only negatively impacted the SoBaS of the victims but of all the students at the school (Huang, 2022; Cemalcilar, 2010). Research on factors such as the provision of extracurricular activities by the school or the participation therein has thus far generated inconsistent results (Midgen et al., 2019; Dukynaitė & Dudaitė, 2017).

Overall, the studies support the assumption that all the three levels analyzed, that is, the individual, classroom and school levels, have an impact on students' SoBaS. Since most of the research was based on data from regular or mainstream classes, much less is known about the factors promoting SoBaS in inclusive schools,

that is, schools with a high level of experience in catering to a highly diverse student population.

3. The Laborschule Bielefeld and Regular Inclusive Comprehensive Schools

3.1 Laborschule Bielefeld

LS is an experimental school of the federal state of North Rhine-Westphalia (NRW), Germany. Before its opening in 1974, its founder, Hartmut von Hentig, together with a developmental team, had derived its name as well as a few of its core ideas from an experimental school conceptualized by the American pedagogical philosopher John Dewey (Dewey, 1896/1976; Thurn, 2012; Knoll, 2014). His experimental school established in 1886 aimed at constantly developing, testing and assessing new forms of teaching and learning. The *laboratory* metaphor traces back to Dewey himself, and both the schools at the universities of Chicago (Illinois, USA) and Bielefeld were initially conceptualized as integral units or laboratories for invention and evaluation concerning teaching, learning and education.

The organizational framework developed at the LS allows teachers' engagement in various research-oriented tasks – along with their teaching obligations – and is the so-called teacher-researcher model (Hollenbach & Tillmann, 2010; Thurn, 2012). The study presented in this paper was carried out as part of a longitudinal teacher-researcher project termed *Well-Being and Inclusion at the LS – A Self-Reflection* (WILS; Kullmann et al., 2015; Geist et al., 2019). In the course of the WILS project (2013–2018), students from grades six to ten were surveyed once a year about their school-related well-being and conditional factors. Like in most LS research projects, the teachers had been cooperating with the university scientists from early on.

For both experimental schools, representing an “embryonic society” (Dewey, 1899/2008, p. 12; Thurn, 2012) is another common feature and claim. Accordingly, social learning, democratic participation and taking responsibility for oneself and others are important facets of the LS's pedagogic philosophy. These goals are supported by a fairly unique, open architecture with up to three classes sharing one big learning space and a staff room that has no walls and, therefore, does not separate teachers and other personnel from the students and other members of the school community. Also, both experimental schools have discarded traditional subjects and their related “methods of memorizing and reciting” (Knoll, 2014, p. 456). Instead, they follow constructivist approaches based on principles such as self-directed and problem-oriented learning.

At the LS, approximately 700 students learn together for 11 years (including a preschool year beginning at age five) and can obtain lower secondary level qualifications just like at regular comprehensive schools (see below). It is conceptualized as

a school without segregation and currently includes around 10 % SEN students per class, that is, two to three SEN students in a class of approximately 22 students. In grades six to ten, there are three classes per grade. The coupling of several features of individualization, differentiation and support with counselling and feedback enables groups of students with mixed abilities and achievements to learn together. Based on the course choices offered from the fifth grade, students create the qualification profile that best suits their abilities and interests. The LS selects its students based on several background variables to mirror the social stratification of the city of Bielefeld and the federal state of NRW (Devantié et al., 2019).

The LS refrains from external differentiation based on academic performance. Until the end of grade 9, no traditionally graded reports are given. Instead, students receive highly individualized, so-called “learning progress reports”, describing their achievements in personal and scholastic aspects. Developmental opportunities are also provided through various extracurricular offerings and requirements; for example, a so-called “journey curriculum” is followed where increasing responsibilities are placed on the students as they grow up.

