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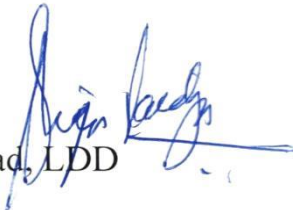
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Greeting from the LDD, NCERT!

The Library and Documentation Division (LDD) of NIE, NCERT is pleased to bring out “**Indexing & Abstracting Service of Periodicals**” for the month of **June, 2023**. This information product of LDD is the collection of Articles in the area of Educational Research, Elementary Education, Inclusive Education, and ICT in Education, Educational Psychology, Science Education and Teacher Education.

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## ACTION IN TEACHER EDUCATION

1. Gardiner, W., Hinman, T. B., Tondreau, A., Degener, S., Dussling, T. M., Stevens, E. Y., Wilson, N. S., & White, K. (2022). When “Nice” Isn’t: Confronting Niceness and Whiteness to Center Equity in Teacher Education. *Action in Teacher Education*, 45(2), 90–106. <https://doi.org/10.1080/01626620.2022.2158390>

**Abstract:** Niceness is a socialized disposition, particularly amongst white women, that prioritizes comfort and neutrality while preventing resistance against oppressive systems. Given the demographics of teachers and teacher educators, niceness and whiteness are deeply embedded in programs and institutions. As eight white, female teacher educators, we drew on the power of cross-institutional collaboration to form a self-study community of practice with the purpose of interrogating and dismantling the ways niceness and whiteness function in our teaching and teacher institutions and create barriers to centering equity and justice. Findings indicated that collaboration helped us identify how niceness shaped and continues to shape our teaching and teacher identities, particularly how we navigate difficult conversations, think about our roles as teacher educators, and imagine literacy curricula. Findings also indicated that despite efforts to recognize and interrupt niceness and whiteness, our growth was nonlinear, and we find that constant vigilance and reflection is necessary. Implications for the broader field of education include the power of self-study for disrupting niceness and whiteness in teacher education and orienting the community toward action through mutual support and accountability, while also recognizing the ways in which niceness continues to function as a barrier for enacting change for social justice.

**Keywords:** Self-study, equity, niceness, whiteness, methods courses

2. Cho, H., Chou, A., & Wiens, P. D. (2023). Teacher Education Students’ Perceptions About Bilingualism and Emergent Bilingual Students. *Action in Teacher Education*, 45(2), 107–123. <https://doi.org/10.1080/01626620.2023.2174203>

**Abstract:** Teachers’ perceptions guide their instructional decisions and interactions with their students. Given the increasing number of Emergent Bilingual (EB) students and the more acceptance of multilingual language ideologies in the social and political contexts, there is an urgency to examine teachers’ beliefs about EB students and to train teachers to teach students from the pluralist perspective. This paper examines the language ideologies of teacher education students and how their language ideologies are related to their backgrounds, their attitudes about the engagement of the EB students and their families, and their perceived responsibility to teach EB students. The survey responses of 235 teacher education students were analyzed using descriptive statistics, regression, and correlation. The participants held more multilingual and heteroglossic beliefs about bilingualism. Their language ideologies were significantly related to their attitudes toward EBs and their families and their perceived teacher responsibility. Race was the only variable that demonstrated a statistically significant relationship with monoglossic or heteroglossic beliefs. We discuss how teacher educators address heteroglossic language ideologies in their programs to help teacher education students create inclusive and asset-oriented learning environments.

**Keywords:** Teacher attitudes, teacher education, language ideology, English learners, emergent bilingual.

3. Yoon, B. (2023). Classroom Study of Teacher Collaboration for Multilingual Learners: Implications for Teacher Education Programs. *Action in Teacher Education*, 45(2), 124–141. <https://doi.org/10.1080/01626620.2023.2175739>

**Abstract:** There has been growing evidence suggesting that collaboration between content teachers and English as a second language (ESL) teachers is crucial for multilingual learners' (MLLs) equitable learning experiences. What is lacking is more nuanced analyses of teacher collaboration in the classroom context. This article reports on the findings of a qualitative case study to address the nuanced contexts through the voices and actions of participant teachers and students. It focuses on the teachers' roles in supporting MLLs and the elements involved in an effective collaborative partnership through the perspectives of an English language arts teacher and an ESL teacher in a middle school setting. Findings suggest that joint teacher presence can be achieved if both teachers recognize their overall role to support MLLs' successful language and content learning. Despite the limited time for planning lessons together, the teachers attempted to overcome the challenge by leveraging their professional capital, enacting their agency, and taking a flexible form of collaboration. This study refines existing findings that there is an uneven power structure between content teachers and ESL teachers and provides teacher education programs with suggestions and future directions for effective collaboration for MLLs.

**Keywords:** Teacher collaboration, teacher education, multilingual learners, ESL teacher, content area teacher

4. Putman, S. M., Cash, A. H., & Polly, D. (2023). Development of Teacher Education Candidates' Self-Efficacy for Culturally Responsive Teaching Through Extended Clinical Experiences. *Action in Teacher Education*, 45(2), 142–158. <https://doi.org/10.1080/01626620.2023.2180111>

**Abstract:** Teacher self-efficacy is a construct that exerts a powerful influence on the behaviors of teachers. Yet, few studies have been conducted examining the impact of contextual structures within educator preparation programs on the development of general and domain-specific teaching efficacy. This study investigated the impact of an embedded internship in culturally- and linguistically-diverse elementary schools on self-efficacy for culturally responsive teaching. The results indicated candidates who participated in the internship demonstrated differences in self-efficacy for culturally responsive teaching that were significantly different in comparison to candidates who completed the traditional teacher education program. Implications are discussed as related considerations for teacher education programs as they seek to structure clinical experiences with focused opportunities for mastery experiences and relationship-building.

**Keywords:** Teacher self-efficacy, culturally responsive teaching, clinical experiences

5. Jacobs, J. (2023). Preparing the Next Generation of Equity-Centered Teacher Educators: Considerations for a Pedagogy of Teacher Educator Education. *Action in Teacher Education*, 45(2), 159–181. <https://doi.org/10.1080/01626620.2023.2184881>

**Abstract:** Within the equity-centered teacher preparation literature, the learning of teacher candidates is often at the center of the conversation. Less prevalent are conversations about the equity-centered teacher educators who will be responsible for equity-centered teacher candidate preparation. The purpose of the study was to understand the development of the next generation of equity-centered teacher educators through doctoral preparation using a teacher knowledge framework coupled with a lens of critical consciousness and praxis. Interviews were utilized to understand the experiences of six doctoral student participants learning about equity-centered teacher education through their participation in various learning contexts within their doctoral program. Findings included the need for equity-centered teacher educators to 1) develop a theoretical basis for working with teacher candidates, 2) engage in consciousness-raising about past experiences and beliefs, and 3) have opportunities for praxis. These findings led to assertions that the next generation of equity-centered teacher educators need opportunities to construct multiple types of knowledge and opportunities to engage in praxis within their preparation. The findings have implications for essential components for preparing the next generation of equity-centered teacher educators.

**Keywords:** Teacher educators, equity, professional learning, teacher education

## AMERICAN JOURNAL OF PHYSICS

1. On the bifurcation behavior of a folded notebook page. (2023). *American Journal of Physics*, 91(5), 335. <https://doi.org/10.1119/5.0097340>

**Abstract:** We study how a bound notebook page can be folded *once* so that the page is visible when the notebook is closed and becomes a bookmark. An additional practical requirement is that the folded page stays within the same side of the bind, so that it does not get creased further when one closes the notebook. This simple problem displays a remarkably rich bifurcation behavior, which can be analyzed using undergraduate calculus. The main finding is that the optimal way of folding the page depends on the page's aspect ratio and changes abruptly when the latter exceeds the critical value of 1.207 11. This behavior also resembles a first-order phase transition in thermodynamics despite its geometric origin.

2. Da Cruz Lopes, Q., Ramanarivo, S., Cohen, C., & Benzaquen, M. (2023). Paragliders' launch trajectory is universal. *American Journal of Physics*, 91(5), 340. <https://doi.org/10.1119/5.0101359>

**Abstract:** We designed and built a reduced-scale model experiment to study the paragliding inflation and launching phase at given traction force. We show that the launch trajectory of a single skin glider is universal, that is, independent of the exerted force. As a consequence, the length of the take-off run required for the glider to reach its “ready to launch” vertical position is also universal. We successfully compare our results to full-scale experiments and show that such universality can be understood through a simple theoretical model.

3. Timberlake, T. K., & Mahend, R. V. M. (2023). The one-dimensional potential energy function that is analogous to a two-dimensional track. *American Journal of Physics*, 91(5), 345. <https://doi.org/10.1119/5.0100950>

**Abstract:** When learning about potential energy functions, students are sometimes told that the potential energy function is analogous to that of a particle sliding along a frictionless roller coaster track or wire confined to a vertical plane with peaks and valleys of the track corresponding to unstable and stable equilibrium points. However, motion along a track with height  $z(x)$  is a constrained two-dimensional motion, not a one-dimensional motion, so the exact nature of this analogy may be unclear. We show that the horizontal motion of a point mass sliding along a frictionless track  $z(x)$  and subject to a uniform gravitational field is equivalent to the motion of a particle in one dimension characterized by an “analogous potential energy” function  $UE(x)$ , which generally depends on the total energy of the system (and thus on the initial conditions). We derive a general expression for  $UE(x)$  in terms of  $z(x)$  and the total energy and show that the equilibrium points of the actual potential energy  $U(x)=mgz(x)$  are also *static* equilibrium points for  $UE(x)$  with the same stability. However,  $UE(x)$  may have additional *dynamic* equilibrium points that are not present for  $U(x)$ . As an example, we derive  $UE(x)$  for a double well track and determine the period of oscillations on that track. The results show that in general a single track corresponds to many different analogous potential energy functions, each with a different value for the total energy.

4. Cross, R. (2023). Sliding and rolling along circular tracks in a vertical plane. *American Journal of Physics*, 91(5), 351. <https://doi.org/10.1119/5.0107553>

**Abstract:** Objects that slide or roll along curved tracks in a vertical plane are investigated in two separate experiments. One concerns a smooth metal nut that slides along a semi-circular track made from coat hanger wire. The other concerns a billiard ball that slides and rolls along a curved track. A simple theoretical model is provided to account for the results and to extend the discussion to consider shortest descent times down circular tracks.

5. Park, C. (2023). Heavy symmetric tops and the Hannay angle. *American Journal of Physics*, 91(5), 357. <https://doi.org/10.1119/5.0101149>

**Abstract:** The dynamics of a heavy symmetric top are studied in connection with the Hannay angle. When the top undergoes a steady precession due to gravity without nutation, the Hannay angle has a geometric nature such that it is identical to the solid angle subtended by the loop swept out by the symmetry axis of the top. Here, we show that the Hannay angle can also be described by the angle between two radial vectors on the disk of the top corresponding to the pure spinning motion and the coupled motion of spin and precession for one period of the precession. The geometric nature of the angle between the two radial vectors is verified by demonstrating, via parallel transport, that the magnitude of the angle is the same as that of the solid angle. In the presence of nutation, the path constructed by the symmetry axis is not closed, and the steady precession appears in the limit of infinite initial spin angular velocity. As a consequence, in an ideal situation of no friction, the Hannay angle as a pure geometric effect does not exist in the superposed motion of precession and nutation.

6. Vallejo, A. (2023). Finding and improving bounds of real functions by thermodynamic arguments. *American Journal of Physics*, 91(5), 366. <https://doi.org/10.1119/5.0121919>

**Abstract:** The possibility of stating the second law of thermodynamics in terms of the increasing behaviour of a physical property establishes a connection between that branch of physics and the theory of algebraic inequalities. We use this connection to show how some well-known inequalities, such as the standard bounds for the logarithmic function or generalizations of Bernoulli's inequality, can be derived by thermodynamic methods. Additionally, we show that by comparing the global entropy production in processes implemented with decreasing levels of irreversibility but subject to the same change of state of one particular system, we can find progressively better bounds for the real function that represents the entropy variation of the system. As an application, some new families of bounds for the function  $\log(1+x)\log$  are obtained by this method.

7. Littman, M. G., Gordis, E., Zhelmin, P., & Arnold, J. (2023). Introducing quantum mechanics through its historical roots: The hydrogen Rydberg atom viewed through the lens of the old quantum theory. *American Journal of Physics*, 91(5), 371. <https://doi.org/10.1119/5.0094860>

**Abstract:** Solutions of Schrödinger's equation for Rydberg states of hydrogen are shown to display patterns that can be understood semi-classically within the framework of Bohr-Sommerfeld planetary orbits and de Broglie's concept of matter waves. Using  $n=10$  and  $n=100$  quantum levels we show how de Broglie-wave-analyzed Kepler orbits can be matched to excited-state wavefunctions and charge distributions. Making the connection between the old and new quantum theories can help beginning students develop an intuition about quantum mechanics and allow them to develop an appreciation of how Schrödinger's wave mechanics was stimulated by the theories of his predecessors.

8. Holstein, B. R. (2023). Applications of the eikonal approximation in quantum mechanical scattering. *American Journal of Physics*, 91(5), 379. <https://doi.org/10.1119/5.0077649>

**Abstract:** Scattering is an important component of any quantum mechanics course. However, the scattering amplitude in the case of a general potential is often calculated using the simple Born approximation, which does not embed general properties such as unitarity or analyticity. We show that a relatively simple extension, the eikonal approximation, offers a significant improvement and demonstrate this in the case of the electromagnetic and gravitational interactions.

9. McDonough, B., & Withers, P. (2023). The discovery of a supermassive black hole at the center of the Milky Way galaxy. *American Journal of Physics*, 91(5), 386. <https://doi.org/10.1119/5.0086222>

**Abstract:** Black holes are fascinating astrophysical objects, yet they are rarely encountered in undergraduate-level physics courses. Here, we use concepts accessible to upper division physics majors to explain the discovery of a supermassive black hole at the center of the Milky Way galaxy, which was recognized by the award of the 2020 Nobel Prize in Physics. Infrared observations of the innermost region of the Milky Way galaxy show that many stars orbit around the galactic center at distances comparable to the size of the solar system with decadal-scale periods. We show how, given the sizes and periods of these stellar orbits, Newton's version of Kepler's third law can be used to determine the mass and maximum radius of the concentration of mass at the galactic center. We consider various possible physical interpretations consistent with this mass and maximum radius, rejecting flat disks due to dynamical instabilities, clouds of gas and/or dust due to gravitational instabilities, and clusters of compact objects due to collisional instabilities. This demonstrates that a supermassive black hole is the only possible explanation for the observed orbits of stars close to the galactic center.

10. Fung, J., & Weil, C. L. (2023). Flexible, low-cost phase-sensitive detection for the undergraduate laboratory with a Teensy microcontroller. *American Journal of Physics*, 91(5), 395. <https://doi.org/10.1119/5.0126691>

**Abstract:** We perform phase-sensitive detection with an inexpensive microcontroller, the Teensy 3.5. The programming and pricing of this microcontroller is similar to that of commonly used Arduino microcontrollers, but the Teensy 3.5 offers superior hardware performance. Our Teensy-based phase-sensitive detector can operate either with an external reference signal or by internally generating a reference signal.

Additionally, we have developed an open-source graphical user interface for controlling the instrument. We demonstrate that our phase-sensitive detector exhibits good linearity in amplitude and phase, even with 25 mV signals dominated by larger-amplitude noise. We also use our phase-sensitive detector in a simple laboratory measurement: determining the distance dependence of the intensity of a light-emitting diode (LED) with the room lights on. Our instrument is a useful tool for teaching students about phase-sensitive detection and can be a viable low-cost alternative to commercial lock-in amplifiers.

11. Reguilon, A., Bethard, W., & Brekke, E. (2023). A low-cost confocal microscope for the undergraduate lab. *American Journal of Physics*, 91(5), 404. <https://doi.org/10.1119/5.0128277>

**Abstract:** We demonstrate a simple and cost-efficient scanning confocal microscope setup for use in advanced instructional physics laboratories. The setup is constructed from readily available commercial products, and the implementation of a 3D-printed flexure stage allows for further cost reduction and pedagogical opportunity. Experiments exploring the thickness of a microscope slide and the surface of solid objects with height variation are presented as foundational components of undergraduate laboratory projects and demonstrate the capabilities of a confocal microscope. This system allows observation of key components of a confocal microscope, including depth perception and data acquisition via transverse scanning, making it an excellent pedagogical resource.

## APPLIED MEASUREMENT IN EDUCATION

1. Zhan, P., Liu, Y., Yu, Z., & Pan, Y. (2023). Tracking Ordinal Development of Skills with a Longitudinal DINA Model with Polytomous Attributes. *Applied Measurement in Education*, 36(2), 99–114. <https://doi.org/10.1080/08957347.2023.2201702>

**Abstract:** Many educational and psychological studies have shown that the development of students is generally step-by-step (i.e. ordinal development) to a specific level. This study proposed a novel longitudinal learning diagnosis model with polytomous attributes to track students' ordinal development in learning. Using the concept of polytomous attributes in the proposed model, the learning process of a specific skill, from non-mastery to mastery, can be divided into multiple ordinal steps in order to better characterize the learning trajectory. The results of an empirical study conducted to explore the performance of the proposed model indicated that it could adequately diagnose the ordinal development of skills in longitudinal assessments. A simulation study was also conducted to examine the estimation accuracy of general ability and the classification accuracy of attributes of the proposed model in different simulated conditions.

2. Visser, L., Cartschau, F., Von Goldammer, A., Brandenburg, J., Timmerman, M. E., Hasselhorn, M., & Mähler, C. (2023). Measurement invariance in relation to first language: An evaluation of German reading and spelling tests. *Applied Measurement in Education*, 36(2), 115–131. <https://doi.org/10.1080/08957347.2023.2201701>

**Abstract:** The growing number of children in primary schools in Germany who have German as their second language (L2) has raised questions about the fairness of performance assessment. Fair tests are a prerequisite for distinguishing between L2 learning delay and a specific learning disability. We evaluated five commonly used reading and spelling tests for measurement invariance (MI) as a function of first language (German vs. other). Multi-group confirmatory factor analyses revealed strict MI for the Weingarten Basic Vocabulary Spelling Tests (WRTs) 3+ and 4+ and the Salzburger Reading (SLT) and Spelling (SRT) Tests, suggesting these instruments are suitable for assessing reading and spelling skills regardless of first language. The MI for A Reading Comprehension Test for First to Seventh Graders – 2nd Edition (ELFE II) was partly strict with unequal intercepts for the text subscale. We discuss the implications of this finding for assessing reading performance of children with L2.

3. Perez, A. L., & Evans, C. (2023). Keeping Up the PACE: Evaluating Grade 8 Student Achievement Outcomes for New Hampshire's Innovative Assessment System. *Applied Measurement in Education*, 36(2), 137–156. <https://doi.org/10.1080/08957347.2023.2201700>

**Abstract:** New Hampshire's Performance Assessment of Competency Education (PACE) innovative assessment system uses student scores from classroom performance assessments as well as other classroom tests for school accountability purposes. One concern is that not having annual state testing may incentivize schools and teachers away from teaching the breadth of the state content standards. This study examined the effects of PACE on Grade 8 test scores after 5 years of implementation

using propensity score matching followed by hierarchical linear modeling. The results suggest that PACE students perform about the same, on average, in mathematics and ELA as non-PACE students on the state assessment. There was no evidence of differential effects for students who had an individualized education program or were granted FRL. Findings for this limited sample suggest schools and teachers did not sacrifice the breadth of students' opportunity to learn the state content standards while piloting a state performance assessment reform.

4. Alahmadi, S., Jones, A. T., Barry, C. L., & Ibáñez, B. (2023). Comparing drift detection methods for accurate rasch equating in different sample sizes. *Applied Measurement in Education*, 36(2), 157–170. <https://doi.org/10.1080/08957347.2023.2201704>

**Abstract:** Rasch common-item equating is often used in high-stakes testing to maintain equivalent passing standards across test administrations. If unaddressed, item parameter drift poses a major threat to the accuracy of Rasch common-item equating. We compared the performance of well-established and newly developed drift detection methods in small and large sample sizes, varying the proportion of test items used as anchor (common) items and the proportion of drifted anchors. In the simulated-data study, the most accurate equating was obtained in large-sample conditions with a small-moderate number of drifted anchors using the mINFIT/mOUTFIT methods. However, when any drift was present in small-sample conditions and when a large number of drifted anchors were present in large-sample conditions, all methods performed ineffectively. In the operational-data study, percent-correct standards and failure rates varied across the methods in the large-sample exam but not in the small-sample exam. Different recommendations for high- and low-volume testing programs are provided.

