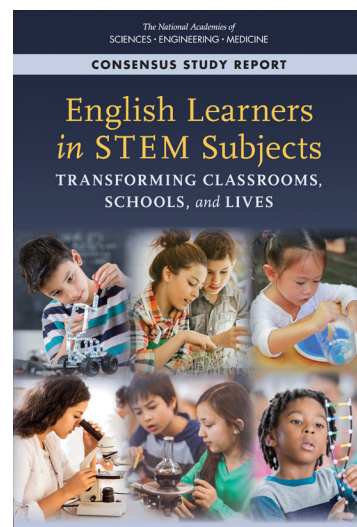


English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives

Highlights for State Leaders

English learners (ELs) comprise a diverse and talented pool of learners who bring valuable perspectives and resources to science, technology, engineering, and mathematics (STEM) classrooms that reflect their experiences with their home languages, homes and communities, as well as STEM schooling in other countries. Yet, many of these students' lack access to rigorous STEM learning opportunities, in part due to incorrect assumptions that English proficiency is a prerequisite for students to learn STEM content.

English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives (2018), a report from the National Academies of Sciences, Engineering, and Medicine, emphasizes the importance of teaching language and STEM content in an interconnected way and identifies factors that affect ELs' access to rigorous, grade-appropriate STEM content learning opportunities and their success in STEM. Organizing schools and equipping teachers so that all students, including ELs, have opportunities to reach their full potential in STEM requires changes in classrooms and schools. This brief highlights information and recommendations from the report relevant to principals, teacher leaders, counselors, and after-school coordinators.



CLASSIFYING STUDENTS AS ENGLISH LEARNERS

The process for classifying a student as EL varies considerably across states. However, clear and consistent designations of EL and English-proficiency status are needed to better understand the trajectories of these students. Too often, **EL status can be a barrier to student enrollment in advanced STEM courses.** Failure to be reclassified as English proficient by the end of the elementary grades can result in continued placement in EL-isolated programs that provide limited access to grade-level, content-rich STEM curriculum. This makes accurate classification and reclassification particularly important.

MONITORING SUCCESS OF ENGLISH LEARNERS

Current approaches to monitoring the achievement of ELs as a group can underestimate their success. **Reporting on the educational attainment of ELs once they are classified proficient in English would allow a deeper understanding of the academic achievement of students who begin school as ELs but are later reclassified, what program models and instructional strategies work best, and whether specific approaches work best for particular EL subpopulations under specific conditions.** Reports on EL achievement typically compare ELs to never-ELs. This comparison does not take into account the performance of students who used to be ELs, but are now reclassified as proficient, which can lead to an overestimation of achievement gaps between ELs and never-ELs.

MEASURING ACHIEVEMENT OF ENGLISH LEARNERS

Given the linguistic heterogeneity of ELs, obtaining accurate measures of academic achievement for ELs is more difficult than for never-EL students. **More accurate decisions concerning ELs' STEM academic achievement are possible when they are based on multiple sources of information, multiple test scores, and/or qualitative forms of assessment.** Efforts to strengthen teachers' formative assessment skills are needed to improve STEM instruction and promote ELs' learning. Large-scale STEM assessments yield better-informed decisions about ELs' STEM achievement when test scores are used in combination with other information (e.g., classroom formative assessment).

BUILDING CAPACITY TO PROMOTE SUCCESS OF ENGLISH LEARNERS

Currently, states lack systemic policies and programs to equip STEM teachers to work with ELs. **Professional development (PD) related to teaching ELs in content areas is not currently required for teachers of STEM subjects**

who serve ELs, and efforts to fill this gap are not equally distributed across or within states, resulting in fewer teachers who have the skills necessary to design rigorous instruction. Building effective PD systems requires adequate assessment of teachers' needs, expectations, prior experiences, and constraints. Careful consideration should also be given to the types and quality of PD experiences that are made available, as well as specialized certifications to teach ELs. By providing resources that illustrate evidence-based instructional practices for promoting ELs' STEM learning, state leaders can play an essential role in supporting the development of teachers' knowledge about interpreting large-scale STEM assessments and designing productive classroom summative and formative assessments.

RECOMMENDATIONS

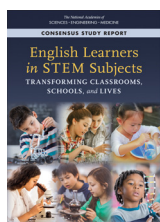
The report offers a set of recommendations to guide the efforts of policymakers, state, district, and school leaders, as well as educators, as they work collaboratively to support ELs' learning in STEM subjects. Below are the key recommendations that are specific to state leaders.

RECOMMENDATION 1: Evaluate current policies, approaches, and resources for their potential to negatively affect ELs' access to STEM learning opportunities, including classification and reclassification, course-taking, classroom instruction, program models offered, PD, and fiscal resources.

- States should evaluate their definition of EL, including proper specification of entrance and exit procedures and criteria for districts to implement.
- States should evaluate policies associated with the timing of large-scale state assessments and waivers for assessment (i.e., waivers for science assessment), frameworks for teacher certification, and the distribution of financial and human resources.

RECOMMENDATION 2: Develop a high-quality framework to identify and remove barriers to ELs' participation in rigorous STEM learning opportunities.

States should take an active role in collecting and sharing resources across schools and districts. Leaders in states, districts, and schools should continuously evaluate, monitor, and refine policies to ensure that ELs' STEM learning outcomes are comparable to their never-EL peers.



English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives (2018)

Available:

<https://nationalacademies.org/ELinSTEM>

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For More Information . . . This Highlights for District and School Leaders was prepared by the Board on Science Education based on the Consensus Study Report *English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives* (2018). The study was sponsored by the National Science Foundation. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242; <http://www.nas.edu/ELinSTEM>.

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