The assembly of the learning group (“Versammlung”) together with its teacher, on benches arranged in a circle represents another core element of the LS’s approach, which combines democratic and social learning. The assembly is the starting and end point of every lesson. It is used for different teaching purposes and for sharing viewpoints and information of various kinds. It helps students to stand up for their convictions, respect the viewpoints of others and settle common matters (von der Groeben et al., 2011). The assembly also enables the students to experience academic and emotional support from others, which in turn, is related to SoBaS (Allen et al., 2018). However, critical incidents concerning the assembly have been identified based on interviews with SEN students (Geist et al., 2019; Külker et al., 2017). These interviews are another pillar of the multi-dimensional WILS project (see above).

Overall, the LS is an experienced inclusive school. The pedagogical principles of the school are based on the fundamental assumption that the diversity of students is enriching and opens up learning opportunities for all. Since experimental schools are unique, it is vital for them and their regular school counterparts to share and compare educational concepts, processes and outcomes, wherever appropriate. Methodically sound comparisons can help the experimental school under focus as well as mainstream schools to reflect on their students’ situations and on the local setup of factors identified as being helpful for inclusive school development.

3.2 Regular Inclusive Comprehensive Schools in Germany

Due to the setup of the LS as a state-run, inclusive comprehensive school and the WILS project’s focus on the secondary grades of six to ten, inclusive classes at regular comprehensive schools (*Integrierte Gesamtschulen*) were identified as the most

appropriate reference group for the study presented here and are henceforth referred to as regular inclusive comprehensive schools (RICS).

Regular comprehensive schools are commonly considered to be “better prepared on heterogeneity” (Algermissen et al., 2015, p. 20) compared to other school types on the secondary level. They traditionally cater to an academically broad range of students. Courses with different levels of proficiency are offered for core subjects from a certain grade onward, while the students continue to be taught together for all other subjects (Kultusministerkonferenz, 2021). Comprehensive schools regularly offer routes to different certificates in the lower secondary level (grades five to ten) as well as – for appropriately qualified students – successive courses to gain the general qualification for university entrance (*Abitur*) at the upper secondary level.

Due to the broad range of students visiting regular comprehensive schools and the different routes of qualifications offered, they are often comparably huge schools with 1000 or more students. The size of the schools also usually allows for a broad range of extracurricular activities, such as sports, languages, gardening, music and performing or visual arts. Further, students regularly receive marks and traditionally graded reports from fifth grade onward. Apart from the system of in-house tracking with regard to the core subjects just outlined, differentiation is supposedly a usual feature of the teaching practice at RICS. However, a pull-out system for SEN students may or may not be in place and may change from school to school or even from class to class.

Since the German secondary school system still holds the tradition of tracking, academic grammar schools (*Gymnasien*) that lead to the general qualification for university entrance from fifth grade onward compete with academically gifted students from comprehensive schools in all the German federal states. The tradition of tracking dates back to the class-specific thinking and school organization of the 19th century and is nowadays legitimized by an opaque, politically justified but not scientifically grounded concept of ability and capability. In some German federal states, up to five types of secondary schools with different admission and qualification profiles exist, accompanied by special schools dedicated to one or more of seven different kinds of SEN (e.g., Kultusministerkonferenz, 2021).

In Germany, about 21,2% of secondary students (grade 5 to 10) are currently visiting regular comprehensive schools (Kultusministerkonferenz, 2023). It was only in the 1970s that this type of school was implemented in the German school system and therefore many comprehensive schools are of similar age as the LS. Regarding inclusion at the secondary level, comprehensive schools and related school types cater to almost two-thirds (63.7%) of SEN students visiting regular schools while academic grammar schools more or less completely refrain from doing so in most federal states (6.7%; Klemm, 2022, p. 10). Based mainly on the political decision to warrant freedom of choice to SEN students and their parents, a system of special schools persists parallel to the regular secondary schools in all but one federal state.

3.3 Comparative Studies Between the LS and Schools of the Regular School System

For LS to effectively fulfil its role as an experimental school, it is essential to evaluate its pedagogical practices and outcomes from multiple perspectives. While the culture of internal evaluation has been prevalent since its inception (e.g., Textor & Zentarra, 2022), systematic and empirically robust comparisons with the regular school system have been relatively uncommon.