5. Chalmers, R. P., & Zheng, G. (2023). Multi-group generalizations of SIBTest and crossing-SIBTest. *Applied Measurement in Education*, 1–21. <https://doi.org/10.1080/08957347.2023.2201703>

**Abstract:** This article presents generalizations of SIBTEST and crossing-SIBTEST statistics for differential item functioning (DIF) investigations involving more than two groups. After reviewing the original two-group setup for these statistics, a set of multigroup generalizations that support contrast matrices for joint tests of DIF are presented. To investigate the Type I error and power behavior of these generalizations, a Monte Carlo simulation study was then explored. Results indicated that the proposed generalizations are reasonably effective at recovering their respective population parameter definitions, maintain optimal Type I error control, have suitable power to detect uniform and non-uniform DIF, and in shorter tests are competitive with the generalized logistic regression and generalized Mantel–Haenszel tests for DIF.

## ASSESSMENT IN EDUCATION: PRINCIPLE, POLICY AND PRACTICE

1. Lipnevich, A. A., Eßer, F. J., Park, M. J., & Winstone, N. (2023). Anchored in praise? Potential manifestation of the anchoring bias in feedback reception. *Assessment in Education: Principles, Policy & Practice*, 30(1), 4–17. <https://doi.org/10.1080/0969594x.2023.2179956>

**Abstract:** Although feedback is one of the most important instructional techniques, strong empirical research on receiving feedback is scarce in comparison to research on feedback provision. In this experimental study, we examined the influence of detailed comments and praise on student motivation and change in performance. 147 university students wrote an essay draft, received feedback (detailed comments, detailed comments and praise, or control) and revised their essay based on feedback. First, we found that students who received detailed comments showed higher motivation and greater improvement compared to their counterparts in the control group. Second, we showed that students who received praise demonstrated lower motivation and reduced improvement, compared to students who did not receive praise in addition to detailed comments. This demonstration of paradoxical effects of praise in higher education is explained in the context of the anchoring bias suggesting that praise should be used wisely.

**Keywords:** Feedback, cognitive biases, praise, writing task anchoring

2. Fresko, B., & Levy-Feldman, I. (2023). Principals' implementation of teacher evaluation and its relationship to intended purpose, perceived benefits, training and background variables. *Assessment in Education: Principles, Policy & Practice*, 30(1), 18–32. <https://doi.org/10.1080/0969594x.2023.2166461>

**Abstract:** Teacher evaluation has evolved from a task used for administrative decisions to an activity whose main goal is the enhancement of student learning and well-being through the improvement of instruction. The actual implementation of teacher evaluation by school principals will determine greatly the extent to which it can achieve this goal. An attempt was made to examine how principals' implementation of teacher evaluation was related to their reasons for evaluating (formative or summative), their perceptions of its benefits, their preparation for the evaluator role, and several background variables. Data were gathered by questionnaire from 219 school principals in Israel. Findings indicated that evaluating for improvement rather than for administrative reasons, believing teacher evaluation to benefit school functioning, and feeling adequately trained for the task significantly predicted fuller implementation of the teacher evaluation model. Implications of the findings for preparing and supporting school principals in their role as evaluators is discussed.

**Keywords:** Teacher evaluation, principals as evaluators, training evaluators professional development, formative evaluation

3. Andersson, C., & Massih, S. S. (2023). PISA 2018: did Sweden exclude students according to the rules? *Assessment in Education: Principles, Policy & Practice*, 1–20. <https://doi.org/10.1080/0969594x.2023.2189566>

**Abstract:** This study assesses whether student exclusions from PISA 2018 in Sweden followed the criteria set by the OECD. We do this using both qualitative and quantitative methods. Our conclusion is that the exclusions made in PISA 2018 in Sweden did not follow OECD criteria and were much too high. Furthermore, interviews with school coordinators indicate that many of them misunderstood the OECD criteria. We also conclude that the National Agency for Education did not sufficiently follow up on exclusions. A review of the Swedish exclusion rate made by the OECD did not present credible results but accepted the results. A recalculation of PISA 2018 scores for Sweden where we assume non-participating students to be low performers show that results are significantly affected.

**Keywords:** PISA, Sweden, OECD, participation rates, exclusion rate

4. Wellberg, S. (2023). Teacher-made tests: why they matter and a framework for analysing mathematics exams. *Assessment in Education: Principles, Policy & Practice*, 1–23. <https://doi.org/10.1080/0969594x.2023.2189565>

**Abstract:** Classroom assessment research in the United States has shifted away from the examination of teacher-made tests, but such tests are still widely used and have an enormous impact on students' educational experiences. Given the major shifts in educational policy in the United States, including the widespread adoption of the Common Core State Standards, I argue that researchers should examine the tests and quizzes that teachers create and administer in order to determine whether those policies have had the intended impact of teachers' assessment practices. Furthermore, these investigations should be grounded in discipline-specific conventions for developing and demonstrating knowledge. I then propose a research-based framework for analysing mathematics exams that focuses on alignment with learning goals, cognitive complexity, variety of task formats, attentiveness to culture and language, and clarity of expectation. This framework is meant to be used formatively, helping researchers, administrators, and teachers identify strengths and areas for growth.

**Keywords:** Classroom assessment, mathematics education, curriculum alignment, cognitive demand task implementation, culturally-relevant assessment

5. Cui, Y., Chen, F., Lutsyk, A., Leighton, J. P., & Cutumisu, M. (2023). Data literacy assessments: a systematic literature review. *Assessment in Education: Principles, Policy & Practice*, 1–21. <https://doi.org/10.1080/0969594x.2023.2182737>

**Abstract:** With the exponential increase in the volume of data available in the 21<sup>st</sup> century, data literacy skills have become vitally important in work places and everyday life. This paper provides a systematic review of available data literacy assessments targeted at different audiences and educational levels. The results can help researchers and practitioners better understand the current state of data literacy assessments in terms of issues related to 1) educational levels and audiences; 2) data literacy definitions and competencies; 3) assessment types and item formats; and 4) reliability and validity evidence. The results from the present review led us to conclude that teaching and assessing data literacy is still an emerging field in education. Therefore, high-quality assessment tools are greatly needed to provide valuable insights for students and instructors to monitor progress as well as facilitate and support teaching and learning.

**Keywords:** Data literacy, assessment, evaluation, 21st century competencies, quantitative skills

## BIOCHEMISTRY AND MOLECULAR BIOLOGY EDUCATION

1. Jones, E., Glanz, H., Wilkinson, S., & Fogle, E. (2022). A report on learning gains and student confidence after incorporating an enzyme purification and characterization course-based undergraduate experience. *Biochemistry and Molecular Biology Education*, 51(2), 128–136. <https://doi.org/10.1002/bmb.21698>

**Abstract:** Course-based undergraduate research experiences (CUREs) can provide undergraduate students access to research opportunities when student and faculty resources are limited. In addition to expanding research opportunities, CUREs may also be explored as a pedagogical tool for improving student learning of course content and laboratory skills, as well as improving meta-cognitive features such as confidence. We examined how a 6-week CURE in an upper-level undergraduate biochemistry lab affected student gains in content knowledge and confidence in scientific abilities, compared to a non-CURE section of the same course. We find that gains in content knowledge were similar between CURE and non-CURE sections, indicating the CURE does not negatively impact student learning. The CURE was associated with a statistically significant gain in student confidence, compared to non-CURE group. These results show that even a relatively short CURE can be effective in improving student confidence at scientific research skills, in addition to expanding access to research.

2. Dutta, S., Jiang, J., Ghosh, S., Patel, S., Bhikadiya, C., Lowe, R., Voigt, M., Goodsell, D. S., Zardecki, C., & Burley, S. K. (2022). An idea to explore: How an interdisciplinary undergraduate course exploring a global health challenge in molecular detail enabled science communication and collaboration in diverse audiences. *Biochemistry and Molecular Biology Education*, 51(2), 137–145. <https://doi.org/10.1002/bmb.21699>

**Abstract:** Communication and collaboration are key science competencies that support sharing of scientific knowledge with experts and non-experts alike. On the one hand, they facilitate interdisciplinary conversations between students, educators, and researchers, while on the other they improve public awareness, enable informed choices, and impact policy decisions. Herein, we describe an interdisciplinary undergraduate course focused on using data from various bioinformatics data resources to explore the molecular underpinnings of diabetes mellitus (Types 1 and 2) and introducing students to science communication. Building on course materials and original student-generated artifacts, a series of collaborative activities engaged students, educators, researchers, healthcare professionals and community members in exploring, learning about, and discussing the molecular bases of diabetes. These collaborations generated novel educational materials and approaches to learning and presenting complex ideas about major global health challenges in formats accessible to diverse audiences.

3. Zhao, R., Wang, T., Yang, R., Adam, L., Zaharic, T., Loch, C., Tompkins, G. R., & Cooper, P. R. (2022). Enhancing the student learning experience: Co-teaching biochemistry and clinical sciences within the dental curriculum. *Biochemistry and Molecular Biology Education*, 51(2), 146–154. <https://doi.org/10.1002/bmb.21701>

**Abstract:** Basic knowledge of biochemistry underpins oral and dental care. Undergraduate dental students do not always engage well with basic science teaching

due to not appreciating its clinical relevance. Co-teaching provides one approach to overcome students' disengagement and involves two lecturers, with complementary expertise, presenting the curriculum together. This study investigated student experiences and engagement using co-teaching to integrate biochemistry with clinical sciences in the students' second-year dental curriculum. Two successive second year dental student cohorts were co-taught. Content was delivered by a biochemist and an oral biologist, either online (during the 2020 COVID lockdown) or in-person (2021). Each cohort was surveyed at the end of the teaching module using an online questionnaire containing both interval scale and free-text questions. Responses were received from 39 (42%) and 64 (85%) of students in 2020 and 2021, respectively. Students from both cohorts preferred the co-teaching approach with a mean of 8.74 on a 10-point interval scale. In 2020 and 2021, 77% and 76% of participants, respectively, preferred a combined biochemistry and clinical dentistry delivery, either in-person (37%), via Zoom (19%) or via video recording (14%). Thematic analysis of responses revealed students experienced enhanced engagement when co-taught and they attributed this to integration of the curriculum making the content more relevant and stimulating. Students preferred co-teaching to individual subjects being taught by a single teacher. Co-teaching established the relevance of theoretical biochemistry to clinical dental sciences and enhanced the students' learning experience.

4. Sun, Z., Xu, Z., Yu, Y., Xia, S., Tuhlei, B., Man, T., Zhou, B., Qin, Y., & Shang, D. (2022). Effectiveness of an “online + in-person” hybrid model for an undergraduate molecular biology lab during COVID -19. *Biochemistry and Molecular Biology Education*. <https://doi.org/10.1002/bmb.21704>

**Abstract:** The COVID-19 outbreak has created turbulence and uncertainty into multiple aspects of life in countries around the world. In China, the pandemic continues to pose a great challenge to the nature of traditional in-class education in schools. Chinese education has faced the difficult decision of whether to resume in-person teaching in an unprecedented and time-pressured manner. To ensure the quality of teaching and learning during this time, this study aims to explore the effectiveness of an “online + in-person” hybrid teaching model with a new three-part approach to the hybrid teaching lab, where students prepare for the in-person lab using virtual simulated experiments and learning modules and debrief their learning afterwards online as well. This approach not only enhances the efficiency during the in-person lab but also strongly reinforces concepts and laboratory skills by providing a “practice run” before physically attending the lab. A total of 400 medical undergraduates from Dalian Medical University in China were recruited for this study. In an undergraduate molecular biology laboratory course, we observed 200 students in a hybrid teaching model. We evaluated the learning outcomes from the “online + in-person” hybrid teaching model with a questionnaire survey and assessed the quality of experiment execution, report writing, and group collaboration. Moreover, the 200 students from the hybrid group were evaluated during an annual science competition at the university and compared to 200 students from the competition cohort who had no experience with a hybrid learning model. The comparison data were analyzed using a student's t-test statistical analysis. The students in the hybrid learning group demonstrated a strong enthusiasm for the model, high amount of time utilizing the online system, and high scores on laboratory evaluation assignments. Approximately 98% of the hybrid learning students reported that they preferred mixed teaching to the traditional teaching mode, and all students

scored above 96% on the online laboratory report. Teachers of the course observed that the hybrid group had a noticeably higher level of proficiency in lab skills compared to the previous students. At the Dalian Medical University annual science competition, where we compared our hybrid group to a traditional learning group, scores for both the objective and subjective items showed that the students instructed with the hybrid lab model had superior performance ( $p < 0.05$ ). In the context of the COVID-19 pandemic, we developed a new three-part molecular biology laboratory course that strongly improved students' laboratory skills, knowledge retention, and enthusiasm for the course using online learning to improve their learning efficiency and expedite the in-person laboratory experience. We found that these students performed at a higher level in a combined theoretical/practical science competition compared to the students in traditional in-person lab courses. Additionally, our model subjectively fostered enthusiasm and excellence in both teachers and students. Further, cultivation of the students' independent learning and creative problem solving skills were emphasized. The exploration of an effective teaching model, such as the one described here, not only provides students with a solid foundation for their future medical studies and career development but also promotes more efficient in-person laboratory time.

5. Cardamone, C., Linder, D. E., Knoll, J. S., Webster, C. M., Murray, M., Frank, N., Shorter, B., Heinze, C. R., & Schonhoff, C. M. (2023). Use of short videos and case studies to enhance student confidence in biochemistry knowledge and application in a large lecture biochemistry course in first year veterinary curriculum. *Biochemistry and Molecular Biology Education*, 51(2), 164–170. <https://doi.org/10.1002/bmb.21705>

**Abstract:** Large lecture courses are an efficient way to convey material to many students but have potential limitations, most notably the tendency for them to promote passive learning opportunities rather than active pedagogies. The curriculum at Cummings School of Veterinary Medicine at Tufts University, like many veterinary schools, contains many large lecture courses in the pre-clinical curriculum. This objective of this study was to use two active pedagogical interventions in a first-year lecture course named Veterinary Biochemistry and Metabolism that drew connections between basic science and several veterinary diseases. The first intervention targeted increasing students' intrinsic motivation and their confidence with understanding biochemistry concepts using videos created via collaborations between students, staff, and clinical and basic science faculty. The second intervention targeted active and collaborative learning via the implementation of clinical case studies completed in groups to relate lecture content to clinical scenarios with the aim of further enhancing student confidence in their knowledge of the material. To assess the effectiveness of these two interventions, pre-and post-course surveys using Likert style questions were administered to evaluate student confidence in the targeted concepts. The post-survey included open-ended responses on students' perspectives on their most important takeaways from the activities and their suggestions for improvements. The data showed a positive impact of these interventions on student motivation and confidence in their knowledge. This study provides support that targeted interventions to increase active learning strategies increase student engagement and may improve learning efficacy in large lecture courses.

6. Sun, H., Wang, P., & Li, Y. (2023). An integrated microbiome project for charactering microbial diversity in classroom based on virtual simulation experiments. *Biochemistry and Molecular Biology Education*, 51(2), 171–179. <https://doi.org/10.1002/bmb.21706>

**Abstract:** Microbiome study requires both molecular techniques and bioinformatics skills, which are challenging for biologists to participate in this growing field. To introduce microbiome concepts and skills to students, a 6-week wet-lab and bioinformatics course for undergraduates was implemented through the project-based learning (PBL) approach. In the saliva microbiome project, students collected their saliva samples, performed DNA extraction and PCR amplification, followed by metagenomic analysis to compare the diversity and abundances of microbes among samples. First, students are required to practice molecular techniques and bioinformatics analysis skills in a virtual simulation lab. To our knowledge, our study is the first one to incorporate a virtual lab into microbiome experience. Then, students applied their recently acquired skills to produce and analyze their own 16S amplicon sequencing data and reported their results via a scientific report. The student learning outcomes show that the Virtual lab can improve students' laboratory techniques and research capabilities. Moreover, a simple pipeline to analyze 16S rRNA gene amplicon sequencing data is introduced in a step-by-step manner that helps students to develop analysis skills. This project can be modified as either a virtual course or a module within another course such as microbiology, molecular biology, and bioinformatics. Our study provides evidence on the positive impact of virtual labs on learning outcomes in undergraduate science education.

7. Beheshtian, C., Garcia, V. E., Ng, T. Z., Alkhatib, S., Quang, E., Cho, K. J., Nguyen, T. D., Le, D. N., & Kadandale, P. (2023). Does exposure to research experiences have different learning outcomes than prior exposure to lab techniques in non-research settings? *Biochemistry and Molecular Biology Education*, 51(2), 180–188. <https://doi.org/10.1002/bmb.21707>

**Abstract:** A large body of literature has established the benefits of undergraduate research experiences via the traditional apprenticeship model. More recently, several studies have shown that many of these benefits can be recapitulated in course-based undergraduate research experiences (CUREs) that are more scalable and easier for students to participate in, compared to the apprenticeship-based research experiences. Many Biology curricula also incorporate more traditional laboratory courses, where students learn to use common laboratory techniques through guided exercises with known outcomes. Indeed, many programs across the nation provide such programs or courses for students early in their careers, with a view toward increasing student interest and engagement in Biology. While there is general consensus that all lab experiences have some benefits for students, very few studies have examined whether either research experiences or learning biological techniques in more traditional lab courses directly impacts student performance in lecture courses. Here, we show that prior familiarity with laboratory techniques does not improve student performance in a lecture course, even if these techniques are directly related to content being taught in the course. However, having prior research experience improves performance in the course, irrespective of whether the research experience included the use of course-related laboratory techniques.

8. Gao, L., & Guo, M. (2023). A course-based undergraduate research experience for bioinformatics education in undergraduate students. *Biochemistry and Molecular Biology Education*, 51(2), 189–199. <https://doi.org/10.1002/bmb.21710>

**Abstract:** With rapid development of sequencing technology and the continuous accumulation of biological big data, people who are capable of using bioinformatic skills to analyze omics data and work out biological problems are urgently needed in the workforce, which highlights the importance of developing bioinformatics skills early in the undergraduate curriculum. Meanwhile, course-based undergraduate research experience (CURE) courses have been proved to be an effective teaching format that have many advantages over traditional labs and lectures. Here we introduced an implementation of CURE course of bioinformatics data analysis and visualization for undergraduate students in major of bioinformatics and evaluated the learning outcomes. We were able to address 10 out of 15 core competencies identified by Network for Integrating Bioinformatics into Life Sciences Education. Besides, results evaluated by Laboratory Course Assessment Survey demonstrated the goals of collaboration, discovery and relevance, and iteration were accomplished in our course. Meanwhile, a significant increase in scores of final examinations and a long-term improvement on students' research ability on bioinformatics data analysis and visualization were also observed. In summary, this CURE course is useful for undergraduate students learning related knowledge and participate in authentic research in the field of bioinformatics.

## CONGNITIVE PSYCHOLOGY

1. He, L., Wall, D., Reeck, C., & Bhatia, S. (2023). Information acquisition and decision strategies in intertemporal choice. *Cognitive Psychology*, *142*, 101562. <https://doi.org/10.1016/j.cogpsych.2023.101562>

**Abstract:** Intertemporal decision models describe choices between outcomes with different delays. While these models mainly focus on predicting choices, they make implicit assumptions about how people acquire and process information. A link between information processing and choice model predictions is necessary for a complete mechanistic account of decision making. We establish this link by fitting 18 intertemporal choice models to experimental datasets with both choice and information acquisition data. First, we show that choice models have highly correlated fits: people that behave according to one model also behave according to other models that make similar information processing assumptions. Second, we develop and fit an attention model to information acquisition data. Critically, the attention model parameters predict which type of intertemporal choice models best describes a participant's choices. Overall, our results relate attentional processes to models of intertemporal choice, providing a stepping stone towards a complete mechanistic account of intertemporal decision making.

**Keywords:** Decision making, Intertemporal choice, Attention, Process tracing, Computational modeling

2. Minervino, R. A., Margni, A., & Trench, M. (2023). Analogical inferences mediated by relational categories. *Cognitive Psychology*, *142*, 101561. <https://doi.org/10.1016/j.cogpsych.2023.101561>

**Abstract:** The standard approach posits that analogical inferences are generated by copying unmapped base relations, substituting mapped target entities for source entities, and generating slots for base entities that have not found a correspondence in the target. In the present study we argue that this mechanism does not adequately explain the generation of inferences mediated by relational categories. Experiment 1 revealed that for analogies in which the gist of the information to be transferred is better captured by relational categories than by explicit relations, inferences are more concerned with reinstating the base relational category than with ensuring that the relation of the inference resembles that of the base. Experiment 2 replicated this finding with analogies between situations maintaining a higher degree of semantic and contextual distance. The following experiments addressed whether there are further restrictions that guide a more fine-grained selection of exemplars. Experiment 3 revealed that when no relevant differences exist between compared situations, the exemplars included in analogical inferences tend to match the base exemplars along salient dimensions of the relational category to which both exemplars belong. In turn, Experiment 4 replicated this finding with analogies between situations maintaining some degree of semantic and contextual distance. The study adds to a growing literature recognizing the role of categorization in analogical reasoning. The challenges posed by the present results to the traditional view of analogical inference are discussed, as well as the prospects of the categorial mechanism for explaining other types of analogies not included in the present study.