The most comprehensive comparison between LS and the regular school system was conducted using the testing instruments of the Program for International Student Assessment (PISA, 2000). Various measures of output and quality relating to reading literacy, mathematics, and natural sciences, as well as students' motivational and psychosocial situation and their perception of school and teaching, were determined from the perspective of LS students. The respective school-specific data were then compared with the original assessment data obtained from comprehensive schools and grammar schools in the federal state of NRW (e.g., Stanat et al., 2003). One of the findings that is of particular interest in the context of our study is that students at LS rated the school climate more positively compared to students at both other school types. They reported experiencing a reduced level of competition among their peers, while also providing a more positive evaluation of both the teacher-student relationship and the teachers themselves (Trautwein & Brunner, 2005).

Another, albeit smaller, comparative study investigated the social climate, with a specific focus on student-to-student and teacher-to-student relationships. Using questionnaire data, students in grades sixth, eighth, and tenth at LS (9 classes) were compared to students from comprehensive schools (30 classes) and grammar schools (36 classes) in the regular school system. While the teacher-student relationship was reported as more positive by LS students, certain aspects of social relations among students were rated significantly lower compared to students from both other school types (Wischer, 2003). Since the respective studies did not provide measures of variance, we were unable to further evaluate the group differences based on effect sizes.

Overall, empirical comparisons with the regular school system have been exceedingly rare for LS. From our standpoint, comparing SoBaS as an outcome variable and universal indicator of school quality can assist both LS and individual mainstream schools in reflecting on their students' current situation and the factors involved, with the aim of enhancing or ensuring students' SoBaS as a goal of local inclusive school development.

4. Research Questions

Given the long history of many RICS in dealing with students' heterogeneity (see Section 3.2), as well as previous research that does not entirely favor the LS (see

Section 3.3), we refrained from setting up any hypotheses. Considering the rather rare possibility of securing a methodically sound comparison between the LS and the mainstream educational system using quantitative empirical data, three research questions were selected for this study:

1. Do students at the LS differ from students attending inclusive classes in comprehensive schools within the regular German school system in terms of their SoBaS?
2. Does the factor ‘attending the LS – or not’ significantly explain students’ SoBaS in a regression analysis, controlling for demographic variables such as SEN status, family language, and gender?
3. Which factors concerning students’ educational environment at the LS can predict their SoBaS in a regression analysis?

5. Method

5.1 Data

Questionnaire data from ninth-grade students of two sources were utilized to answer the research questions. At the LS, the questionnaires were administered during the longitudinal teacher-researcher project WILS described above (see Section 3.1). To compare the data from the LS with a representative national sample, ninth-grade LS students were additionally asked about their SoBaS in 2017 and 2018 (total: six classes) using the same 9-item-scale as in the national study *IQB Trends in Student Achievement 2015* (Schipolowski et al., 2018).

In this study, we used a sub-sample of the latter (Stanat et al., 2018)¹: we only used data from regular comprehensive school classes in which at least one student had an officially diagnosed SEN status and was taught alongside peers without a SEN status. We termed such classes as “inclusive.”

5.2 Sample

The two-partite sample consists of 115 students from the LS and 2376 students from RICS. The main characteristics of both subsamples are summarized in Table 1.

¹ Data for our secondary analysis were gratefully made available by the Research Data Centre (FDZ) at the Institute of Educational Quality Improvement (IQB), Berlin.

Table 1: Sample Characteristics

Student Characteristics	LS		RICS	
	<i>n</i>	%	<i>n</i>	%
Gender				
Female	59	51.3	1096	46.1
Male	56	48.7	1280	53.9
Family Language ^a				
German (only)	89	77.4	1550	65.2
Non-German ^b	26	22.6	826	34.8
SEN				
With	11	9.6	180	7.6
Without	104	90.4	2196	92.4

Note. LS = Laborschule Bielefeld, RICS = regular inclusive comprehensive schools. ^aIncluding data based on imputation. ^bOther language only or mixed.

5.3 Measures

5.3.1 Dependent Variable

The 9-item scale used for assessing SoBaS in both sub-samples was adapted from PISA 2012 (OECD, 2013; 1 = strongly disagree, 4 = strongly agree). The scale captures information about relationships and experiences at school (e.g., “I feel like an outsider in this school”) as well as school satisfaction (e.g., “Things are ideal in my school,” Schipolowski et al., 2018). In the study presented here, the reliability of the scale determined by Cronbach’s alpha (α) was .84, which is good.

5.3.2 Independent Variables and Covariates

As demographic variables, gender (0 = male, 1 = female), SEN status (0 = no, 1 = yes) and family language (0 = German only, 1 = non-German, i. e., other language only or mixed) were ascertained. The students’ socioeconomic status was determined using their ratings about their parents’ education (6 categories as well as the selection option “other school-leaving qualification”; 1 = “upper secondary education” to 6 = “no school attended”), their parents’ professional situation (4 categories, 1 = “full-time employed” to 4 = “something else, e. g., pensioner”), the number of employees for whom their parents are responsible (3 categories, 1 = “no employee” to 3 = “more than 10 employees”), the number of books at home (5 categories, 1 = “1 to 10”, 5 = “more than 200”), the availability of a musical instrument and whether or not they have a room of their own. The data on parents were collected separately for the mother and father. Parental education was defined as the highest level of education of each parent.

Regarding the third research question, that is, the identification of factors affecting the students' SoBaS at the LS, multiple scales were employed (Kullmann et al., 2020). Based on theoretical reasoning, they were attributed to either the class/teacher level or the school level. A 6-level scale ranging from 0 = "does not apply at all" to 5 = "applies completely" was used to rate each item. Concerning the class/teacher level, students rated the extent to which teachers evaluated and addressed their subject- and learning-related strengths (*strength-oriented diagnostics*, 3 items, $\alpha = .80$, $M = 3.42$, $SD = 1.08$), the perceived level of *individualized learning support* (3 items, $\alpha = .77$, $M = 3.68$, $SD = 0.92$) and – as a fairly LS-specific aspect – the perceived usefulness and *effectiveness of the assembly* (see Section 3.1, 4 items, $\alpha = .78$, $M = 2.33$, $SD = 1.10$). Concerning the school level, students rated how far they perceived *social competence as a school-wide educational goal* (6 items, $\alpha = .88$, $M = 3.93$, $SD = 0.88$).

5.4 Statistical Analysis Strategy

5.4.1 Missing Data

Missing data were catered to by using multiple imputations ($m = 15$; R package MICE; van Buuren & Groothuis-Oudshoorn, 2011). We combined the results of the analyses performed on each dataset following Rubin's (1987) approach.

5.4.2 Propensity Score Matching

The LS and RICS samples to be compared in this study differ in terms of size and background characteristics. To account for selection bias when estimating the effects of attending the LS in contrast to RICS, propensity score matching (PSM) was used. This statistical technique matched students from both parts of the sample based on their individual demographic data. The propensity score represents the probability of participants belonging to a particular group. By doing so, pre-existing differences between the groups for the observed covariates can be controlled since PSM produces less biased estimates and increases the balance between groups (Powell et al., 2020).

As implemented in the R package MatchIt (Ho et al., 2011), the propensity score was estimated using binary logistic regression. We conducted Nearest Neighbor Matching (1-to-1 and 1-to-5 within a caliper, $c = 0.1 SD$) to pair LS students with their closest neighbor in the RICS sample. Further, we imposed exact paring for gender and SEN status. Since the ratio of RICS to LS students was around 20:1, matching was conducted without replacement (Dehejia & Wahba, 2002). We assessed the covariate balance after matching using the standardized differences in means of the propensity score. With the respective differences being smaller than

0.00, we presume a successful matching (Stuart et al., 2013). The results reported in this paper (see Section 6) are based on the 1-to-1 matching².