**Keywords:** Analogy, Inference, Relational categories

## ECONOMIC AND POLITICAL WEEKLY

1. *Monsoon rainfall variability in India*. (2023, June 19). Economic and Political Weekly. <https://www.epw.in/journal/2023/24/special-articles/monsoon-rainfall-variability-india.html>

**Abstract:** Investigating the effects of monsoon variability on the agricultural output at the regional level for five broad agroclimatic regions from 1980–81 to 2016–17, the analysis validates our postulation that the impact of rainfall deviation on regional economic output is highly varied and hence an aggregate analysis will not be reflective. Similar to earlier studies, we found asymmetry in response to deficit versus excess of summer monsoon rains.

2. *Institutional analysis of dependency on forest resources*. (2023, June 19). Economic and Political Weekly. <https://www.epw.in/journal/2023/24/special-articles/institutional-analysis-dependency-%C2%A0forest.html>

**Abstract:** The dynamics between formal and informal players is essential to understand local dependence on forest resources and the effects of institutional arrangements on conservation and conflict. A study of three villages at the Navegaon National Park, Maharashtra was undertaken to analyse these dynamics following an ethnomethodological approach. The impact of institutional dynamics on resource dependency and conflict is explored through the implementation of forest conservation programmes, interactions between formal and informal players and within village communities, impacts of displacement threats, migration and resource restrictions on informal players, redesign of religious institutions, and human–wildlife conflict.

3. *Banks' credit risk analysis of Indian firms*. (2023, June 19). Economic and Political Weekly. <https://www.epw.in/journal/2023/24/special-articles/banks%E2%80%99-credit-risk-analysis-indian-firms.html>

**Abstract:** A firm-level panel data analysis of selected BSE top 200 companies for 2017–21 is presented to link the environmental, social, and governance ratings and carbon dioxide emissions with their default risk and solvency position. The results indicate strong empirical evidence that the firm's risk of default is linked to its environmental performance along with the level of carbon emission. The findings will enable banks to establish a linkage between credit risk and climate change risk. This will assist banks as well as policymakers to adjust borrower-level ratings and factor the impact of climate change on their capital as well as business decisions.

## EUROPEAN JOURNAL OF SPECIAL NEEDS EDUCATIONS

1. Olsson, Å. (2022). Teachers' gendered perceptions of attention deficit hyperactivity disorder – a literature review. *European Journal of Special Needs Education*, 1–14. <https://doi.org/10.1080/08856257.2022.2076476>

**Abstract:** This study provides a systematic review of previous research about teachers' gendered perceptions of pupils with diagnoses or symptoms of attention deficit hyperactivity disorder (ADHD). This review was conducted using the databases Scopus, Web of Science and ERIC. Nineteen articles were selected after narrowing down a total of 121 articles, in accordance with inclusion criteria. In sum, previous research concludes that teachers' identification, assessment and attitudes related to pupils with ADHD diagnoses or symptoms are associated with the pupils' gender. When pupils exhibit academic, emotional or behavioural difficulties, teachers assess girls' impairments more severe than boys' impairments. Nevertheless, teachers are more likely to recommend treatment, counselling and/or medication to boys than to girls. While teachers' perceptions of pupils' difficulties are gendered, strategies or methods for teaching pupils with ADHD seem not to be. In the articles included in this review, there are hardly any examples given of gender-sensitive teaching methods. Furthermore, it is concluded that regardless of gender aspects, a deficit perspective dominates in research presented in this article, and it appears that children are held responsible for school difficulties while the school setting is not.

**Keywords:** Attention deficit hyperactivity disorder, ADHD, gender, teachers' perceptions, support

2. Tops, W., Jansen, D., Ceulemans, E., Petry, K., Hilton, N. H., & Baeyens, D. (2022). Participation problems and effective accommodations in students with dyslexia in higher education. *European Journal of Special Needs Education*, 38(3), 317–333. <https://doi.org/10.1080/08856257.2022.2089507>

**Abstract:** Students with dyslexia face particular challenges in higher education. Individuals with disabilities have a right to accommodations to guarantee equal opportunities and participation in education. The present study addresses (1) the frequency of functioning and participation problems of students with dyslexia in higher education, (2) the teaching and evaluation methods during which the functioning and participation problems emerge, and (3) the effectiveness of accommodations perceived by students with dyslexia. Results showed that students with dyslexia primarily have problems with reading comprehension, reading speed, spelling and text writing. Furthermore, most students with dyslexia experience more problems during classical teaching (e.g. lecture) or classical evaluation methods (e.g. written exam with open questions) than during dynamic or activating teaching methods (e.g. excursion or internship) or alternative evaluation methods (e.g. peer evaluation). Finally, perception of the effectiveness of accommodations depends strongly on the individual functioning and participation problems students with dyslexia experienced.

**Keywords:** Dyslexia, accommodations, participation problems, higher education

3. Bulgarelli, D., Bianquin, N., Barron, C., & Emmett, M. J. (2022). Outdoor play of children with and without disabilities. Insights from the Covid-19 pandemic in Ireland and Italy. *European Journal of Special Needs Education*, 1–15. <https://doi.org/10.1080/08856257.2022.2089508>

**Abstract:** Several factors might affect outdoor play (individual and family aspects, neighbourhood environment, policy and socio-cultural factors). The Covid-19 lockdowns became a barrier to outdoor play and had a greater impact on children with disabilities. This study describes the outdoor activities and play and the contextual factors that affected them in 4- to 13-year-old children with and without disabilities. 1,667 parents answered an online questionnaire with both open-ended and close-ended questions during the first lockdown in Ireland and Italy in 2020. Parents perceived their children as being unable to play outside as they could before Covid-19. The built environment impacted children's access to outdoor spaces. A content analysis was run on the parents' responses to open-ended questions describing children's outdoor activities and play, and the contextual factors affecting them. Results showed that the active role of adults in organising routines, spaces and introducing changes, and the existing features of the outdoor built environment were crucial to support outdoor play. Comparing the contextual factors supporting outdoor play and activities of children with and without disabilities, the main difference concerned the type of role played by the adults. Some differences due to age, gender and nationality were also discussed.

**Keywords:** Outdoor play, children with disabilities, gender differences, pandemic, contextual factors, content analysis

4. Paloniemi, A., Björn, P. M., & Kärnä, E. (2022). Special education teachers' views on their agency in teacher collaboration. *European Journal of Special Needs Education*, 1–14. <https://doi.org/10.1080/08856257.2022.2089509>

**Abstract:** Special education teachers' (SETs) views on their agency in teacher collaboration were analysed using Cultural-Historical Activity Theory (CHAT). Finnish SETs (N = 238) answered open-ended survey questions concerning successful and unsuccessful collaboration with the classroom teachers in a tiered support framework. The findings revealed that the perceived agency of the special education teachers is both limited by and directed towards the classroom teachers' understanding of the shared responsibility concerning support provision for students. Finally, the findings highlight the relevance of the cultural-historical activity theory by suggesting that the features of successful collaboration, in tandem with relevant constructs of the theory, constitute a mutual understanding of the goal of collaboration (shared object), structures (community) and guidance (norms) towards relevant use of instruments and fair division of responsibilities (division of labour). Implications for inclusive special education suggest that reciprocal reflection on the teaching practices requires shared everyday work between the SETs and the classroom teachers.

**Keywords:** Special education teachers, teacher collaboration, teacher agency, tiered support cultural-historical activity theory

5. Tegtmejer, T., Hjørne, E., & Säljö, R. (2022). Diagnoses and special educational support. A study of institutional decision-making of provision of special educational support for children at school. *European Journal of Special Needs Education*, 1–15. <https://doi.org/10.1080/08856257.2022.2089510>

**Abstract:** This study investigates what role diagnoses play in institutional decision-making in regards to provision of special educational support and in the referral of pupils from mainstream schooling to special needs schools or classes. During the past decades, many countries have witnessed a radical increase in the number of children receiving psychiatric diagnoses, and increasing demands for special educational support. This development raises the question of how these two observations relate, and if psychiatric diagnoses serve as a prerequisite for allocating support. This study uses an institutional ethnographic approach to analyse qualitative data from four Danish municipal referral committees, processing 13 children’s cases. In these settings, representatives of school authorities and educational psychologists decide if a child should be offered special educational support. The results show that the committees do not use diagnoses as direct arguments for their decisions. However, the institutional setup of the referral system creates an expectation that children referred to the committees already are diagnosed, as the types of special educational support are organised according to diagnostic categories. When a child is identified as experiencing problems at school, this expectation might prompt schools, parents or educational psychologists to request that a psychiatric assessment is carried out.

**Keywords:** Diagnoses, institutional categorisation, decision-making, special educational support

6. Buzzai, C., Passanisi, A., Aznar, M. A., & Pace, U. (2022). The antecedents of teaching styles in multicultural classroom: teachers’ self-efficacy for inclusive practices and attitudes towards multicultural education. *European Journal of Special Needs Education*, 1–16. <https://doi.org/10.1080/08856257.2022.2107679>

**Abstract:** The present study aimed to contribute to the understanding of the antecedents of teaching styles in multicultural classrooms. In particular, research has investigated whether teachers’ attitudes towards multicultural education played a mediating role in the relationships among teachers’ efficacy for inclusive practices and motivating teaching styles (autonomy supportive and structuring) and demotivating teaching styles (controlling and chaotic). Participants included 474 in-service teachers, 100 males (21.1%) and 374 females (78.9%), with an average age of 38.05 years (SD = 7.03), who were recruited from several high schools located in Sicily (Italy). Results of the SEM analysis showed that teachers’ attitudes towards multicultural education mediated the association between teachers’ efficacy for inclusive practices and (de)motivating teaching styles. Furthermore, teachers’ efficacy for inclusive practices was a direct positive predictor of motivating teaching styles, while teachers’ multicultural attitudes were a direct predictor of (de)motivating teaching styles. This study highlighted the importance of teachers’ attitudes towards multicultural education and self-efficacy for inclusive education as antecedents of teaching styles in multicultural classrooms with practical implications in the school context.

**Keywords:** Inclusive practices, teachers’ self-efficacy, teacher’s motivation, multicultural education

7. Ladenstein, J., Breyer, C., & Gasteiger-Klicpera, B. (2022). Exploring changes in collaboration through the professionalisation of learning and support assistants: a mixed methods study. *European Journal of Special Needs Education*, 1–14. <https://doi.org/10.1080/08856257.2022.2107682>

**Abstract:** The inclusion of all children in regular classrooms is an important aim in many European countries. For the implementation of inclusion some children rely on support via learning and support assistants. Despite the benefits assistants provide by enhancing student access and progress, assistants' support has also been criticised for contributing to more exclusive than to inclusive processes in class. A necessary precondition for enhancing inclusive processes is the assistants' extension of professional knowledge and competence. This study aims to evaluate the effects of a developed online tool for assistants' professionalisation on the collaboration with teachers and parents. Moreover success factors in assistants' work are identified. The quantitative study sample consisted of 70 assistants, teachers and parents. Focus group interviews with nine assistants and teachers were also conducted. The results of this mixed methods study showed that assistants, teachers and parents have a tendency to evaluate their collaboration more positively after assistants have made use of an online tool for professionalisation. All of them perceived the regular exchange of information to be particularly important. The results of this study also showed that clear definition of the roles and responsibilities of assistants is necessary if they are to work successfully in schools.

**Keywords:** Multi-professional collaboration, professional development, inclusive education, mixed methods design.

8. Laranjeira, M., Teixeira, M. C. T. V., Roberto, M. S., & Sharma, U. (2022). Measuring teachers' attitudes and intentions towards inclusion: Portuguese validation of Attitudes to Inclusion Scale (AIS) and Intention to Teach in Inclusive Classroom Scale (ITICS). *European Journal of Special Needs Education*, 1–16. <https://doi.org/10.1080/08856257.2022.2107683>

**Abstract:** Successful implementation of inclusive practices depends on the extent of which school educators believe in this and are well prepared to implement include all learners. It is therefore relevant to study the variables that influence pedagogical practices of educators to teach in inclusive classrooms, namely attitudes and intentions regarding inclusion. This study was undertaken to test the psychometric validation of Attitudes Towards Inclusion Scale (AIS) and the Intention to Teach in an Inclusive Classroom Scale (ITICS) for Portugal. The sample comprised 171 teachers (86% female) in primary and secondary schools. The results confirmed the two-factor structure of the original versions of the AIS (beliefs and feelings) and ITICS (curriculum changes and consultation). Teachers with inclusion training had more positive attitudes and higher level of intentions than their colleagues without training in this area. We analysed the correlations between attitudes, intentions, and perceived efficacy relative to inclusive practices as an indicator of concurrent validity and found adequate indicators of internal consistency ( $\omega = 0.70$  to  $0.94$ ) and convergent and discriminant validity. Our analysis suggests that adding new items to ITICS can further enhance the psychometric properties of the scale. We discuss implications of our research for researchers, educators and policy makers

**Keywords:** Inclusive education, teachers, attitudes, intentions, validation

9. Willemse, T. M., Goei, S. L., Boei, F., & De Bruïne, E. (2022). School-wide positive behaviour interventions and support in Dutch schools for special education. *European Journal of Special Needs Education*, 1–16. <https://doi.org/10.1080/08856257.2022.2120331>

**Abstract:** This study explores teachers' experiences with School-Wide Positive Behaviour Interventions and Support (SWPBIS) at three special education (SPED) schools type 4 in the Netherlands. These SPED schools focus on supporting children with mental health difficulties or challenging behaviour. In 2014, an Act was introduced in the Netherlands with the aim of mainstreaming students with special educational needs (SEN) meaning they are educated in an inclusive environment with students who do not have such needs unless the nature and degree of those needs are such that they warrant a more specific support measure or intervention, which mainstream education cannot cater for. As a result, the manifestation of problem behaviour of students in SPED schools became more complex and intense. Based on 25 individual interviews and three group interviews with 40 SPED teachers, results indicate they experienced a safer and predictable school climate due to SWPBIS. In addition, teachers mentioned positive developments concerning team building, staff turnover and coping with a changing student population. More specifically they mentioned more open and positive communication, a sense of belonging and loyalty to their colleagues, and a shared commitment to their students in comparison to the situation prior to the introduction of SWPBIS. Staff also emphasised this approach contributed to a shared language. The development and dialogue on shared school values and the teaching of behavioural expectations as rules and procedures across school settings supported new staff-members to more easily integrate this with organisational routine and school culture and this contributed to a more predictable and safer environment for their vulnerable students.

**Keywords:** Positive behaviour support, special education

10. Vorlíček, R. (2022). Inclusion of a pupil with autism spectrum disorder in mainstream education in the Czech Republic. *European Journal of Special Needs Education*, 1–10. <https://doi.org/10.1080/08856257.2022.2076479>

**Abstract:** Along with the inclusive reform mainstream schools have become more open to children with autism *spectrum disorder* (ASD). Nevertheless, knowledge gaps related to educational research in autism remain. Little is known about the inclusion of children with ASD in mainstream education, especially in regions such as Central and Eastern Europe. The article fills this gap by focusing on an 8-year-old pupil with ASD in mainstream education during typical daily routines and activities. Special attention is devoted to the social position of this pupil in a school community as well as teacher practices in the first grade of a primary school in the Czech Republic. The article is based on ethnographic research, with observation as the main method. The results of the research indicate that pupils with ASD will be socially *successful* in mainstream Czech schools if we ensure that schools have sufficient and good-quality support. The article seeks to serve as a contribution to the debate on autism-friendly schools as well as on discussions with regard to monitoring the implementation of changes promoted in school systems in relation to inclusive education.

**Keywords:** autism spectrum disorder, inclusive education, peer relations, primary school, social interaction, ethnographic research

## INTERNATIONAL JOURNAL OF EDUCATIONAL DEVELOPMENT

1. Sahlberg, P. (2023). Trends in global education reform since the 1990 s: Looking for the right way. *International Journal of Educational Development*, 98, 102748. <https://doi.org/10.1016/j.ijedudev.2023.102748>

**Abstract:** Reforming national education systems has become a global phenomenon. International education development literature describes education policies and consequent reforms in different countries around the world. This article describes the emergence of the global education reform movement (GERM) and its main manifestations in national education policies and reforms since the 1990 s. The aim of this article is to show how GERM has evolved during the past decades as a neoliberal educational change orthodoxy and how it has become challenged by the international comparative data and research. The conclusion is that the success of whole-system educational change depends on national policymakers' understanding of the difference between wrong and right drivers in planned education reforms for social and economic development of their countries. Global education reform movement as it is described in this article has not been able to improve quality, equity, and efficiency of education although that has been its basic promise.

2. Smith, H., Simoncini, K., McDonald, R., & Haslett, S. (2023). The impacts of a culturally relevant book flood on early literacy in Papua New Guinea. *International Journal of Educational Development*, 98, 102726. <https://doi.org/10.1016/j.ijedudev.2023.102726>

**Abstract:** Determining the most effective means to improve literacy rates in low resource educational environments remains an important challenge. We explored literacy impacts of a book flood of culturally relevant reading books in Papua New Guinea (PNG) through teacher training and distributing 25,240 copies of 126 culturally relevant books to 150 schools. The project also included 150 control schools. We sampled Elementary 1 and 2 level cohorts in 79 schools at baseline and 79 Elementary 2 level schools at follow up - over 1,100 children at each stage - and found statistically significantly greater improvements in the intervention group's reading comprehension. Our analysis indicates that the flood of culturally relevant books was the principal reason.

3. Bennell, P. (2023). The attainment of gender education equality: A preliminary assessment of country performance in sub-Saharan Africa. *International Journal of Educational Development*, 98, 102722. <https://doi.org/10.1016/j.ijedudev.2022.102722>

**Abstract:** The research literature on girls' education in low and middle income countries focuses almost exclusively on 'what works?' which is confined mainly to relatively small scale experimental interventions, particularly randomised control trials. This evidence is important but it provides few insights about the overall (especially more recent) progress made by individual countries and the overall effectiveness of the national strategies and specific policies in promoting girls' education. This article is an initial attempt to redress this research imbalance. It has three principal objectives. Firstly, it outlines a broad conceptual framework which provides the basis for a holistic analysis of country-level performance in improving

girls' education. Secondly, it presents an initial, tentative assessment of country performance in improving girls' education across sub-Saharan Africa. And thirdly, it explores some of the potentially key national characteristics and policy interventions which may help to explain the considerable variability in country performance during the last two decades in redressing gender inequalities in education in this region.

4. Šťastný, V., & Chvál, M. (2023). Different subjects, different incentives: Private tutoring and perceived instructional quality in Czech lower-secondary schools. *International Journal of Educational Development*, 98, 102737. <https://doi.org/10.1016/j.ijedudev.2023.102737>

**Abstract:** Whether education systems can stimulate or attenuate the demand for private supplementary tutoring by acting on the quality of provided school instruction is a complex and relatively unexplored issue. This study aims to reduce this knowledge gap by analysing the relationships between private tutoring attendance and instructional quality perceived at individual and classroom levels. Regression analyses are performed on a representative sample of 1280 pupils in the senior grade of lower secondary Czech schools. In mathematics and national language, students who find the school instruction interesting, who learn a lot, whose teachers can motivate them and explain the subject well, are less likely to use private tutoring in this subject. By increasing the quality of teaching in these subjects, schools and teachers may indirectly reduce the demand for private tutoring. However, perceived quality of school instruction in English language does not affect English tutoring, which is procured by affluent families irrespective of the perceived quality of school instructions.

5. Shafiq, M., & Parveen, K. (2023). Social media usage: Analyzing its effect on academic performance and engagement of higher education students. *International Journal of Educational Development*, 98, 102738. <https://doi.org/10.1016/j.ijedudev.2023.102738>

**Abstract:** In many nations, including Pakistan, students in higher education use social media as a common means of communication. Even while research suggests that using social media in a classroom setting would probably improve students' academic performance, the mechanism underlying this link has not yet been fully investigated. Based on the assertions that integrating social media use is intended to increase student involvement, the purpose of this study was to examine how college students use social media and determine whether social media use has any impact on their academic performance. There are two phases to this study project. Phase I of the data collection process begins with the Top 10 universities in Pakistan being chosen at random. A structured questionnaire was used to gather data from 234 sample respondents, including social media users and non-users, in order to accomplish the study's goals. The findings show that when students use social media's knowledge-sharing capabilities, their academic performance improves. Also, the learning outcome of students who engaged in the social media facilities is more; various aspects discussed in the study revolving around social media are useful for the students, teachers, and educational institutions to enhance their academic purposes.

6. Santos, Í., & Pekkola, E. (2023). Policy entrepreneurs in the global education complex: The case of Finnish education experts working in international organisations. *International Journal of Educational Development*, 98, 102749. <https://doi.org/10.1016/j.ijedudev.2023.102749>

**Abstract:** This article analyses the perceived role of Finnish education experts working in development cooperation for education. We interviewed 31 education experts working in international organisations representing Finland. A theoretically pluralist approach is utilised combining complexity thinking with a multiple streams approach. The analysis demonstrates that the context of educational development cooperation is ambiguous and complex. Influencing policymaking is a strategic, non-linear task which takes time, resources, and personal skills. Policy entrepreneurs need to understand the dynamics of development cooperation, identify actors that trust them, and recognise when policy windows are likely to open.

**Keywords:** Development cooperation for education, Influence, Finnish education experts, Complexity, Multiple streams approach

7. Estébanez, R. P., Grande, E. U., Espada, M. C., Villacorta, M. Á., Lorain, M. A., & Martín, G. R. (2023). Rethinking international cooperation in Higher Education Institutions, in the post COVID world from the student's perspective. *International Journal of Educational Development*, 98, 102750. <https://doi.org/10.1016/j.ijedudev.2023.102750>

**Abstract:** The University must be a representation of fundamental values such as trust, democracy, honesty, humility, justice and freedom. Above all, the basic ones for this research, such as respect, responsibility and solidarity, are the foundation of what it means to help those who need it most. Knowledge must always be the guarantor of human beings welfare, discovering new ways to meet their needs and improve their quality of life. Its role is especially important due to the health, social and historical crisis facing our planet. This work has been carried out with the implementation of a real case study based on the recreation and management of a real development aid activity from a financial and accounting view. Together with the case a subsequent questionnaire has been designed and passed among students of several Higher Education Degrees and Double Degrees, from six different Universities, with the aim of comparing the motivation and interest in development cooperation of university students. This analysis has been done in two very different moments and situations, the time before COVID and the time after the appearance of the pandemic. With the data collected, a multivariate analysis was carried out, obtaining very interesting results. Among the most remarkable results we can highlight that all students agreed they have reconsidered how to help emerging economies after the COVID crisis. Moreover, students participated and learned more in the seminars about international cooperation, as well as felt more committed towards international cooperation. Instead students did not think more subjects of international cooperation were needed in their degrees. More research about COVID impact must be done in the following years.

**Keywords:** Higher Education, International Cooperation COVID pandemic, Accounting: Case study

8. Ndijuye, L. G., & Benguye, N. D. (2023). Home environment, early reading, and math: A longitudinal study on the mediating role of family SES in transition from pre-primary to grade one. *International Journal of Educational Development*, 98, 102751. <https://doi.org/10.1016/j.ijedudev.2023.102751>

**Abstract:** This longitudinal study explored the role of home learning environments and family SES on children's early reading and math skills in Tanzania. Sample included 400 children – 182 boys and 218 girls, with an average age of 5.9 ranging from 62 to 73 months; and 400 parents – 314 mothers and 86 fathers from naturalised citizens/refugees and local majorities. Children's early reading (vocabulary) and math (number recognition) were assessed by the end of pre-primary and again by the end of grade one. Data were collected by MELE, Bracken's school readiness scale, and parents' questionnaire. Findings indicated that in a playbased pre-primary settings, family SES predicted children's early reading and math skills. Girls outperformed boys in math skills but not in early reading skills. However, home learning environments and family SES did not significantly predict the change in early reading or math skills from pre-primary to grade one. Further, family SES did not moderate the relationship between home learning environments and children's early reading and math skills. Parental involvements and children's mastery of the medium of instruction were vital for successful transition. Implications of these findings are discussed in a context of a developing sub-Saharan country.

**Keywords:** Early childhood education, Pre-primary, Home learning environments, Family socioeconomic status, Early reading skills, Early math skills

9. Stutchbury, K., & Biard, O. (2023). Practical theorising for the implementation of educational change: Evidence from sub-Saharan Africa. *International Journal of Educational Development*, 98, 102746. <https://doi.org/10.1016/j.ijedudev.2023.102746>

**Abstract:** New school curricula across Africa are calling for new approaches to learning and teaching. In response, much educational development work focuses on supporting pedagogic change. The successful implementation of educational change is challenging, attested by persistently low achievement levels, yet it remains under-theorised. However, 'implementation' as a process is well-theorised in the field of healthcare. This paper explains a middle-range sociological theory – Normalisation Process Theory – which seeks to describe how new practices become normalised. Drawing on evidence from the field, it argues that NPT, although developed in healthcare settings, offers insights which could benefit the implementation of educational development projects.

**Keywords:** TESSA, Teacher Education in sub-Saharan Africa, ZEST, Zambian Education School-based Training

10. Encina, Y., Berger, C., & Miranda, D. (2023). Authoritative school climate as a context for civic socialization. *International Journal of Educational Development*, 98, 102752. <https://doi.org/10.1016/j.ijedudev.2023.102752>

**Abstract:** This study represents a confirmatory attempt to classify schools based on the Authoritative Socialization Theory and test whether schools' classification is

invariant across different structural characteristics of schools. Furthermore, it tests whether school typologies are related to school outcomes such as school violence, sense of belonging, and student participation. Through latent class analysis and a multilevel modeling approach, we analyzed data from a representative national survey in 1322 Chilean schools. Consistent with authoritative socialization theory and previous research, a four-class model was retained by considering two school climate dimensions: disciplinary structure and student support. These classes were named authoritative, indifferent, authoritarian, and permissive based on theory. In addition, classes showed to be invariant between schools considering the school administration and the school's religiosity; however, regarding the school size, the model showed to be partially invariant. Finally, the school levels of violence and belonging showed the expected pattern considering the theory and previous evidence; however, the average student participation levels showed an unexpected pattern. We conclude that the proposed methodology to classify schools is helpful and offers some advantages to the current classification methods under this theoretical framework. In substantive terms, our results show that not all students have the same probability of experiencing a nurturing school climate within a school system such as the Chilean one characterized by high levels of school segregation.

11. Bennell, P. (2023a). How well paid are primary school teachers in Sub-Saharan Africa? A review of recent evidence. *International Journal of Educational Development*, 98, 102755. <https://doi.org/10.1016/j.ijedudev.2023.102755>

**Abstract:** The main objective of this article is to evaluate the robustness of the arguments that have been forwarded to support what from the early 2000s became dominant policy and academic narratives that teachers are over-paid in Sub-Saharan Africa. This is done in two main ways. Firstly, by identifying shortcomings in the theoretical and conceptual frameworks that have been adopted and, in particular, the heavy reliance on the GDP per capita pay ratio as the key pay indicator. And, secondly, by undertaking a comprehensive empirical analysis of three key types of pay data namely; (i) national GDP per capita pay ratios; (ii) pay differentials between teachers and comparable occupation groups; (iii) the adequacy of teacher pay in relation to minimum living standards for typical households. Recent information on teacher pay in the late 2010s was collected from primary and secondary sources in 36 out of 42 mainland countries in SSA. The main conclusion of the article is that, for the large majority of countries in SSA, school teachers are not over-paid in relation to any of these three indicators. The main focus is on primary school teachers in government/public schools who account for over two-thirds of teachers across the continent as a whole.

12. Sugawara, C. L., Kim, H., Stanke, K. M., Krasniqi, V., & Bašić, S. (2023). The role of community-university engagement in strengthening local community capacity in Southeastern Europe. *International Journal of Educational Development*, 98, 102747. <https://doi.org/10.1016/j.ijedudev.2023.102747>

**Abstract:** For more than a century, scholars have been interested in promoting community-based learning to develop students' agency and civic engagement. While community-university engagement (CUE) matured into an academic discipline of its own, questions about its impact on local communities remain largely ignored. This study examines the landscape of CUE in Southeastern Europe and its impact on local

capacity development. One hundred eighty-seven faculty from Bosnia and Herzegovina, Croatia, and Kosovo completed a self-administered survey. The results link CUE programs with increased community assets, functioning and transformational capacity, and underscore the importance of learning with community stakeholders to promote local development.

## JOURNAL OF APPLIED DEVELOPMENTAL PSYCHOLOGY

1. Jing, T., Ren, K., & Gunderson, E. A. (2023). Verbal labels influence children's processing of decimal magnitudes. *Journal of Applied Developmental Psychology*, 86, 101537. <https://doi.org/10.1016/j.appdev.2023.101537>

**Abstract:** Verbal labels for math concepts influence multiple aspects of math learning. In this study, we examined the influence of point labels (e.g., 0.42 as “point four two”), decomposed labels (e.g., “four tenths and two hundredths”), and common-unit labels (e.g., “forty-two hundredths”) on children's processing and representation of decimal magnitudes. We randomly assigned 162 5th- and 6th-graders to briefly learn decomposed, common-unit, or point labels. Children then completed measures of decimal magnitude processing and representation. We found that the place-value labels (i.e., decomposed and common-unit labels) each showed unique advantages in reducing the whole-number bias, and common-unit labels also reduced componential processing. No difference was found in the ratio effect – which served as an index of the precision of decimal magnitude representation – among children from the three conditions. These findings add to our understanding of the role of verbal labels in math learning and have important implications for instructional practices.

2. Paes, T. M., Duncan, R. J., Purpura, D. J., & Schmitt, S. A. (2023). The relations between teacher-child relationships in preschool and children's outcomes in kindergarten. *Journal of Applied Developmental Psychology*, 86, 101534. <https://doi.org/10.1016/j.appdev.2023.101534>

**Abstract:** This study examined relations between closeness and conflict in the teacher-child relationship in preschool and children's problem behaviors, social skills, and executive function (EF) in kindergarten, and examined if these relations are moderated by parental education. The study also explored associations between teacher-child closeness and conflict and the subscales of children's problem behaviors and social skills. The sample consisted of 126 preschool children ( $M = 56.70$  months,  $SD = 3.89$ ). Regression analyses revealed that teacher-child conflict was related to poorer social skills in children ( $\beta = -0.24, p = .020$ ), specifically lower assertion ( $\beta = -0.21, p = .044$ ) and lower engagement ( $\beta = -0.28, p = .002$ ). Additionally, as conflict in the teacher-child relationship increased, EF decreased for children whose parents have a lower level of education, less than a college degree ( $\beta = 0.46, p = .035$ ). Implications for future research are discussed.

3. Polinsky, N., Pagano, L. C., Acosta, D. I., Haden, C. A., & Uttal, D. H. (2023). Spatial language in families' conversational reflections about museum experiences. *Journal of Applied Developmental Psychology*, 86, 101539. <https://doi.org/10.1016/j.appdev.2023.101539>

**Abstract:** Prior work demonstrates the importance of spatial language use during museum experiences for children's spatial skills. The ways families talk about experiences *after* they occur is also important in the learning process. Therefore, we asked how families use spatial language in conversational reflections after experiencing exhibits and programs in a children's museum. Families ( $N = 243$ ) with a 6- to 11-year-old child made recordings discussing experiences in a tinkering exhibit

and up to two other exhibits. Families reflected on tinkering programs that were either open-ended, function-focused, or engineering-focused. In comparison to families who reflected on open-ended tinkering programs, those who reflected on engineering-focused programs used more spatial language in their reflections. Furthermore, our analysis of reflections about additional museum exhibits revealed that families used the most spatial language when reflecting on exhibits emphasizing navigation. Results suggest design features of informal learning experiences that may support spatial language in families' reflections.

4. Montañez, S. R. (2023). Advancing equity through research: The importance of asset-based approaches and methods. *Journal of Applied Developmental Psychology*, 86, 101540. <https://doi.org/10.1016/j.appdev.2023.101540>

**Abstract:** This commentary delves into the pivotal role that researchers can play in promoting equity through their research. The commentary underscores two salient themes that resonate throughout the articles featured in this special edition. The first theme highlights the immense value of adopting asset-based perspectives and redefining the concept of assets. By doing so, we can gain a more profound appreciation of the strengths and capabilities of communities and avoid perpetuating deficit-based narratives. The second theme emphasizes the critical importance of rigorously scrutinizing research methodologies that form the bedrock of the research process and shape findings and conclusions. By embracing mixed methods and participatory approaches, we can promote greater inclusivity and equity in the research process and reimagine how researchers, practitioners, and communities can work collaboratively to tackle shared challenges.

5. Korucu, I., Paes, T. M., Costello, L. C., Duncan, R. J., Purpura, D. J., & Schmitt, S. A. (2023). The role of peers' executive function and classroom quality in preschoolers' school readiness. *Journal of Applied Developmental Psychology*, 86, 101532. <https://doi.org/10.1016/j.appdev.2023.101532>

**Abstract:** The present study examined associations between peers' EF and gains in individual children's EF, language, mathematics, and literacy skills across the preschool year, and whether these associations are moderated by classroom quality. Participants included three cohorts of children ( $n = 556$ , 52.5% male,  $M$  age = 57.5), their parents, and teachers from a larger evaluation of a state-funded prekindergarten program. Multilevel models indicated that peers' EF in the fall of preschool was a significant predictor of individual children's EF ( $\beta = 0.14, p = .001$ ), mathematics ( $\beta = 0.06, p = .049$ ) and literacy ( $\beta = 0.09, p = .027$ ) in the spring of preschool, but was not related to language ( $\beta = 0.03, p = .342$ ), while controlling for child and classroom level covariates, fall EF, and relevant pre-academic and language skills. Results from moderation analyses indicated a significant interaction effect between classroom quality and peers' EF in predicting children's literacy ( $\beta = 0.07, p = .040$ ), suggesting that when children are in low-quality classrooms, having peers with higher EF was more strongly related to gains in literacy skills. No other significant interaction effects were found between classroom quality and peers' EF in predicting individual children's EF, language, and mathematics. Implications for future research on peer effects and practice and policy for preschool education are discussed.

6. Howe, S. L., & Zimmer-Gembeck, M. J. (2023). Maternal socialization profiles, child gender, and later child regulation and internalizing symptoms. *Journal of Applied Developmental Psychology*, 86, 101521. <https://doi.org/10.1016/j.appdev.2023.101521>

**Abstract:** We investigated main and interactive longitudinal associations of mothers' responses to children's emotions (emotion socialization) and child gender with children's emotion regulation and internalizing symptoms, applying person- and variable-centered analyses. Participants were 320 Australian mothers of children ( $M_{age} = 7.4$  years; 51% boys) who completed surveys two times. There were no longitudinal associations of four maternal socialization profiles with child regulation or symptoms, but there were profile differences; mothers with a punishing/minimizing profile had children with the poorest regulation, low involved mothers had children who were most regulated, and coaching/accepting mothers had children with the highest anxiety. Additionally, girls had higher anxiety and less depressive symptoms than boys. In variable-centered analyses, mothers higher in emotion-focused responses had children who increased in anxiety symptoms over time. Also, mothers higher in emotion minimization had girls who decreased in regulation and increased in depressive symptoms over time, with the reverse found for boys.

7. Wilhelmsen, T., Røysamb, E., Lekhal, R., Brandlistuen, R. E., Alexandersen, N., & Wang, M. V. (2023). Children's mental health: The role of multiple risks and child care quality. *Journal of Applied Developmental Psychology*, 86, 101546. <https://doi.org/10.1016/j.appdev.2023.101546>

**Abstract:** The benefit of universal access to Early Childhood Education and Care (ECEC) for children's development can depend on the ECEC quality and children's early childhood risks. This study utilised data from the Norwegian Mother, Father and Child Cohort Study (MoBa;  $N = 7355$ , 50.2% boys) to investigate the relative contribution of children's early childhood risk accumulated up to three years of age and five separate dimensions of ECEC quality on children's mental health (externalising and internalising problems) at five years of age rated by mothers and teachers. Results from the hierarchical regression models indicated that lower ECEC quality added to, and higher ECEC quality counteracted, the risk of mental health problems. Relationship quality was the strongest contributor. Total ECEC quality and relationship quality interacted significantly with early childhood risk, indicating that higher ECEC quality protected against, while lower ECEC quality exacerbated, the detrimental effects of early childhood risk on mental health problems.

8. Tone, E. B., & Henrich, C. C. (2023). Peer victimization and social confidence in youth with disabilities. *Journal of Applied Developmental Psychology*, 86, 101519. <https://doi.org/10.1016/j.appdev.2023.101519>

**Abstract:** With cross-lag mixture modeling we tested the direction of associations between peer victimization and social confidence over time for youth with developmental disabilities. We conducted secondary analysis on a subsample of 3188 youths from the Special Education Elementary Longitudinal Study (SEELS; three measurement waves over four years). The model revealed three classes. The first class had relatively high levels of peer victimization and comprised youths with varied disability classifications. The second and smallest class had high levels of peer

victimization and more likelihood of having emotional disturbance. The third and largest class had relatively low peer victimization levels and greater proportions of older youths with learning disabilities. In the third class, more socially confident youths were less victimized by peers at subsequent waves, and peer victimization at Wave 1 predicted increased social confidence at Wave 3. Findings underscore the value of identifying factors that decrease risk for peer victimization or promote resilience.

## JOURNAL OF EDUCATION FOR TEACHING

1. Kunnari, J., Pursiainen, J., Läärä, E., Rusanen, J., & Muukkonen, H. (2022). Fit between applicants' prior knowledge and university selection criteria: study of Finnish teacher education student admission in 2013–2015. *Journal of Education for Teaching*, 49(2), 180–193. <https://doi.org/10.1080/02607476.2022.2072714>

**Abstract:** Fluent transitions to higher education are a common concern, especially in highly selective Finnish teacher education (TE). This study examined the fit between the matriculation examination (ME) results and the selection criteria applied in TE. We studied the accepted applicants in Finland in 2013–2015 (n = 5116), and both the accepted and rejected applicants at the University of Oulu in 2015 (n = 2170). Among the accepted applicants, the ME typically consisted of mother tongue, advanced syllabus English, basic syllabus mathematics, psychology, and health education. The various selection criteria did not directly differentiate the applicants with respect to the ME. The two strongest predictors in the ME for acceptance to TE were the choice of and performance in advanced syllabus mathematics and psychology. The results are discussed in light of selection criteria and TE.

**Keywords:** General upper secondary education, matriculation examination, admission process, selection criteria, teacher education.

2. Wang, W., Wang, Z., & Lin, W. (2022). 'I really like teaching, but. . .' understanding pre-service teachers' motivations and perceptions about teaching as a career choice. *Journal of Education for Teaching*, 49(2), 194–206. <https://doi.org/10.1080/02607476.2022.2061337>

**Abstract:** This study investigates pre-service teachers' motivations and perceptions about the decision to choose teaching as a career choice. Twenty-seven students who have embarked on teacher education programme in Scotland were interviewed. It was found that students conveyed ambivalent feelings and perspectives in the decision to teach in the sense that they perceived teaching as a platform to fulfil their career aspirations and enjoy themselves but also portrayed teaching negatively in relation to workload, work-related stress, salary, and social status. In light of expectancy-value theory, this study concludes that participants' seemingly highly intrinsically motivated to pursue a teaching career is likely to involve the feature of weighing the intrinsic rewards of teaching (enjoyment or fulfilment) and the negative perceptions deriving from a high level of workload and emotional stress and low salary and social status. The findings of this study have important practical implications for recruiting and retaining teachers; and, for helping future teachers fulfil their interests and articulated professional goals.

**Keywords:** Pre-service teachers, teacher education, career motivation, perception, teaching choice

3. Simonsz, H., Leeman, Y., & Veugelers, W. (2022). Beginning student teachers' motivations for becoming teachers and their educational ideals. *Journal of Education for Teaching*, 49(2), 207–221. <https://doi.org/10.1080/02607476.2022.2061841>

**Abstract:** Research on beginning student teachers' motivations for becoming teachers has shown that they want to contribute to the lives of their students and to society; however, few of these studies have addressed beginning student teachers' views on what education is for in relation to the development of both their future students and society. To examine their motivations and ideals, we conducted a survey among 498 secondary student teachers of history and English language at three Dutch teacher education institutes. The student teachers entered a four-year bachelor programme. The results of the factors influencing teaching (FIT)-choice scale show that motivations representing social utility value were rated the highest. Regarding social development, the highest-rated ideals were autonomy and social commitment, and of the ideals focussed on qualification, subject matter knowledge was rated the highest. We found some differences in motivation between student teachers of history and those of the English language; for example, the former's subject matter motivation was higher than that of the latter. A correlational analysis revealed significant moderate correlations between motivations and educational ideals. In the discussion, we address the implications of our findings for teacher education.