5.4.3 Modelling Approach

Based on PSM, we examined the differences in the SoBaS between students from LS and RICS using *t*-Tests and effect sizes (first research question). We analysed the impact of visiting the LS on students' SoBaS – in contrast to visiting RICS – by applying linear regression while controlling for gender, SEN status and family language, since the respective groups sometimes (tend to) differ with regard to SoBaS and similar indicators of school quality (see Section 2.1; second research question).

To answer the third research question on the factors determining the students' SoBaS at the LS, we carried out a linear regression analysis for each independent factor separately to calculate its individual influence on the dependent variable. Thereafter, covariates were included in multiple steps. In Model 1, we included the students' demographic characteristics, such as gender, SEN status and family language. Model 2 includes the individual perception of students regarding factors that can theoretically be attributed to the classroom or teacher level. In Model 3, a factor concerning the school level was added (see Table 4).

Even though the students were nested in classes, we did not apply multilevel modeling since the class-related variance in the SoBaS is small ($ICC=0.03$) and six classes do not provide a sufficient number of clusters on the second level (Hox, 2010). On a theoretical basis, however, the factors measured at the student level can be attributed to the class/teacher or school level.

6. Results

Concerning the first research question, group comparisons on SoBaS were performed between ninth-grade students of the LS and RICS (see Table 2). According to the fairly high mean values of both groups, students showed, on average, a rather high level of SoBaS. However, concerning the total sample and all the sub-groups compared, students at the LS showed higher values of SoBaS based on the effect size measure Cohen's *d* from small to medium ($.31 \leq d \leq .39$). Such differences were termed as practically meaningful (Cohen, 1988). Additionally, for comparisons in which subgroups were large enough to meet the respective statistical power criterion, significance was reached based on the *p*-value accompanying the respective *t*-Test.

2 Results based on Nearest Neighbor Matching 1-to-5 can be provided by the corresponding author on request. They do not differ much.

Table 2: Means, Standard Deviations and Group Comparisons with Regard to SoBaS

Criterion	LS			RICS			Group Comparison	
	<i>n</i>	<i>M^a</i>	<i>SD</i>	<i>n</i>	<i>M^a</i>	<i>SD</i>	<i>t</i>	<i>d^b</i>
Total	108	3.32	0.44	108	3.14	0.54	-2.19*	0.37
SEN								
With	10	3.24	0.36	10	3.08	0.59	-0.55	0.31
Without	98	3.33	0.44	98	3.14	0.53	-2.13*	0.39
Family Language								
Non-German ^c	25	3.25	0.55	23	3.07	0.55	-0.87	0.32
German (only)	82	3.34	0.40	85	3.16	0.53	-2.05*	0.38
Gender								
Female	54	3.32	0.41	54	3.13	0.56	-1.60	0.39
Male	53	3.32	0.47	53	3.14	0.52	-1.65	0.36

Note. LS = Laborschule Bielefeld, RICS = regular inclusive comprehensive schools. Multiple imputed data (m = 15). Students were selected based on Nearest Neighbor Matching (1:1). ^aMinimum = 1, Maximum = 4. ^bCohen’s *d*. ^cOther language only or mixed. **p* < .05.

To further elucidate the impact of visiting the LS on students’ SoBaS, a bipartite multiple regression analysis was conducted (research question 2, see Table 3). First, the three demographic characteristics considered were found to be of little relevance for SoBaS as they were not significantly linked to the SoBaS and explained less than 0.5% of the variance (Model 1). Schooling at the LS, however, appeared to have a strong positive effect on students’ SoBaS when contrasted with students visiting RICS while concomitantly controlling for the individual background properties (Model 2). Including the grouping variable *school type*, that is, *LS* in model 2, raised the explained variance to 3%, indicating a small but relevant effect (Cohen, 1988).