**Keywords:** Motivation for becoming a teacher, FIT-choice scale, educational ideals, beginning secondary education student teachers

4. Cuba, M. J., Nomi, B. C., & McMillan, J. H. (2022). Supporting undocumented students: a comparative study of training methods for pre-service school professionals. *Journal of Education for Teaching*, 49(2), 222–235. <https://doi.org/10.1080/02607476.2022.2066463>

**Abstract:** Despite the 1982 Supreme Court decision *Plyler v. Doe*, little guidance has been provided on how to support undocumented students. Although education scholars have explored undocumented students' experiences, little research examines the effects of professional development on pre-service school professionals' understanding regarding policies and factors impacting undocumented students and their families. Since school professionals can be allies, and schools can provide safe spaces, this quantitative study investigated the effectiveness of two professional development opportunities- a two-hour, in-person training, and a film training- for pre-service school professionals focused on increasing their understanding of policies and factors impacting undocumented students. Findings indicated greater effectiveness for the in-person training when compared to the film training, and also indicated minimal differences in pre-post scores when comparing participants by race/ethnicity and level of experience on the topic. The results suggest that effective professional development can improve school professionals' understanding of advocacy and support.

**Keywords:** Professional development, undocumented students, K-12pre-service teacher education, quantitative research

5. Kaufmann, E. (2022). Lens model studies: Revealing teachers' judgements for teacher education. *Journal of Education for Teaching*, 49(2), 236–251. <https://doi.org/10.1080/02607476.2022.2061336>

**Abstract:** Teachers need to judge students accurately to ensure social justice within classrooms. Currently, many reviews have estimated how accurately teachers overall

judge students, but only a few provided clues about how teachers' accuracy could be improved. To provide insight regarding the sources of teachers' (in)accuracy, we review and synthesise lens model studies concerning the judgement accuracy of teachers. After describing the lens model and the limitations of previous reviews, an individual participant data meta-analysis of lens model studies was performed. We describe how our approach can be utilised to enhance the accuracy of teachers' judgements by distinguishing sources of inaccuracy, particularly among teachers in need of further training, and judgement tasks that need the attention of subject matter experts.

**Keywords:** Decision-making, lens model equation, social justice theory, teacher education, teachers' judgment accuracy

6. Jin, X., Tigelaar, D., Van Der Want, A., & Admiraal, W. (2022). The effects of a teacher development programme in chinese vocational education on the efficacy and professional engagement of novice teachers. *Journal of Education for Teaching*, 49(2), 252–265. <https://doi.org/10.1080/02607476.2022.2072713>

**Abstract:** The self-efficacy and professional engagement of novice teachers were examined in the context of a teacher development programme (TDP) in the Chinese vocational education context. A pre- and post-test control group design was used. The experimental and control groups contained 41 and 42 novice teachers, respectively, who were mostly in their first year. Multivariate analysis of co-variance and paired samples *t*-tests showed that the TDP had significant effects on two sub-scales of teachers' efficacy (i.e. classroom management and student engagement) and one sub-scale of professional engagement (i.e. planned persistence). Then, we discussed the possible explanations of these findings and proposed suggestions for future TDPs and further research.

**Keywords:** Teacher development programme, efficacy, professional engagement, novice teacher, vocational education

7. Nasri, N. M., & Talib, M. a. A. (2022). An extended model of school-university partnership for professional development: bridging universities' theoretical knowledge and teachers' practical knowledge. *Journal of Education for Teaching*, 49(2), 266–279. <https://doi.org/10.1080/02607476.2022.2061338>

**Abstract:** The United Nations Sustainable Development Goal (SDG) 4: Quality Education has recently driven more outreach teacher professional development (PD) programmes. While research evidence shows the importance of school-university partnerships for effective PD programmes, this research area remains under-investigated in many developing countries, including Malaysia. This qualitative study investigated the experiences and perspectives of 40 primary school teachers who participated in a three-phase, school-university PD programme. Phase 1 emphasised reflective pedagogy and co-development of teaching interventions. Phase 2 focused on classroom teaching intervention and continuous feedback on teaching methods, whereas Phase 3 consisted of interview sessions. Guided by the 'Interconnected Model of Teacher Professional Growth', an extended version of the model was developed to include an emerging domain; the Initial Positive Perception Domain. This domain addresses teachers' voluntary involvement and their clear intention to

collaborate with the university researchers. Most importantly, this domain facilitates positive interaction between the existing domains in the model by promoting teachers' reflective pedagogical practice and strengthening the collective learning community. This study provides explicit evidence that a teacher's initial positive perception towards school-university partnership serves as a fundamental bridge between theoretical knowledge and practical knowledge for developing highly effective PD programmes.

**Keywords:** School-university partnership, professional development, teacher quality

8. Sepulveda-Escobar, P. (2022). ESOL teacher educators' learning initiatives and perceived learning needs: still a pending task. *Journal of Education for Teaching*, 49(2), 280–296. <https://doi.org/10.1080/02607476.2022.2038517>

**Abstract:** Even though international research has offered a rich account of teacher educators' professional learning, it has overlooked the implications of the disciplines they teach for their professional learning engagement. Therefore, it is timely to examine teacher educators from different fields of expertise to offer a more specific and subject-related understanding of their professional learning involvement. This study investigates the initiatives that Chilean university-based ESOL teacher educators engage in to continue learning and their perceived professional learning needs. Data are drawn from a national web-based survey and a focus group. The results suggest that individual formal learning opportunities that are highly valued, and sometimes prescribed, by higher education institutions are predominant. Their professional learning needs, however, relate mainly to promoting collaborative peer-learning, advancing knowledge about diversity in the classroom and technology literacy, and enhancing their research skills and practice in language teaching. This study highlights the importance of identifying these needs as a foundation to design learning opportunities that meet the demands of the profession and the particularities of each discipline. Recommendations to enhance their continuous education towards a view of professionalism that recognises their ability to manifest ideas and agency to effect change are discussed.

**Keywords:** Teacher educators, professional learning and development, learning needs

9. Burns, E., Palmer, S., Edwards, D., Farrelly, C., Grogan, L., Hayes, N., Meyers, N., O'Mallon, S., & Pridham, B. (2022). Teacher talk on day-one of pre-service teacher educator classes: performative class management. *Journal of Education for Teaching*, 1–14. <https://doi.org/10.1080/02607476.2022.2154142>

**Abstract:** Nine experienced university pre-service teacher educators used a collaborative autoethnography method to reflect on what they say to students on the first day of new classes and how their performance sets up the semester. Our group exchanges provided an opportunity to express long-developing values and practices embedded in individual's teaching craft. The exchanges were often revelatory to other participants unfamiliar with the performative day-one interactions for start-of-semester classes that their colleagues had developed in different teaching specialities. Narratives of practice, experience and philosophies of class management are present in these conversations about applying pedagogical strategies. The shared accounts revealed skills developed experimentally over many semester-starts to achieve

successful class management. The accounts demonstrated a range of interwoven practices individual pre-service teacher educators emphasised in engaging students: what the educators said and how they positioned their opening statements and actions for students at the start of each new semester.

**Keywords:** Class management, first class, first day, performative teaching, teacher talk

10. Rappa, N. A., & Ledger, S. (2022). Pre-service teachers' reflections on their challenging experiences interacting with a parent avatar: Insights on deepening reflection on the simulation experience. *Journal of Education for Teaching*, 49(2), 311–325. <https://doi.org/10.1080/02607476.2022.2061339>

**Abstract:** Australian preservice teachers (PSTs) are required to show evidence that they can 'engage with parents/carers' (AITSL Standard 7.3). This paper reports on a pilot study of PSTs, in their final year within an Initial Teacher Education programme, in a mixed reality learning environment immersing themselves in authentic and challenging conversations with a parent avatar. Based on data drawn from a survey of 57 respondents, the paper describes emergent themes gleaned from PSTs' comments about their interactions. The findings identify key areas of focus in PSTs' reflections and the ensuing discussion explores practical and theoretical considerations for deepening reflection on the simulation experience. It also highlights the benefit of simulation to provide PSTs the opportunity to practise difficult conversations with parents before they encounter the experience in the real world.

**Keywords:** Mixed reality, simulation, initial teacher education, parent-teacher interaction, reflection

11. Anwer, M., & Reiss, M. (2022). Linking research and practice in education: the views of expert researchers in the field. *Journal of Education for Teaching*, 49(2), 326–340. <https://doi.org/10.1080/02607476.2022.2055447>

**Abstract:** The existence of a gap between educational research and practice, resulting in research that makes only a limited contribution to the improvement of professional practices in education, has been a topic of much discussion. There is widespread agreement among researchers that practice in education should be informed by research evidence. At the same time, other authors have voiced concerns about giving evidence-based practice too prominent a place in educational settings. In this article, we assess the views of expert researchers in the field of education regarding the linking of research and practice in education. Individual, semi-structured interviews were undertaken with twelve experts from Pakistan and the UK, contrasting countries where the issue of the utility of research for educational practice has been much debated. In both countries, there was a strong consensus among the researchers that there are important gaps between research and practice in education. The interviewees made a range of suggestions as to how these gaps might be filled, and we examine these suggestions.

**Keywords:** Educational research, educational practice, evidence-based practice, translational research, knowledge mobilisation

## JOURNAL OF EDUCATIONAL PSYCHOLOGY

1. Fong, C. J., Gonzales, C., Cox, C. H., & Shinn, H. B. (2021). Academic help-seeking and achievement of postsecondary students: A meta-analytic investigation. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000725>

**Abstract:** Nearly all college students require some academic assistance throughout their learning experiences. Rather than a dependent act, help-seeking is a self-regulated and motivated strategy; however, there are mixed findings regarding the relationship between academic help-seeking and academic achievement. Thus, the current study used meta-analytic techniques to assess the relationship between academic help-seeking variables and achievement (GPA, grades, test scores) among postsecondary students in 108 studies (119 samples,  $N = 37,941$ ). Findings revealed a positive association between self-reported, need-contingent help-seeking behaviors and student achievement; the average weighted correlation was very small but potentially meaningful in the long run. Furthermore, the quality of help-seeking mattered, revealing small to moderate associations of greater consequence. Specifically, and executive help-seeking were negatively correlated to achievement; instrumental help-seeking along with formal help-seeking was positively correlated with academic performance. Moreover, a few factors significantly moderated the relationship between help-seeking and achievement. Implications for research and practice will be discussed.

2. Buchin, Z. L., & Mulligan, N. W. (2023). Retrieval-based learning and prior knowledge. *Journal of Educational Psychology*, *115*(1), 22–35. <https://doi.org/10.1037/edu0000773>

**Abstract:** Retrieval practice typically benefits later memory more than restudy (i.e., the testing effect). The benefits of retrieval-based learning generalize across a range of materials and contexts, leading many cognitive scientists to advocate for broad educational implementation. However, educators and practitioners call for more research on factors critical to education (e.g., individual differences between learners). One key understudied factor is the amount of relevant prior knowledge held by the learner, which can moderate the effectiveness of other learning strategies (i.e., expertise-reversal effects). The current study investigated the potential moderating influence of prior knowledge on the learning benefits of retrieval. To assess the causal effects of prior knowledge on later learning strategy effectiveness, we randomly assigned online participants to be trained in multiple topics within one of two academic domains over 3 days. Participants then engaged in a more typical testing effect paradigm—they studied new scientific text passages related to their trained or untrained domain and completed two rounds of focused restudy or retrieval with elaborative feedback (repeated for the other domain). Two days later, participants took a final test on the previously learned information from both domains. Despite being rated as more effortful than restudy, retrieval practice led to greater overall test performance (with larger relative benefits on retention than transfer questions). Critically, despite a substantial benefit from training-induced knowledge, testing effects were nearly identical for high and low prior knowledge information. This suggests that prior knowledge is not a critical boundary condition of retrieval-based learning.

3. Putwain, D. W., Nicholson, L. J., & Kutuk, G. (2023). Warning students of the consequences of examination failure: An effective strategy for promoting student engagement? *Journal of Educational Psychology*, *115*(1), 36–54. <https://doi.org/10.1037/edu0000741>

**Abstract:** In the context of high-stakes qualifications, teachers may warn students of the negative consequences of failure as a tactic designed to increase engagement and, ultimately, achievement. Previous studies have shown that these types of messages, namely fear appeals, are indirectly related to engagement and achievement in different ways, depending on how they are evaluated by the student. When fear appeals are evaluated as a challenge, they are positively related to engagement and achievement. When evaluated as a threat, fear appeals are negatively related to engagement and achievement. In the present study, we offer a robust test of these relations in a multilevel model that controls for autoregressive and concurrent relations in the domain of mathematics. Self-reported data were collected from 1,530 participants, aged 14–16 years, at two time points over the final 2 years of secondary education. These data were linked to prior and subsequent achievement. Results showed that students who attended to fear appeals and evaluated them as a challenge showed higher subsequent engagement, and students who showed higher engagement showed higher achievement. Accordingly, it may be beneficial to identify those students likely to evaluate fear appeals as a threat and intervene to enhance the likelihood of a challenge evaluation (e.g., building confidence through strategy focused feedback and strengthening beliefs in the value of effort). Given the difficulties associated with teachers judging students' motivation and emotion as private experiences, methods to access student voice should be considered.

4. Dryden, R. P., Campbell, A. V., Perry, R. P., Hamm, J. M., Chipperfield, J. G., Parker, P. C., & Leboe-McGowan, L. C. (2022). Assisting students in debt to overcome academic setbacks with a cognitive-reframing motivation intervention. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000770>

**Abstract:** Novel and unpredictable learning environments are a feature of school-to-college transitions that erode students' academic control, emotional resilience, and achievement (Perry, Hall, & Ruthig, 2005). Although motivation interventions can benefit college students (Koenka, 2020), few studies have examined treatment efficacy for students of varying socioeconomic backgrounds. This randomized treatment-control study assessed whether a cognitive-reframing intervention (attributional retraining [AR]) improved cognitive, affective, and performance outcomes of students with debt in a two-semester, online course. For in-debt students, AR (vs. no-AR) fostered cognitive reframing of achievement setbacks to increase academic control, adaptive emotions, posttreatment performance, and final course grades. Changes in maladaptive causal attributions mediated AR-grades efficacy in a path sequence specified by Weiner's (1985, 2014, 2018) attribution theory. Findings advance motivation intervention research by showing AR boosts achievement for students with debt, mediated by theory-derived cognitive and affective processes.

5. Kim, J. S., Burkhauser, M., Relyea, J. E., Gilbert, J., Scherer, E., Fitzgerald, J., Mosher, D., & McIntyre, J. (2023). A longitudinal randomized trial of a sustained content literacy intervention from first to second grade: Transfer effects on students' reading

comprehension. *Journal of Educational Psychology*, 115(1), 73–98.  
<https://doi.org/10.1037/edu0000751>

**Abstract:** We developed a sustained content literacy intervention that emphasized building domain and topic knowledge from Grade 1 to Grade 2 and evaluated transfer effects on students' reading comprehension outcomes. The Model of Reading Engagement (MORE) intervention emphasizes thematic lessons that provide an intellectual framework for helping students connect new learning to a general schema (i.e., how scientists study past events). A total of 30 elementary schools ( $N = 2,952$  students;  $N = 144$  teachers) were randomly assigned to a treatment or control group. Over 12 months, the treatment group students participated in (a) spring Grade 1 thematic content literacy lessons in science and social studies followed by wide reading of thematically related informational texts during summer, and (b) fall to spring Grade 2 thematic content literacy lessons in science. After implementation of Grade 1 thematic content literacy lessons and summer support for reading, treatment group students experienced smaller summer losses on a domain-general measure of reading than control group students. Following the sustained implementation of thematic content literacy lessons in science through Grade 2, treatment group students also outperformed their control group peers on a science content reading comprehension outcome ( $ES = .18$ ). Furthermore, we found transfer effects on science content reading comprehension that varied by passage-item type (near-, mid-, and far-transfer passages determined by the inclusion and number of directly taught words in passages). A sustained content literacy intervention that aligns content and instruction across grades can help students transfer knowledge to novel reading comprehension tasks.

6. Gillam, S. L., Vaughn, S., Roberts, G., Capin, P., Fall, A., Israelsen-Augenstein, M., Holbrook, S., Wada, R., Hancock, A., Fox, C., Dille, J. T., Magimairaj, B. M., & Gillam, R. B. (2022). Improving oral and written narration and reading comprehension of children at-risk for language and literacy difficulties: Results of a randomized clinical trial. *Journal of Educational Psychology*.  
<https://doi.org/10.1037/edu0000766>

**Abstract:** Narration has been shown to be a foundational skill for literacy development in school-age children. Elementary teachers routinely conduct classroom lessons that focus on reading decoding and comprehension, but they rarely provide instruction in oral narration (Hall et al., 2021). This multisite randomized controlled trial was designed to rigorously evaluate the efficacy of the *Supporting Knowledge of Language and Literacy (SKILL)* intervention program for improving oral narrative comprehension and production. Three hundred fifty-seven students who were at-risk for language and literacy difficulties in Grades 1–4 in 13 schools across seven school districts were randomly assigned to the *SKILL* treatment condition or a business as usual (BAU) control condition. *SKILL* was provided to small groups of two to four students in 36 thirty-minute lessons across a 3-month period. Multilevel modeling with students nested within teachers and teachers nested within schools revealed students who received the *SKILL* treatment significantly outperformed students in the BAU condition on measures of oral narrative comprehension and production immediately after treatment. Oral narrative production for the *SKILL* treatment group remained significantly more advanced at follow-up testing conducted 5 months after intervention ended. Improvements in oral narration generalized to a measure of

written narration at posttest and the treatment advantage was maintained at follow-up. Grade level did not moderate effects for oral narration, but it did for reading comprehension, with a higher impact for students in grades 3 and 4.

7. Wu, Y., & Schunn, C. D. (2022). Assessor writing performance on peer feedback: Exploring the relation between assessor writing performance, problem identification accuracy, and helpfulness of peer feedback. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000768>

**Abstract:** Although peer review has been widely used for formative assessment in writing instruction, there remain concerns about whether assessors are at a sufficient writing performance level that would allow them to identify major problems in the reviewed work and provide helpful feedback to improve draft quality. Little empirical research has not examined how assessor writing performance specifically influences problem identification accuracy and helpfulness of feedback, nor has it acknowledged different grain sizes of assessor performance. Assessor writing performance at different grain sizes (i.e., performance at the levels of genre, dimension of a genre, and specific problem topic) was assessed alongside problem identification accuracy and feedback helpfulness in 234 high school students who participated in an anonymous multipeer review in a secondary writing course in the United States. A correlation analysis showed that assessor performance levels on specific problem topics were meaningfully separable, thereby allowing for consideration of the effects of assessor performance at genre, dimension, and topic levels. Multiple regression results indicated that assessor writing performance was unrelated to problem identification accuracy at any grain size. Therefore, scaffolds in the reviewing process appear sufficient to support problem identification accuracy. However, assessor writing performance, particularly on specific dimensions and specific topics, consistently predicted helpfulness of feedback, even though lower performing assessors rarely produce incorrect advice. Theoretical and practical implications of the findings are discussed.

8. McCoy, D. C., Sabol, T. J., Wei, W., Busby, A. K., & Hanno, E. C. (2022). Pushing the boundaries of education research: A multidimensional approach to characterizing preschool neighborhoods and their relations with child outcomes. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000728>

**Abstract:** With more low-income children in the United States participating in center-based early childhood education programs than ever before, understanding the features of preschool classrooms that promote positive and equitable outcomes for children is of increasing concern to education researchers. Relatively little empirical work, however, has considered the role that characteristics outside of preschool walls might play in shaping low-income children's learning and development early in life. This study uses novel administrative data to characterize the institutional resources, indicators of social organization, and structural determinants of development for the neighborhoods surrounding 195 preschools across nine U.S. cities. Using latent profile analysis, preschool neighborhoods were grouped into four profiles reflecting different combinations of community characteristics. These neighborhood profiles predicted low-income preschoolers' ( $N = 1,230$ ;  $M$  age = 4.18 years) language/literacy, executive function, and approaches to learning at the end of the 2009 or 2010 academic year, with particularly positive outcomes in communities characterized by

high physical disorder and unaffordability, as well as in those marked by high community resources and physical order and low residential mobility. Findings highlight the multidimensional realities of low-income children's preschool community environments and offer new directions for characterizing educational contexts.

9. Wirth, A., Stadler, M., Birtwistle, E., & Niklas, F. (2022). New directions in the conceptualization and operationalization of the home learning environment. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000749>

**Abstract:** The Home Learning Environment (HLE) focuses on everyday learning habits in families to support the development of children's early cognitive competencies. A growing number of studies have assessed the HLE by using different conceptual approaches and various assessment methods, often focusing on either the home literacy environment or the home numeracy environment. However, it is still unclear whether the 2 dimensions of the HLE are separable constructs and which assessment method is best suited for assessing the HLE, making it difficult to interpret and compare different study results. In the current study, we used multitrait-multimethod (MTMM) analyses to compare 3 common methods for assessing the HLE and their relations to various outcomes of kindergarten children. Our sample consisted of 2 independent cohorts of children ( $N_1 = 190$ ,  $N_2 = 310$ ) with an average age of 61 months ( $SD = 4.6$ ). In both cohorts, the MTMM matrix showed a substantial effect of common methods and indicated a 1-dimensional HLE construct indicated most strongly by the children's book title recognition test (TRT-VS). Even when controlling for child and family characteristics (i.e., intelligence and socioeconomic status), the HLE was statistically significantly related to both the mathematical competencies and the linguistic competencies of the child in a structural equation model. This pattern of results was found consistently across both cohorts. We discuss the significance of a 1-dimensional HLE construct and its different assessment methods in the light of implications for future research and interventional approaches.

10. Sommet, N., Weissman, D. L., & Elliot, A. J. (2022). Income inequality predicts competitiveness and cooperativeness at school. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000731>

**Abstract:** Competitiveness and cooperativeness are important predictors of social and learning outcomes at school. Drawing on evidence suggesting that contexts with high income inequality foster an ethos of competitiveness and inhibit cooperativeness in the economic environment, we examine whether income inequality is also associated with more competitiveness and less cooperativeness in the academic environment. We conducted four preregistered studies to test this idea. In Study 1, analysis of the OECD PISA 2018 data set ( $\approx 500,000$  15-year-old students from 75 countries) revealed that students from economically unequal countries perceive their schoolmates as more competitive and less cooperative. In Study 2a and 2b, analysis of the PISA 2003 (250,000 + students from 38 countries) and PISA 2000 (75,000 + students from 32 countries) data sets revealed that students from unequal countries are themselves more competitive and, surprisingly, also more cooperative. Follow-up analyses resolved this apparent paradox, showing that students from unequal countries are oriented toward instrumental rather than intrinsic cooperativeness (i.e., using

cooperation as a strategic tool to achieve academic success rather than for the enjoyment of the activity itself). Study 3 offers a conceptual experimental replication ( $\approx 850$  young adults imagining going back to school) and indicates that induced income inequality (a) increases perceived competitiveness, (b) decreases perceived cooperativeness, (c) prompts an orientation toward competitiveness, and (d) prompts an orientation toward instrumental rather than intrinsic cooperativeness. Results are discussed in relation to the multidisciplinary literatures on the psychology of income inequality, the selective function of school systems, competition, self-determination, and cooperative learning.

## JOURNAL OF HUMAN VALUES

1. Freeman, R. E., & Freeman, B. (2023). Business in a Post-COVID world: The move to stakeholder capitalism. *Journal of Human Values*, 29(2), 105–114. <https://doi.org/10.1177/09716858231167100>

**Abstract:** The last 15 years have seen a remarkable set of changes in the global business environment. Established companies and start-ups alike have been subjected to some fundamental shifts in the very way that we conceptualize business. Together with some generational challenges we have seen myriad calls for a new narrative about business. And, even more recently, the COVID pandemic has reinforced a number of these shifts and led to even more fundamental change. The purpose of this essay is to outline these challenges to the dominant narrative about business and to suggest that it is no longer a useful way to think about value creation and trade (business).

2. Gowda, M. V. R., & Thakur, F. (2023). Insights from India's Encounters with COVID-19. *Journal of Human Values*, 29(2), 115–121. <https://doi.org/10.1177/09716858231167513>

**Abstract:** The uncertainties relating to the COVID-19 pandemic continue to pose extraordinary challenges to policymakers worldwide. The recent lifting of restrictions in China raised the spectre of another wave of infections beyond its borders, which has thankfully not occurred, so far. Now, three years after the pandemic emerged, policy assumptions and responses are being re-evaluated—from whether the virus emerged as a laboratory leak, to whether vaccines have efficacy, to whether Sweden's laissez-faire approach was superior to other countries' ambitious interventions. We examine India's experience with COVID-19—impressionistically—to draw larger lessons for policymakers. India's responses were a mix of hits and misses. Some measures helped contain the pandemic and assisted those in need. Other measures seemed performative—geared towards garnering glory on the global stage. Together, they throw light on the challenges of coping with a crisis in real time.

3. Smith, R. D., & Kulkarni, S. P. (2023). The importance of the authentic virtuous employee in the search for meaningfulness in work. *Journal of Human Values*, 29(2), 122–136. <https://doi.org/10.1177/09716858231154388>

**Abstract:** The article focuses on the 'meaningfulness in work' concept and addresses three theoretical gaps by investigating 'meaningfulness in work' from the perspective of Heidegger's 'authenticity' and 'Dasein' constructs as well as virtue ethics. First, it adapts Heideggerian phenomenology and argues that meaningfulness in work may be revealed to an 'authentic' employee, while they performs everyday activities by 'existing' in their world and discovers their Dasein. Second, it emphasizes the normative, as opposed to instrumental implications of meaningfulness and invokes virtue ethics towards this end. Third, it integrates the Heideggerian approach with virtue ethics to describe how an 'authentic' and 'virtuous' employee may achieve meaningfulness in work (conceptualized as 'eudaimonia'). An 'authentic virtuous employee' 'exists in their world' and discovers what is truly meaningful in work to them. They also displays temperance and courage in terms of closing the gaps between current and desired levels of meaningfulness in work, and continually

contemplates it. We describe a ‘professional’ as an example of an ‘authentic virtuous employee’.

4. Rishi, P., Bk, P., Gupta, S., & Sinha, S. (2023). Mindfulness and Diversity Acceptance as indicators of frugality-linked sustainability behaviour during COVID-19: Mediating Role of Happiness. *Journal of Human Values*, 29(2), 137–152. <https://doi.org/10.1177/09716858231154397>

**Abstract:** Sustainable behaviour promotes pro-ecological behaviour and is a practice of consuming and utilizing resources responsibly. The ongoing COVID-19-induced pandemic has already put economic, social and psychological distress across the globe. Meanwhile, it has become vital to think of issues related to the sustainable management of resources. Behavioural norms play a prominent role while promoting sustainable living. This research examines how the sustainable dimension in one’s behaviour influences the decision-making in their daily life. Previous studies have shown the importance of sub-factors like happiness, diversity constraint and frugal actions as factors affecting sustainable behaviour. These indicators mainly define the action one will choose to react to while buying and consuming different resources. The study identifies happiness as the mediating variable which influences the relationship between the predictor variables—mindfulness and diversity acceptance and the criterion variable—frugality-linked sustainable behaviour. With a sample of 324 participants, Baron and Kenny’s mediation model was outlined to test the mediation. Results showed a positive relationship between frugality, diversity, mindfulness and happiness. Happiness was found to be mediating between mindfulness, diversity acceptance and frugality-linked sustainable behaviour indicating that mindfulness and diversity acceptance alone have limited potential to impact the frugality-linked sustainable approach that individuals take. Happiness, as explained through a positive frame of mind, plays a very important role in enhancing sustainability behaviour.

5. Malhotra, N., & Baag, P. K. (2023). Impact of COVID-19 on the Income of Entrepreneurs Who Borrowed from SHG. *Journal of Human Values*, 29(2), 153–167. <https://doi.org/10.1177/09716858231154396>

**Abstract:** The COVID-19 pandemic has shaken the world. After liberalization in 1991, microfinance became a panacea for poor people without collateral and information asymmetry. The higher cost of microfinance and debt traps highlighted the need for the state to intervene in resource redistribution. In addition, national lockdowns and COVID-19 restrictions have made it difficult for emerging economies like India to achieve this sustainable development goal. The Reserve Bank of India introduced self-help group (SHG) bank linkage to ensure the financial inclusion of the poor. The difference-in-difference method examined how SHGs affect entrepreneur households’ income. CMIE Consumer Pyramid dx data were used for analysis. The data establish that SHGs have increased the income of the households, and demographic factors such as education, income level and gender also impact the financial inclusion of the poor.

## JOURNAL OF SCHOOL PSYCHOLOGY

1. Nelson, G., Kiss, A. J., Coddling, R. S., McKevev, N. M., Schmitt, J. F., Park, S., Romero, M. E., & Hwang, J. (2023). Review of curriculum-based measurement in mathematics: An update and extension of the literature. *Journal of School Psychology, 97*, 1–42. <https://doi.org/10.1016/j.jsp.2022.12.001>

**Abstract:** The purpose of this literature review on curriculum-based measurement in mathematics (CBM-M) was to update and extend the Foegen et al. (2007) progress monitoring in mathematics review. We included 99 studies focused on at least one of the three stages of CBM research (i.e., one point in time [screening], repeatedly over time [progress monitoring], and instructional utility) in mathematics for students in preschool through Grade 12. The results of this review indicated that researchers have increased the amount of research conducted at the early mathematics and secondary levels; however, many studies focused on the stages of CBM research are still conducted at the elementary level. The results also demonstrated that most studies ( $k = 85$ ; 85.9%) were focused on Stage 1, with fewer studies reporting results related to Stage 2 ( $k = 40$ ; 40.4%) and Stage 3 ( $k = 5$ ; 5.1%). The results of this literature review also underscore that although considerable growth has been achieved in the past 15 years in CBM-M development and reporting, next steps in research include a focus on investigating the uses of CBM-M for progress monitoring and instructional decision making.

2. Mettler, J., Khoury, B., Zito, S., Sadowski, I., & Heath, N. L. (2023). Mindfulness-based programs and school adjustment: A systematic review and meta-analysis. *Journal of School Psychology, 97*, 43–62. <https://doi.org/10.1016/j.jsp.2022.10.007>

**Abstract:** Mindfulness-based programs (MBPs) are increasingly used in educational institutions to enhance students' mental health and resilience. However, reviews of the literature suggest this use may have outpaced the evidence base and further research is needed to better understand the mechanisms underlying these programs' effectiveness and which outcomes are being affected. The purpose of this meta-analysis was to investigate the strength of MBPs' effects on school adjustment and mindfulness outcomes while also considering the potential influence of study and program characteristics, including the role of comparison groups, students' educational level, the type of program being used, and the facilitator's training and previous mindfulness experience. Following a systematic review of five databases, 46 studies using a randomized controlled design with students from preschool to undergraduate levels were selected. At post-program, the effect of MBPs compared to control groups was (a) small for overall school adjustment outcomes, academic performance, and impulsivity; (b) small to moderate for attention; and (c) moderate for mindfulness. No differences emerged for interpersonal skills, school functioning, or student behaviour. The effects of MBPs on overall school adjustment and mindfulness differed based on students' educational level and the type of program being delivered. Moreover, only MBPs delivered by outside facilitators with previous experience of mindfulness had significant effects on either school adjustment or mindfulness. This meta-analysis provides promising evidence of the effectiveness of MBPs in educational contexts to improve students' school adjustment outcomes beyond typically assessed psychological benefits, even when using randomized controlled designs.

**Keywords:** Mindfulness; Meta-analysis; Program; Education; Students

3. Bettencourt, A. F., Clary, L. K., Ialongo, N. S., & Musci, R. J. (2023). Long-term consequences of bullying involvement in first grade. *Journal of School Psychology, 97*, 63–76. <https://doi.org/10.1016/j.jsp.2023.01.004>

**Abstract:** Few prospective studies have examined how early bullying experiences impact long-term adjustment and the differential impact of children's co-occurring bullying and peer victimization involvement on adjustment in adulthood. This study addressed these gaps by examining subgroups of first graders involved in bullying and associations with four outcomes in early adulthood, including (a) Major Depression diagnosis, (b) post-high school suicide attempt, (c) on-time high school graduation, and (d) criminal justice involvement. Additionally, middle school standardized reading test scores and suspensions were examined as potential mechanisms through which early bullying involvement is associated with adult outcomes. Participants were 594 children from nine urban elementary schools in the United States who participated in a randomized controlled trial of two school-based universal prevention interventions. Latent profile analyses using peer nominations identified three subgroups: (a) *High involvement bully-victims*, (b) *Moderate involvement bully-victims*, and (c) *Low/No involvement youth*. Compared to the *No/Low involvement* class, *High involvement bully-victims* were less likely to graduate high school on time (OR = 0.48,  $p = .002$ ) and *Moderate involvement bully-victims* were more likely to be involved in the criminal justice system (OR = 1.37,  $p = .02$ ). *High bully-victims* were at greater risk for both not graduating high school on-time and criminal justice system involvement, which were partially explained by 6th grade standardized reading test scores and suspensions. *Moderate bully-victims* were less likely to graduate high school on time, which was partially explained by 6th grade suspensions. Findings highlight how early bully-victim involvement increases risk for difficulties that affect adult quality of life.

4. Kutaka, T. S., Chernyavskiy, P., Sarama, J., & Clements, D. H. (2023). Ordinal models to analyze strategy sophistication: Evidence from a learning trajectory efficacy study. *Journal of School Psychology, 97*, 77–100. <https://doi.org/10.1016/j.jsp.2023.01.002>

**Abstract:** Investigators often rely on the proportion of correct responses in an assessment when describing the impact of early mathematics interventions on child outcomes. Here, we propose a shift in focus to the relative sophistication of problem-solving strategies and offer methodological guidance to researchers interested in working with strategies. We leverage data from a randomized teaching experiment with a kindergarten sample whose details are outlined in Clements et al. (2020). First, we describe our problem-solving strategy data, including how strategies were coded in ways that are amenable to analysis. Second, we explore what kinds of ordinal statistical models best fit the nature of arithmetic strategies, describe what each model implies about problem-solving behavior, and how to interpret model parameters. Third, we discuss the effect of “treatment”, operationalized as instruction aligned with an arithmetic Learning Trajectory (LT). We show that arithmetic strategy development is best described as a sequential stepwise process and that children who receive LT instruction use more sophisticated strategies at post-assessment, relative to their peers in a teach-to-target skill condition. We introduce latent strategy sophistication as an analogous metric to traditional Rasch factor scores and

demonstrate a moderate correlation them ( $r = 0.58$ ). Our work suggests strategy sophistication carries information that is unique from, but complimentary to traditional correctness-based Rasch scores, motivating its expanded use in intervention studies.

5. Schwarzenthal, M., Phalet, K., & Kende, J. (2023). Enhancing or reducing interethnic hierarchies? Teacher diversity approaches and ethnic majority and minority students' ethnic attitudes and discrimination experiences. *Journal of School Psychology, 97*, 101–122. <https://doi.org/10.1016/j.jsp.2023.01.005>

**Abstract:** Diversity approaches in school may affect students' interethnic relations but are often only assessed through students' perceptions. We related teacher-reported diversity approaches (i.e., assimilationism, multiculturalism, color-evasion, and intervening with discrimination) to ethnic majority and minority students' ethnic attitudes as well as to their experiences or perceptions of ethnic discrimination. We also explored students' perceptions of teacher approaches as hypothetical mediators of teacher effects on interethnic relations. We coupled survey data from 547 teachers ( $M_{\text{age}} = 39.02$  years, 70% female) in 64 schools in Belgium with large-scale longitudinal survey data from their students, including 1287 Belgian majority students ( $M_{\text{age}} = 15.52$ , 51% female) and 696 Turkish- or Moroccan-origin minority students ( $M_{\text{age}} = 15.92$ , 58% female) enrolled in the same schools (Phalet et al., 2018). Longitudinal multilevel models revealed that over time, teacher-reported assimilationism predicted (even) more positive attitudes towards Belgian majority members, and multiculturalism predicted less highly positive attitudes towards Belgian majority members among Belgian majority students. Teacher-reported intervening with discrimination predicted more perceived discrimination of ethnic minority students over time among Belgian majority students. We did not find significant longitudinal effects of teachers' diversity approaches with Turkish- or Moroccan-origin minority students' ethnic attitudes, nor with their discrimination experiences or perceptions. We conclude that teachers' multiculturalism and anti-discrimination approaches reduced interethnic bias and raised awareness of discrimination among ethnic majority students. However, different perceptions by teachers and students suggest the need for schools to better communicate inclusive diversity approaches.

6. Guglielmi, R. (2023). Probing gaps in educational outcomes within the U.S.: A dual moderation multiple mediator latent growth model. *Journal of School Psychology, 97*, 123–151. <https://doi.org/10.1016/j.jsp.2023.01.001>

**Abstract:** Racial/ethnic disparities in math achievement are especially troubling because math proficiency predicts long-term educational outcomes, but the mechanisms underlying these disparities remain unclear. Previous research has demonstrated that across diverse samples, both within and outside the United States, the relation between students' academic aspirations and later postsecondary attainment is mediated by initial levels of math ability and by growth in that ability across time. The key issue examined in this investigation is the extent to which students' underestimation or overestimation of their math ability (i.e., calibration bias) moderates those mediated effects and whether this moderation varies as a function of race/ethnicity. Using data from two longitudinal national surveys (i.e., NELS:88 and HSL:09), these hypotheses were tested in samples of East Asian American, Mexican

American, and Non-Hispanic White American high school students. In both studies and in all groups, the model explained large portions of the variance in postsecondary attainment. In East Asian Americans and non-Hispanic White Americans, calibration bias moderated the effect mediated by 9th grade math achievement. The strength of this effect was greatest at high levels of underconfidence and steadily weakened as self-confidence grew, suggesting that some degree of underconfidence may be achievement-promoting. Indeed, in the East Asian American sample, this effect became negative at high levels of overconfidence (i.e., academic aspirations actually predicted the lowest postsecondary attainment levels). Educational implications of these findings are discussed and possible reasons for the failure to find moderation effects in the Mexican American sample are explored.

7. Begeny, J. C., Wang, J., Levy, R., Sanetti, L. M. H., Loehman, J., & Rodriguez, K. (2023). Considering the implementation research-to-practice gap: An experimental evaluation of intervention-general methods for assessing and supporting intervention fidelity through coaching. *Journal of School Psychology, 97*, 152–170. <https://doi.org/10.1016/j.jsp.2023.01.003>

**Abstract:** Implementation support through coaching—such as with embedded fidelity assessment, performance feedback, modeling, and alliance building—has been empirically supported as a way to increase and sustain interventionists' fidelity levels. However, education research consistently shows that practitioners struggle to monitor and improve interventionists' fidelity using implementation support strategies. One explanation for this type of implementation research-to-practice gap is that evidence-based coaching strategies have significant limitations with respect to their usability, feasibility, and adaptability. This study is the first to experimentally evaluate an evidence-based set of adaptable materials and procedures designed to assess and support the intervention fidelity of school-based interventions. Using a randomized multiple-baseline-across-participants design, we examined the extent to which these materials and procedures would influence intervention adherence and quality of an evidence-based reading intervention. Across all nine interventionist participants, data revealed that the implementation strategies meaningfully improved intervention adherence and quality, and high levels of intervention fidelity maintained 1 month after removing the support procedures. Findings are discussed with respect to how these materials and procedures address a critical need within school-based research and practice as well as how they may help to inform and address the implementation research-to-practice gap in education.

8. Davis, E. M., Schmidt, E., Rothenberg, W. A., Davidson, B., Garcia, D., Barnett, M. L., Fernandez, C., & Jent, J. (2023). Universal Teacher-Child Interaction Training in early childhood special education: A cluster randomized control trial. *Journal of School Psychology, 97*, 171–191. <https://doi.org/10.1016/j.jsp.2023.02.001>

**Abstract:** Growing evidence suggests that Teacher-Child Interaction Training-Universal (TCIT-U) is effective for increasing teachers' use of strategies that promote positive child behavior, but more rigorous research with larger, diverse samples is needed to understand the effects of TCIT-U on teacher and child outcomes in early childhood special education. Using a cluster randomized control trial, we evaluated the effects of TCIT-U on (a) teacher skill acquisition and self-efficacy and (b) child behavior and developmental functioning. Teachers in the TCIT-U group ( $n = 37$ )

exhibited significantly greater increases in positive attention skills, increased consistent responding, and decreased critical statements relative to teachers in the waitlist control group ( $n = 36$ ) at post and 1-month follow-up ( $d$ 's range from 0.52 to 1.61). Teachers in the TCIT-U group also exhibited significantly fewer directive statements ( $d$ 's range from 0.52 to 0.79) and greater increases in self-efficacy compared to waitlist teachers at post ( $d$ 's range from 0.60 to 0.76). TCIT-U was also associated with short-term benefits for child behavior. Frequency ( $d = 0.41$ ) and total number of behavior problems ( $d = 0.36$ ) were significantly lower in the TCIT-U group than in the waitlist group at post (but not follow-up), with small-to-medium effects. The waitlist group, but not the TCIT-U group, demonstrated an increasing trend in number of problem behaviors over time. There were no significant between-group differences in developmental functioning. Current findings build support for the effectiveness of TCIT-U as universal prevention of behavior problems with an ethnically and racially diverse sample of teachers and children, including children with developmental disabilities. Implications for implementation of TCIT-U in the early childhood special education setting are discussed.