Table 3: Regression Analysis to Elucidate the School Type Effect on SoBaS

	Model 1		Model 2	
	β	<i>SE</i>	β	<i>SE</i>
SEN	-.14	.17	-.14	.17
Non-German Family Language ^a	-.15	.11	-.16	.11
Female Students	-.01	.08	-.01	.07
LS			.37*	.08
Adjusted <i>R</i> ²	.004		.03	

Note. Multiple imputed data (m = 15). Students were selected based on Nearest Neighbor Matching (1:1). ^aOther language only or mixed. **p* < .05.

Additionally, a linear regression with factors attributed to the school's educational culture was performed on the LS sample to explain students' SoBaS (research question 3, see Table 4). The respective data were not available for students from RICS because these factors were not part of the study serving as the data source (see Section 5.1).

While all the factors of educational culture appeared to have a significant positive impact on SoBaS, the influence was strongest for *social competence as a school-wide educational goal* (Single Influence in Table 4). In accordance with the preceding results, students' demographic characteristics did not significantly affect their SoBaS (Model 1). Integrating selected characteristics of the teaching culture (theoretically attributed to classroom level) showed that students with a more positive assessment of the effectiveness of the assembly ("Versammlung", see Section 3.1) and the strength-oriented diagnostics, such as consideration and perception of their strengths, achievements, and efforts, showed a more positive SoBaS (Model 2). The second model explains 33% of the variance in SoBaS.

Model 3 additionally integrates *social competence as a school-wide educational goal*, representing a characteristic of the LS's global school culture (theoretically attributed to the school level). The factor not only appeared to be significantly linked to the students' SoBaS but turned out to be the most powerful predictor of all. The explained variance increased from 33% to 40%, showing a major growth in explained variance. While the factor *strength-oriented diagnostics* now failed to reach a significant level, *effectiveness of the assembly* as a relevant element of the teaching culture at the classroom/teacher level remains significantly associated with SoBaS.

Table 4: Regression Analysis Explaining the SoBaS of Students Visiting the Laborschule Bielefeld

Predictor	Single Influence			Model 1		Model 2		Model 3	
	β	SE	Adj. R ²	β	SE	β	SE	β	SE
Demographic characteristics									
SEN	-.07	.14	-.004	-.06	.14	-.09	.11	-.09	.11
Non-German Family Language ^a	-.10	.10	.000	-.09	.10	-.05	.08	-.10	.08
Female	.01	.08	-.009	.01	.08	.00	.07	-.05	.07
Characteristics of class/teaching culture									
Effectiveness of assembly	.44**	.03	.19			.26**	.03	.20*	.03
Individualized learning support	.51**	.04	.25			.21	.06	.06	.06
Strength-oriented diagnostics	.51**	.03	.26			.25*	.05	.15	.05
Characteristic element of school culture									
Social competence as a school-wide educational goal	.59**	.04	.34					.39**	.05
Adjusted R ²					-.02		.33		.40

Note. ^aOther language only or mixed. ** $p < .01$. * $p < .05$.

7. Discussion

SoBaS is a basic requirement for every student, making it important as both an output variable at the individual-level and an indicator of school quality. Achieving a high level of SoBaS for each student can be particularly challenging, especially for inclusive schools, due to the greater heterogeneity of their students' needs and competencies.

The first major aim of our study was to compare the levels of SoBaS at the LS, an experienced inclusive experimental school, with a suitable representative sample from RICS. For the LS, being a state-run experimental school, these comparisons hold significant interest and importance as it serves as a benchmark school for various aspects of school culture and teaching.

In both samples, the average reported levels of SoBaS for ninth-grade students were relatively high and therefore satisfactory. Upon comparing the total sample and various sub-samples based on demographic variables frequently associated with differences in the SoBaS (SEN, migration background, gender), consistently higher levels of SoBaS were observed at the LS, with effect sizes ranging from small to medium (see Table 2). According to the conventional interpretation of effect sizes, these differences hold practical relevance, suggesting that they globally point toward a culture of teaching, learning, and school-based living at the LS that favors students' SoBaS even more than in the case of RICS. While the statistical power is apparently insufficient to reject all null hypotheses related to sub-groups, the overall effect of visiting the LS on SoBaS is significant (see Tables 2 and 3).