9. Kratochwill, T. R., Horner, R. H., Levin, J. R., Machalicek, W., Ferron, J. M., & Johnson, A. H. (2023). Single-case intervention research design standards: Additional proposed upgrades and future directions. *Journal of School Psychology, 97*, 192–216. <https://doi.org/10.1016/j.jsp.2022.12.002>

**Abstract:** Single-case intervention research design standards have evolved considerably over the past decade. These standards serve the dual role of assisting in single-case design (SCD) intervention research methodology and as guidelines for literature syntheses within a particular research domain. In a recent article (Kratochwill et al., 2021), we argued for a need to clarify key features of these standards. In this article we offer additional recommendations for SCD research and synthesis standards that have been either underdeveloped or missing in the conduct of research and in literature syntheses. Our recommendations are organized into three categories: expanding design standards, expanding evidence standards, and expanding the applications and consistency of SCDs. The recommendations we advance are for consideration for future standards, research design training, and they are especially important to guide the reporting of SCD intervention investigations as they enter the literature-synthesis phase of evidence-based practice initiatives.

## LANGUAGE ASSESSMENT QUARTERLY

1. North, B., & Piccardo, E. (2023). Aligning Language Frameworks: An Example with the CLB and CEFR. *Language Assessment Quarterly*, 20(2), 143–165. <https://doi.org/10.1080/15434303.2023.2184266>

**Abstract:** This paper presents a methodology for directly aligning ‘can do’ frameworks to each other. The methodology, inspired by the manual for relating examinations to the *Common European Framework of Reference for Languages: Learning, teaching, assessment* (CEFR) (Council of Europe, 2009) and Kane’s (2004, 2013) interpretative argument, takes account of both the horizontal dimension (content analysis) and the vertical dimension (benchmarking with Multifaceted Rasch Modelling – MFRM). The paper exemplifies the application of the methodology by introducing the research conducted to align the *Canadian Language Benchmarks* (CLB)/ *Niveaux de compétence linguistique canadiens* (NCLC) to the CEFR, presenting the resulting alignment, and discussing the rationale for the choices made.

2. Chen, H., Cai, Y., & De La Torre, J. (2022). Investigating Second Language (L2) Reading Subskill Associations: A Cognitive Diagnosis approach. *Language Assessment Quarterly*, 20(2), 166–189. <https://doi.org/10.1080/15434303.2022.2140050>

**Abstract:** This study uses a cognitive diagnosis model (CDM) approach to investigate the associations among specific L2 reading subskills. Participants include 1,203 Year-4 English major college students randomly selected from the nationwide test takers of Band 8 of Test for English Majors (TEM8), a large-scale English proficiency test for senior English majors in China. Their English reading was measured using a reading comprehension subtest of the TEM8. Based on the CDM output on latent class size estimates, the chi-square test of independence was used to uncover the associations among reading subskills, and odds ratio estimation was used to determine the strengths of those associations. The CDM output on attribute mastery prevalence was used to establish the stochastic direction of the associations between reading subskills. The study has the following findings: a reading subskill network displaying significant subskill associations together with their strengths and directions can be established through a CDM approach, and the patterns of reading subskill associations based on cognitive levels and local/global comprehension resonate with major reading process models and reflect the hierarchical and compensatory characteristics of reading subskills.

3. Burton, J. D. (2022). Gazing into Cognition: Eye Behavior in Online L2 Speaking Tests. *Language Assessment Quarterly*, 20(2), 190–214. <https://doi.org/10.1080/15434303.2022.2143680>

**Abstract:** The effects of question or task complexity on second language speaking have traditionally been investigated using complexity, accuracy, and fluency measures. Response processes in speaking tests, however, may manifest in other ways, such as through nonverbal behavior. Eye behavior, in the form of averted gaze or blinking frequency, has been found to play an important role in regulating information in studies on human cognition, and it may therefore be an important

subconscious signal of test question difficulty in language testing. In this study, 15 CEFR B2/C1-level-English learners took a Zoom-based English test with ten questions spanning six CEFR complexity levels. The participants' eye behaviors were recorded and analyzed between the moment the test question ended and the beginning of their response. The participants additionally provided self-report data on their perceptions of test-question difficulty. Results indicated that as test questions increased in difficulty, participants were more likely to avert their gaze from the interlocutor. They did not, however, blink more frequently as difficulty changed. These results have methodological implications for research on test validation and the study of nonverbal behavior in speaking tests.

4. Grapin, S. E. (2022). Assessment of English learners and their peers in the content areas: Expanding What “Counts” as evidence of content learning. *Language Assessment Quarterly*, 20(2), 215–234. <https://doi.org/10.1080/15434303.2022.2147072>

**Abstract:** In this article, I argue for expanding what “counts” as evidence of content learning in the assessment of English learners (ELs) and their peers in the content areas. ELs bring expansive meaning-making resources to content classrooms that are valuable assets for meeting the ambitious learning goals of the latest K-12 education reform. Traditionally, however, the assessment of ELs in the content areas (e.g., science, language arts) has been pursued in restrictive ways, with a narrow focus on demonstrating learning through the written language modality and independent performance. This disconnect between the expansive meaning-making resources of ELs and the restrictive nature of content assessments limits ELs' opportunities to demonstrate what they know and can do and ultimately serves to perpetuate the deficit views of these students. I begin by providing contextual background on classroom assessment aligned to the latest standards in U.S. K-12 education. Then, I present two studies that illustrate two different expansive assessment approaches with ELs in elementary science: (a) multimodal assessment and (b) dynamic assessment. Finally, I highlight synergies of these studies with related research efforts across diverse contexts, toward the goal of developing a collective vision of expansive assessment that leverages ELs' expansive ways of making meaning.

## LINGUISTICS AND EDUCATION

1. Hurdus, J. (2023). The relational actor: How teachers in bilingual schools distribute their political agency. *Linguistics and Education*, 74, 101152. <https://doi.org/10.1016/j.linged.2023.101152>

**Abstract:** The growing interest in the individual agent in language-in-education policymaking comes at a time when theorists in multiple fields place ever more emphasis on the role of the relations between individuals in social production. In an attempt to reconcile both perspectives, I conduct a qualitative, egocentric policy network analysis to explore how teachers in American Spanish-English bilingual schools distribute their agency as they solve problems and design policy accordingly. Four patterns of agency distribution emerge: 1) partnership-sustained relational goods hinge on joint obligation, 2) teachers seek out knowledge and expertise from others in episodes of joint composing, 3) the participants limit their distribution of agency when undertaking acts of subversion, and 4) teachers enroll agents with power when instigating model-wide changes. These patterns suggest that agency-focused research that overlooks relations may underestimate the complexity of the policymaking process. The findings point to a need to complement scaled approaches to language planning with non-scalar methods as certain relational dynamics cannot be confined to a single layer of the policy apparatus. Finally, I offer added nuance to the notion of implementation and ideological space, highlighting that educators intentionally limit their distribution of agency in order to carve open space for subversive practices.

2. Ingram, M. (2023). A (dis)play on words: Emergent bilingual students' use of verbal jocularities as a channel of the translanguaging corriente. *Linguistics and Education*, 74, 101165. <https://doi.org/10.1016/j.linged.2023.101165>

**Abstract:** This study demonstrates how 3rd-grade Latin@ emergent bilingual students employed the use of types of *juegos de palabras*, or wordplay, within and across named languages to engage around the site of humor. Based on observations from their academic year, I employed ethnographic methods to delve into how these students created, participated in, and mobilized linguistic resources to implement intra- and inter-language play manifesting as multiple-meaning words, syllable reordering and punning within their mirthful interactions. By using a *translanguaging corriente* (García et al., 2017) framework to understand how this developed, I aspire to render visible their jocular practices of verbal adeptness with those in their classroom *community*. The implications that I suggest are that instances of mirth are a legitimate locus of Latin@ bilingual students' linguistic and cultural expression as well as a promising form of communication worth our attention as theorists and practitioners.

3. Zhang, Z., Heydon, R., Chen, L., Floyd, L., Ghannoum, H., Ibdah, S., Massouti, A., Shen, J., & Swesi, H. (2023). Family literacies during the COVID-19 lockdown: Semiotic assemblages and meaning making at home. *Linguistics and Education*, 74, 101166. <https://doi.org/10.1016/j.linged.2023.101166>

**Abstract:** When home became the primary place for children's learning during the COVID-19 lockdown, a dominant rhetoric emerged about a literacy-skills crisis, especially involving learners from low-income and culturally and linguistically

diverse families. By documenting the literacies practiced and the literacy-learning opportunities created in and among households during the lockdown in the spring and summer of 2020, this study turns this deficit-oriented rhetoric on its head. Conducted by parents with their children (aged 2-15), this collective biography found that during the lockdown households were forced into spaces that were physically constrained yet replete with a wide range of semiotic resources. Parents and children used these resources, which included multiple modes, media, and languages, to produce expansive literacies and literacy-learning opportunities. The present study offers suggestions about how to recognize and build on learners' linguistic, cultural, and semiotic repertoires in the creation of literacy curricula.

**Keywords:** Family literacies, Semiotic resources, Semiotic assemblage, Posthumanism, Learning at home COVID-19 pandemic

4. Björk, O., & Iyer, R. (2023). The dialogism of 'telling': Intertextuality and interdiscursivity in early school writing. *Linguistics and Education*, 74, 101168. <https://doi.org/10.1016/j.linged.2023.101168>

**Abstract:** Recently, Sweden has seen a rise in research concerning content and functional aspects of early school writing and has a tradition of form-orientated research. While this provides important insights, few studies still focus on dialogism in early school writing and on how students draw on experiences in writing. This study aims to shed light on the interplay between student experiences and their written texts in primary school writing instruction. Using intertextual and interdiscursive analysis, this study examines 38 student texts divided into two corpora and written concerning two different prompts. The prompts generated very different texts that showed a complex dialogism through the inner speech of the students. The intertextual and interdiscursive dialogues in the respective corpora draw on different conventions of writing and on different experiential worlds. The study further shows how heteroglossic centrifugal forces can work alongside monoglossic centripetal forces in the social practices of early school writing.

**Keywords:** Bakhtin, Dialogism, Early school writing, Register, Genre, Associative intertextuality, Interdiscursivity

## MATHEMATICAL THINKING AND LEARNING

1. Dvir, M., & Ben-Zvi, D. (2021). The double-edged sword of conjecturing. *Mathematical Thinking and Learning*, 25(2), 153–176. <https://doi.org/10.1080/10986065.2021.1940427>

**Abstract:** Employing a statistical modeling inspired pedagogy is becoming a widespread practice in the statistics education community. Many have incorporated the practice of formulating conjectures in their modeling-enhanced educational designs and have reported on its benefits. We further elucidate the mechanism through which students' conjecturing may be beneficial, in particular to their emergent reasoning with informal statistical models and modeling, as well as examine what challenges it may entail – the double-edged sword of conjecturing. We introduce a framework to describe young learners' reasoning with informal statistical models and modeling (RISM), in which students' conjecturing is represented as one of two parallel planes of model creation and refinement. We offer a case study of a pair of students' participation in an integrated modeling learning sequence, including both real-world modeling tasks and probability-world modeling tasks. The pair was chosen as both students held strong, opposing real-world conjectures. Our goal is to elucidate the roles these conjectures can play, for better or for worse, to fully harvest the pedagogical potential of conjecturing.

**Keywords:** Conjectures, informal statistical models and modeling, reasoning with statistical models and modeling, integrated modeling approach, statistics education

2. Parr, E. D. (2021). Undergraduate students' interpretations of expressions from calculus statements within the graphical register. *Mathematical Thinking and Learning*, 25(2), 177–207. <https://doi.org/10.1080/10986065.2021.1943608>

**Abstract:** The purpose of this study is to investigate how students interpret expressions from calculus statements in the graphical register. To this end, I conducted 150-minute clinical interviews with 13 undergraduate mathematics students who had completed at least one calculus course. In the interviews, students evaluated six calculus statements for various real-valued functions depicted in graphs in the Cartesian plane. From my analysis of these interviews, I found four distinct interpretations of expressions in the graphical register that students used in this study while evaluating the statements using the graphs. I describe the characteristics of these four interpretations, which I refer to as (1) nominal, (2) ordinal, (3) cardinal, and (4) magnitude. For some students, the use of these interpretations supported their graphical reasoning and correct evaluations of the statements. For other students, the use of some interpretations rather than others presented obstacles to their graphical understanding of the expressions in the statement. For instance, seven of the students never used a magnitude interpretation (interpreting an expression as a distance in the graph), even when working with difference expressions. I discuss implications of these findings for teaching with graphs across levels and directions for future research.

**Keywords:** graphs of functions, calculus, students' interpretations, mathematical expressions, graphical register

3. Campbell, T. G. (2021). Examining how middle grade mathematics students seize learning opportunities through conflict in small groups. *Mathematical Thinking and Learning*, 25(2), 208–231. <https://doi.org/10.1080/10986065.2021.1949529>

**Abstract:** Understanding how students develop learning opportunities through peer-to-peer interaction is vital for advancing research and practice on collaborative learning environments. This study investigated the discourse practices middle grade students utilized to resolve conflict in ways that promoted or inhibited learning opportunities. Seventy-seven middle grade students were audio/video recorded as they worked in groups of three on cognitively demanding mathematical tasks over three days. Analysis centered on the nature of learners' discourse practices within instances of small group conflict. The findings revealed 17 specific discourse practices which promote learning opportunities within conflict and six discourse practices which limit learning opportunities. Practitioners might leverage these findings by explicitly teaching and modeling the discourse practices which promote learning opportunities. Researchers might build upon the theoretical and methodological contributions of this study to examine promotive discourse practices under different constraints than were examined in the present analysis.

**Keywords:** Mathematics, collaborative learning, conflict, learning opportunities, commognition

4. Jung, H., & Magiera, M. T. (2021). Connecting mathematical modeling and social justice through problem posing. *Mathematical Thinking and Learning*, 25(2), 232–251. <https://doi.org/10.1080/10986065.2021.1966713>

**Abstract:** This paper contributes to accumulating the knowledge base about prospective elementary school teachers' (PTs') understanding of socio-critical modeling by exploring how PTs make connections to features of mathematical modeling and social justice while posing mathematical problems and reflecting on their problem-posing. We present a conceptual framework for posing problems that connect social justice issues with the features of mathematical modeling. Drawing on the analysis of 36 individual modeling problems generated by the PTs and 36 written reflections PTs completed throughout their problem-posing activity, we illustrate various ways in which PTs connect the multi-faceted features of mathematical modeling (i.e., realistic context, model development, and shareable process) and social justice (i.e., micro – and macro – level). The PT-posed problems were categorized as (a) modeling problems presenting micro – and macro-level social justice issues (27%), (b) modeling problems presenting micro-level social justice issues (22%), (c) contextualized mathematical problems presenting micro – and macro-level social justice issues (25%), and (d) contextualized mathematical problems presenting micro-level social justice issues (17%). Our work describing the complexity of posing social justice-oriented mathematical modeling (SJMM) problems and articulating decisions PTs make while posing SJMM problems set directions for future efforts and research in teacher preparation.

**Keywords:** Mathematical modeling, social justice, prospective teachers, problem posing

5. Newman, S. D., Loughery, E., Ecklund, A., Smothers, M., & Onger, J. (2021). Spatial training using game play in preschoolers improves computational skills. *Mathematical Thinking and Learning*, 1–7. <https://doi.org/10.1080/10986065.2021.1969866>

**Abstract:** Previous studies have found that block play results in better spatial ability which may lead to greater mathematical skills. The current study examined a specific type of block play, structured block play in which a copy of a block configuration is constructed. Structured block play is a difficult cognitive task that requires an understanding of spatial relations, hand-eye coordination, and spatial working memory among others. This preliminary study was designed to determine whether training using structured block play would lead to improvements in skills linked to mathematical thinking. Two groups of children participated in the study. One group played a competitive structured block building game once a week for 8 weeks. A control group was also tested. All participants completed a kindergarten readiness assessment before and after the 8-week period. Children in the block play group showed significant improvements in the computation module of the assessment, showing improvements in the *makes a set of objects smaller or larger* skills. No such effect was observed for the control group. The results presented demonstrate that young children can, with assistance, engage in structured block play and that they have cognitive benefits from such block building activities.

**Keywords:** Preschool, spatial play, computation

## PHYSICS EDUCATION

1. Pols, F., & Diepenbroek, P. (2023). Collaborative data collection: shifting focus on meaning making during practical work. *Physics Education*, 58(2), 023001. <https://doi.org/10.1088/1361-6552/acb395>

**Abstract:** In practical work focussing on conceptual development, students spend valuable in-class time on collecting data rather than making sense out of it. This provides a barrier to learning about the targeted concept. To address this problem, we developed an approach that we coin *collaborative data collection*. Using a practical on the topic *density*, we describe this approach and illustrate how the focus of practical work shifts away from mere data-collection towards meaning making. Although a single practical is described, the approach can be applied to other practicals as well.

2. Fäldt, Å., & Fredlund, T. (2023). The gyroscopic effect and moment of inertia. *Physics Education*, 58(2), 025001. <https://doi.org/10.1088/1361-6552/aca73a>

**Abstract:** This paper describes a lab to help students develop their understanding of rotational motion. The focus is on moment of inertia, which the students investigate by rolling cylinders down a ramp and determine in two different ways for a bicycle wheel. The most important and original part of the lab is the exploration of the gyroscopic effect, where measurements of precession and rotation frequencies are made using the variation of the detected magnetic field, enabling the calculation of the moment of inertia. The lab is received well by the students and can be done with relatively simple equipment easily accessible to them.

3. Fongsamut, K., Tanasittikosol, M., & Phaksunchai, M. (2022). Effectiveness of the simulation-based learning (SBL) assisted with scaffolding approach to address students' misconceptions about projectile motion. *Physics Education*, 58(2), 025002. <https://doi.org/10.1088/1361-6552/aca57d>

**Abstract:** This research studied the effectiveness of the simulation-based learning assisted with scaffolding approach to address students' misconceptions (MCs) about projectile motion. The five MCs were related to the direction of the force acting on an object (MC1), the acceleration of an object at the top of the trajectory (MC2), the directions of velocity and acceleration during projectile motion (MC3), the time of flight of objects (MC4), and the relationship between the range of projectile motion and angle of projection (MC5). This study was a pre-experimental design using both quantitative and qualitative data. The sample comprised 35 tenth-grade Thai high school students who were chosen using the cluster sampling technique. The teaching method consisted of three steps: a briefing, simulation, and debriefing. Each step was assisted with scaffolding to guide and help the students. The MCs tests consisted of five multiple-choice questions with a four-tier diagnostic test, and the tests were used as a pre-test, end-of-class test, and end-of-topic test. Six semi-structured interview questions were used to obtain in-depth data. The results indicated that MC1, MC2, MC3, MC4, and MC5 were addressed by 11.1%, 85.7%, 57.2%, 57.2%, and 61.5%, respectively, at the end-of-topic test. Students who had MCs in the pre-test changed their understanding of the concepts in MC2, MC3, MC4, and MC5 by 57.1%, 14.3%, 28.6%, and 53.8%, respectively. None of the MC students in MC1 understood the

concept at the end-of-topic test. Nevertheless, the overall results showed increased students' understanding of all conceptions.

4. Studnička, F., Šlégrová, L., Voglová, K., & Šlégr, J. (2022). Heat index, wet-bulb temperature and psychrometrics: what to expect in the 21st century. *Physics Education*, 58(2), 025003. <https://doi.org/10.1088/1361-6552/aca381>

**Abstract:** In recent years, the world has been facing extreme heat waves, breaking all previous records. Therefore, it is essential to emphasize teaching at least the basic knowledge of psychrometry and its impact on human health and well-being. In this paper, we explain several key concepts from the field of psychrometrics as well as instructions on how to assemble a wet-bulb thermometer easily. Methods for calculating heat index, dew point, and other quantities are also mentioned, whether using a wet-bulb thermometer or modern electronic sensors.