By incorporating additional data from the LS, we were able to identify specific aspects of a school's teaching and interaction culture that contribute to higher levels of students' SoBaS in inclusive classes (while demographic characteristics do not appear to predict students' SoBaS, see Table 4). According to our findings, the explanatory power of two variables narrowly related to classroom teaching, namely individualized learning support and strength-oriented diagnostics, diminishes when considering the more socially oriented factors social competence as a school-wide educational goal and effectiveness of assembly (see Table 4). Among these explanatory variables, the former highlights the significant role of fostering social togetherness both inside and outside the classroom to enhance the SoBaS (Allen et al., 2018), while the latter pertains to a diversely used didactic tool that potentially has a generalized effect beyond students' perception of teaching, including, maybe among other factors, their SoBaS as an indicator of school quality.

In general, the support of social-emotional learning, which is one of the characteristic features of the assembly situation, is known to have a high potential in enhancing students' SoBaS when integrated into routine educational practices (Durlak et al., 2011; see Section 3.1). Particularly in classes with highly heterogeneous student populations, it is advisable to establish common exchange and reference points alongside individualized approaches. While assembly-like routines are quite prevalent in German primary schools, which also feature very heterogeneous student

bodies, our findings from grade ninth support the implementation or evaluation-driven improvement of such practices at the secondary level, especially when the objective is to enhance the SoBaS within schools.

However, the strongest factor identified in our analysis appears to be social competence as a school-wide educational goal as perceived by the students. This evaluative variable pertains to interpersonal relationships and has a global, school-level-oriented nature, similar to SoBaS. However, these variables differ in that the social competence scale focuses on the process aspect, assessing the extent to which the school community cares about social interaction and learning, while the SoBaS scale represents the individual student's outcome. Therefore, each variable offers a distinct evaluative perspective, and the impact of the former on the latter, as found in our study, emphasizes the need for the school community to collectively assume responsibility for social learning and interaction at all levels, to support students', and likely also teachers', SoBaS. Other recommended aspects in this context include having a shared vision and goals for social learning, identifying current needs and resources, and providing targeted training opportunities for social and emotional development in learning environments (Mahoney et al., 2021; Oberle et al., 2016).

Drawing from the situation observed at the LS, our findings suggest that students' demographic characteristics do not predict their SoBaS in inclusive classes. While processes that foster social competence in schools seem to be the most crucial, factors at the classroom and teaching level, such as the assembly in our case, also demonstrate relevance. Consequently, it is advisable to develop strategies that encourage positive interaction within the classroom and extend beyond it, aiming to enhance students' SoBaS as a quality characteristic of inclusive schools.

While taking the rare opportunity to compare data from the LS as a state-run experimental school with a fairly and representative selected sample from the regular school system, certain compromises had to be made, which manifest themselves as methodological limitations.

For each sub-sample, the set of background characteristics in both the PSM and regression models was limited. For instance, the group of students with SEN was treated uniformly, despite its known heterogeneity. Furthermore, regarding RICS, no additional information was available regarding how "inclusive education" was implemented in the different schools across various German federal states.

Moreover, only cross-sectional data were available, which means that any conclusions drawn from the regression modelling are hypothetical in terms of causality. Therefore, longitudinal studies are needed to examine the causal influence of the identified factors on SoBaS. Additionally, the nested structure of the data, with students nested within classes, could not be adequately addressed due to the small number of available classes (only six classes as Level 2 elements) at the LS.

Despite its limitations, our study is, to the best of our knowledge, the first study to present findings on students' SoBaS in highly experienced inclusive schools in Germany to an international audience. We identified school culture as well as teaching associated characteristics that are crucial for achieving high levels of stu-

dents' SoBaS. These factors are linked to a supportive learning environment and hence inclusive practices at the LS and might serve as valuable leverage points for all schools aiming to enhance their inclusive practices.

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