5. Rizal, R. (2022). Could the digital literacy of preservice physics teachers be improved by Learning Management System Supported Smartphone (LMS3) application in a physics online lecture? *Physics Education*, 58(2), 025004. <https://doi.org/10.1088/1361-6552/aca864>

**Abstract:** Digital literacy is a vital competency needed by physics teachers, so it should be trained through lectures using technology, one of which is LMS3. The study aims to describe the LMS3 implementation in school physics lectures to train digital literacy and elucidate an enhancement of prospective physics teachers' digital literacy in school physics lectures using LMS3. One-group pre-test–post-test design was conducted on 38 prospective physics teachers who enrolled in school physics lectures. The instruments consisted of digital literacy tests, lecture implementation forms, and interview guides. Besides, LMS3 is an application designed independently using the ADDIE (analysis, design, development, implementation, and evaluation) development model. The learning process using LMS3 occurred synchronously after the lecturer activated the learning process menu and adopted problem-based learning syntax. In general, the enhancement of digital literacy of prospective physics teachers after attending school physics lectures using LMS3 was the high category (N-gain = 0.72). In conclusion, school physics lectures using LMS3 had a significant impact on enhancing digital literacy. This study suggests developing lectures using various technologies that support the improvement of teacher competence in facing challenges in education.

6. Prasitpong, S., Phayphung, W., & Rakkapao, S. (2022). Investigate the physics of instant noodles in a hot cup using Arduino temperature sensors. *Physics Education*, 58(2), 025005. <https://doi.org/10.1088/1361-6552/aca863>

**Abstract:** The study explores the physics of cooking instant noodles in a hot cup using low-cost Arduino sensors developed as a thermocouple and an infrared thermometer. By pouring room temperature water onto a bag of calcium oxide (CaO) contained in the outside cup of the noodles, the exothermic reaction of CaO generates. Its energy is released into the water of the outside cup. This cooks the noodles, which are put into an inside cup. The amount of heat transferred to the water is measured. Moreover, the change in the temperature of the hot cooked noodles with time is investigated using Newton's law of cooling. The experiment using the Arduino

temperature sensors encourages undergraduate students to learn thermodynamics concepts from the instant noodles in a hot cup, primarily found in groceries.

7. Kiemeneij, W., De Putter Smits, L., & Koopman, M. M. (2022). Learning biophysics with open simulations. *Physics Education*, 58(2), 025006. <https://doi.org/10.1088/1361-6552/aca7f6>

**Abstract:** Physics education in secondary schools can include biophysics topics as electives. An open simulation based on a simulation like Minecraft for learning the workings of the action potential in human cells was designed and tested for students in upper secondary physics education. In small design and test cycles both the simulation engine and the classroom materials were developed. The simulation shows realistic results that go beyond the accompanying textbook. The finished prototype of the engine and the materials were used to study student reasoning during their simulation of the action potential. Results show that students reason together about what they see in the simulation to come to theories on the action potential process, showing profound learning. The students did not master the more open inquiry final assignment.

8. Dutra, R. S., Ataliba, J., Pimenta, A. D., Freitas, R. P., Felix, V. S., Gonçalves, E., Ferreira, D., & Pereira, L. O. (2023). Discussing the rotation movement of an electric whirl through mechanical modelling and video analysis. *Physics Education*, 58(2), 025007. <https://doi.org/10.1088/1361-6552/aca32>

**Abstract:** This paper performs a semi-quantitative and low-cost experiment, combining video analysis technique and mechanical modelling, to discuss the rotation movement of an electric whirl on the top of a well-known and popular electrostatic generator. To this end, we perform video analysis of the circular trajectory described by a given sharp point of the electric whirl arm. We propose a simple model to describe the inertia moment of the electric whirl in terms of simple geometries, like: cylinders, truncated cone, and one-dimensional linear arms. The analytical results for the inertia moment are validated using *SolidWorks* simulations and the electronic microscopy experimental technique. When considering a simple electrostatic model for the electric field around sharp points of the electric whirl arms, kinematic and dynamic analyses are used to estimate an upper bound for the magnitude of the electric charge pulled from the air, which results in the electric wind phenomenon.

9. Barnard, A. O., Reeder, S., & Kelly, T. (2023). Falling magnets through coils in series: design and activities. *Physics Education*, 58(2), 025008. <https://doi.org/10.1088/1361-6552/ac96bf>

**Abstract:** The aim of this article is to demonstrate an experimental apparatus that can be used to showcase ideas relating to electromagnetic induction (EMI). The apparatus is low-cost ('home-made') and consists of six N-turn coils wound and then joined electrically in series. The emf induced from a magnet falling through the center of the coils is then measured. From the data obtained, an accurate measurement of  $g$  can be found. However, the full data can also be analyzed to showcase some of the more subtle aspects of EMI that have been shown in the Physics Education literature to be sources of difficulty for students.

10. Echiburú, M., Hernández, C., & Pino, M. (2023). Teaching physics in real-life contexts: the Beirut explosion. *Physics Education*, 58(2), 025009. <https://doi.org/10.1088/1361-6552/acad5b>

**Abstract:** Teaching physics in real-life contexts continues to be a challenge for teachers at different educational levels. In this article, three context-rich problems are proposed to be implemented in the classroom for higher education, using the explosion that occurred in Beirut as a case study. These problems require the search and analysis of real data, integrating technologies as tools to learn physics. In particular, the analysis of images, videos, maps and audio recordings is suggested. The proposed activities are designed to promote active learning of classical mechanics subjects and the development of collaborative skills. The results of each problem allow a discussion based on scientific evidence in the classroom.

11. Juárez, E. C., & Guzmán, D. S. (2023). Learning science and engineering with electronic spreadsheets cycle: a methodological proposal. *Physics Education*, 58(2), 025010. <https://doi.org/10.1088/1361-6552/acad5a>

**Abstract:** In many science and engineering undergraduate programmes, physics courses are fundamental and can be seen as a potential place where students can develop complementary abilities such as the computational thinking process. The present work proposes and describes the learning science and engineering with electronic spreadsheets cycle (LSEESC) methodology to improve the learning of concepts in physics, science, and engineering, with the use of electronic spreadsheets as a digital and supported learning tool, promoting the understanding, critical thinking, and reasoning of physics in students based on activities such as the programming of all dynamical systems, describing mathematical evolution, generating and analysing graphics, and explaining physical phenomena with a high comprehension and transfer of knowledge to identify where the concept can be applied in their professional context using real-life examples or simulations. The proposed methodology can be implemented in different learning scenarios; that is, if the class uses computational devices or if the teacher exposes a specific topic in the classroom, physics and mathematics can be exposed to feedback from students in a comprehensible manner at any time during the instruction, after which a new sequence (cycle) based on previous results can be ejected and adapted. To describe the LSEESC methodology, we use the rigid body concept, which is one of the most general concepts in science and engineering and, integrates the majority of the fundamentals in mechanics, such as kinematics, forces, dynamics, and circular movement. This can be described as the concept of viewing all related equations and plotting the results with the relationships between all variables. The methodology uses simulations or real-life examples to reinforce the concept viewed, allowing students to see, in an integrated manner, how the same variables and concepts can be seen and interact in a real scenario for their professional context.

12. Kolhe, N., & Shetty, S. (2023). A novel cantenna based demonstration of frustrated total internal reflection as an analog for quantum tunnelling. *Physics Education*, 58(2), 025011. <https://doi.org/10.1088/1361-6552/acad59>

**Abstract:** We use a 'Cantenna' (portmanteau of 'Can' and 'Antenna'), which is a unidirectional homemade waveguide, coupled to a standard readily available, 2.4 GHz

Wi-Fi router as a source of microwaves to demonstrate Frustrated Total Internal reflection (FTIR) using paraffin-wax prisms. This largely inexpensive experiment provides an opportunity to demonstrate a process closely analogous to quantum tunnelling in an undergraduate physics lab. FTIR is often demonstrated with glass prisms and lasers, which may not allow for an intuitive understanding of evanescent waves and tunnelling. Wi-Fi signals with a wavelength of 12.5 cm, and large maneuverable prisms, allow the length of the 'barrier' to be changed in a tactile way where measurements could be taken with tools available in a standard physics lab.

13. Laumann, D., Ries, M., & Heusler, S. (2023). Everything can be magnetized: simulating diamagnetic and paramagnetic response of everyday materials in magnetic balance experiments. *Physics Education*, 58(2), 025012. <https://doi.org/10.1088/1361-6552/acad58>

**Abstract:** Magnetic properties are universal and inherent in all matter. While most experimental approaches focus on ferromagnetism and electromagnetism, few experiments exist to analyse diamagnetism and paramagnetism. To demonstrate these mostly unknown types of magnetic, magnetic balance experiments represent a simple and compelling approach. However, phenomenological experiments are not sufficient to develop a fundamental understanding of these types of magnetism. This paper presents an interactive simulation that can be used to complement magnetic balance experiments. It enables learners to understand diamagnetism and paramagnetism more deeply by incorporating interactive visual models gaining insights beyond the real experiments. Among other things, the simulation enables the analysis of substances without the possibility of detecting magnetic properties in real experiments, it visualizes the temporal evolution of magnetization and explains the influence of eddy currents.

14. Karakotsou, C., & Zafiriadis, I. (2023). Teaching uniform linear motion using an Arduino sensor and a smartphone device. *Physics Education*, 58(2), 025013. <https://doi.org/10.1088/1361-6552/acace2>

**Abstract:** In this work, we designed and implemented an Arduino-based experiment to study one-dimensional uniform linear motion. The position of a small vehicle running at a constant velocity in one dimension, is measured using an ultrasonic sensor. A Bluetooth module connected to an Arduino board is paired with a smartphone, where data are acquired and position vs time curves of the vehicle are plotted on the smartphone's screen. Students can share the experimental data via their smartphones and study uniform linear motion through guided experiments. The educational experience of the classroom implementation of the project is also presented. The results show that pairing an Arduino-based sensor with an android device, improves students' comprehension of motion, enhances their motivation and cultivates positive attitude and anticipation for the forthcoming science lessons.

15. Torcal-Milla, F. J. (2023). Oscillation period of the truncated simple pendulum. *Physics Education*, 58(2), 025014. <https://doi.org/10.1088/1361-6552/acaa80>

**Abstract:** In this manuscript, a non typical kind of simple pendulum called *Truncated Simple Pendulum* is analysed to obtain its oscillation period, frequency, and angular frequency. It is easily derived that its motion can be viewed as the concatenation of

two pendular movements with different lengths, contributing each one to half of the period of the complete oscillation. An analytical formulation is derived and corroborated with an experiment showing high agreement. This experiment could be interesting as a proposed exercise for the students or as a laboratory practical work. Besides, the gravity acceleration can be determined from each singular experiment and averaged to obtain it with lesser experimental error. In addition, it can be used to evaluate energy conservation theorem and small angle approximation (Law of isochronism) for the pendular oscillation. The level of the manuscript makes it appropriate for undergraduate students and introductory physics courses.

## SCHOOL EFFECTIVENESS AND SCHOOL IMPROVEMENT

1. Nan, X., & Chiu, S. W. (2022). The school matters: Hong Kong secondary schools' grade-retention composition, students' educational performance, and educational inequality. *School Effectiveness and School Improvement*, 1–18. <https://doi.org/10.1080/09243453.2022.2136210>

**Abstract:** In the face of Hong Kong's high grade-retention rates, this study aimed to investigate how Hong Kong secondary schools' grade-retention composition is associated with student performance and socioeconomic inequality in student performance. As the research questions involved analysis at the school and student levels, this study employed hierarchical linear modelling to analyse the Programme for International Student Assessment (PISA) 2018 data. While grade retention was often suggested to have a negative impact on repeaters' performance in studies using the same-age comparison strategy, this study found that a higher proportion of retained students at school was not associated with a reduction in students' performance. However, greater socioeconomic inequality in student achievement was found in schools with higher retention rates. In addition to providing plausible explanations for these findings, this paper discusses the potential role of the government's retention policies in these respects.

**Keywords:** Grade retention, school retention composition, educational inequality, educational performance, PISA 2018

2. Faber, J. M., Feskens, R., & Visscher, A. J. (2022). A best-evidence meta-analysis of the effects of digital monitoring tools for teachers on student achievement. *School Effectiveness and School Improvement*, 1–20. <https://doi.org/10.1080/09243453.2022.2142247>

**Abstract:** In this study the effects of the use of digital student monitoring tools for teachers (DMTs) on student achievement (primary and secondary schools, mathematics, reading, and language) were investigated through a meta-analysis ( $n = 14$ ). The studies were also coded for feedback and intervention features, which resulted in three groups of combinations of DMTs and interventions. The meta-analytic findings indicate that the use of a DMT overall has a moderate effect ( $ES = .12$ ) on student achievement for studies in which student achievement is measured by means of researcher-independent tests. Positive effects were also found for the use of DMTs in primary education ( $ES = .14$ ), reading ( $ES = .17$ ), mathematics ( $ES = .10$ ), and for two groups of DMT-intervention combinations ( $ES = .25$  and  $.13$ ). Our results are encouraging but should be interpreted with caution, given the small number of studies that met our stringent inclusion criteria.

**Keywords:** Meta-analysis, digital monitoring, feedback, effectiveness, teachers.

3. Steinmann, I., Strello, A., & Strietholt, R. (2023). The effects of early between-school tracking on gender segregation and gender gaps in achievement: a differences-in-differences study. *School Effectiveness and School Improvement*, 1–20. <https://doi.org/10.1080/09243453.2023.2165510>

**Abstract:** We investigated effects of tracking students into higher, more academic, and lower, less academic, school types immediately after primary school (early tracking) instead of having a comprehensive secondary school system (late tracking) on school gender segregation and gender gaps in achievement outcomes. We assumed that, in early tracking countries, girls are more frequently selected into more academic school types, which leads to more school segregation by gender and achievement advantages of girls over boys. In a differences-in-differences design, we compared secondary-school-level gender inequalities between early and late tracking countries, after controlling for primary-school-level differences. We investigated 787 country-by-year observations in 33 matches of primary- and secondary-school-level data sets from three international large-scale assessments. As expected, we found that early tracking increased the degree of school gender segregation. Not conforming to expectations, the evidence did not indicate that tracking had effects on gender gaps in achievement.

**Keywords:** Early tracking, late tracking, differences-in-differences, gender gaps, gender segregation

4. Yada, T., & Savolainen, H. (2023). Principal self-efficacy and school climate as antecedents of collective teacher efficacy. *School Effectiveness and School Improvement*, 1–17. <https://doi.org/10.1080/09243453.2023.2170425>

**Abstract:** The importance of collective teacher efficacy (CTE) has been increasingly emphasised, but few studies have focused on how it can be enhanced. Since CTE is assumed to be related to factors that differ between schools, the belief-shaping sources of CTE could be related to principals' beliefs of their efficacy. Moreover, a school climate that centralises teachers' attempts to improve student learning could enhance CTE. This paper examines a proposed analytical model that links principal self-efficacy (PSE) to CTE, as mediated by the school climate. The model is tested via a multilevel analysis with data from 70 Finnish schools and 767 educators. The analysis revealed that PSE is partially and indirectly related to CTE via the school climate at the school level. Based on these results, theoretical and practical implications for future research and teaching development efforts are discussed.

**Keywords:** Principal self-efficacy, school climate, collective teacher efficacy

5. Mejía-Rodríguez, A. M., & Kyriakides, L. (2023). Searching for the impact of national culture dimensions on student achievement: implications for educational effectiveness research. *School Effectiveness and School Improvement*, 1–21. <https://doi.org/10.1080/09243453.2023.2171068>

**Abstract:** To explore the wider educational environment included in the dynamic model of educational effectiveness, this paper reexamines the association between student achievement and two national culture dimensions: Monumentalism-Flexibility and Collectivism-Individualism. Using Programme for International Student Assessment (PISA) 2018 data of 317,127 students, 12,058 schools, and 41 countries, we evaluated three-level regression models controlling for students' socioeconomic status, gender, and grade; school's average socioeconomic status; and countries' wealth. The results of the multilevel regressions show significant negative associations of the two culture dimensions with student achievement in mathematics,

science, and reading. However, our models indicate that Monumentalism-Flexibility is a better predictor of student achievement in mathematics and science, and that there is variation in effect sizes across domains. Implications for educational effectiveness research are drawn.

**Keywords:** Educational effectiveness research, national context, cultural values, multilevel modeling, educational outcomes, international large-scale studies

6. Tuytens, M., Vekeman, E., & Devos, G. (2023). A focus on students' and teachers' learning through strategic human resource management. *School Effectiveness and School Improvement*, 1–24. <https://doi.org/10.1080/09243453.2023.2172049>

**Abstract:** The importance of strategic planning and human resource management (SHRM) for school effectiveness and improvement has been stressed. Yet, research shows that both are challenging aspects of school management. This qualitative study explores (a) the role of strategic planning in SHRM and (b) the link between SHRM and the factors that stimulate teachers' professional learning. Based on 194 semistructured interviews with school leaders and team members, a comparative analysis between excellent and moderate strategic schools was conducted. The results reveal that excellent strategic schools distinguish themselves through strategic planning that focuses on core aspects of students' learning and a working environment that is characterized by a highly motivated teacher team and various chances for teachers to learn from each other. The study provides an insight into how a "learning-focused" working environment can be enhanced by enacting a set of human resource practices.

**Keywords:** Strategic human resource managementstrategic planningprofessional learning.

## SCIENCE EDUCATION

1. Mikeska, J. N., Cisterna, D., Lakhani, H., Bookbinder, A. K., Myers, D. L., & Vaval, L. (2022). Examining elementary science teachers' responses to assessments tasks designed to measure their content knowledge for teaching about matter and its interactions. *Science Education*, 107(3), 572–608. <https://doi.org/10.1002/sce.21779>

**Abstract:** Despite the importance of developing elementary science teachers' content knowledge for teaching (CKT), there are limited assessments that have been designed to measure the full breadth of their CKT at scale. Our overall research project addressed this gap by developing an online assessment to measure elementary preservice teachers' CKT about matter and its interactions. This study, which was part of our larger project, reports on findings from one component of the item development process examining the construct validity of 118 different CKT about matter assessment items. In this study, 86 elementary teachers participated in cognitive interviews to examine: (a) the knowledge and reasoning they used when responding to these CKT about matter assessment items and (b) the nature of the content challenges and the content teaching challenges they encountered. Findings showed that over 80% of participant interview responses indicated that the CKT about matter items functioned as hypothesized, providing evidence to support future use of these items on a large-scale assessment and in studies of science teachers' CKT. When responding to the items, participants showed evidence of four main challenges with the science content: (a) using scientific concepts to reason about science tasks, (b) using adequate evidence to reason about science phenomenon, (c) drawing upon examples of scientific phenomena, and (d) drawing upon science vocabulary. Findings also showed that participants experienced challenges regarding the following content teaching aspects when responding to these items: (a) connecting to key scientific concepts involved in the work of teaching science, (b) attending to instructional goal(s), and (c) recognizing features of grade-level appropriateness. Implications for using CKT items as part of large-scale science assessment systems and identifying areas to target in elementary science teachers' CKT development are addressed.

2. Ruppert, J., Bartlett, P., & Infante, M. (2022). vAIR—An epistemic model of socioscientific reasoning emerging from citizens engaged in a locally situated SSI. *Science Education*, 107(3), 609–650. <https://doi.org/10.1002/sce.21782>

**Abstract:** Engagement with socioscientific issues (SSI) has emerged as an important focus for science education. SSI have been successfully used to teach science concepts, but they also serve a role in helping learners develop a capacity to engage with science in everyday life. Here we present an epistemic framework for characterizing socioscientific reasoning (SSR), called the vAIR framework standing for virtuous Aims, Ideals, and Reasoning Practices. vAIR is a modification of the AIR framework for epistemic cognition. The “virtuous” framing of vAIR is to align with the language of Sosa's virtue epistemology, reflecting a capacity to engage in reasoning that promotes a collective praxis/enterprise. vAIR was developed from a study of citizens engaged in an authentic SSI to offer a deeper authenticity than might be achieved in the study of a classroom. The goal was to better understand the ontologically distinct components of SSR, as well as gain a better understanding of what “constructive” SSR might look like in the context of collective praxis/enterprise

in the everyday world. The findings are presented through a series of vignettes that capture the rich detail of the context as well as the nuances between the dimensions of the vAIR model. vAIR, we argue, can serve as a tool for scaffolding the development and assessment of SSR in classrooms.

3. Cerda-Smith, J., Joy, A., Mathews, C. J., Knox, J., & Mulvey, K. L. (2023b). STEM-related outcomes for adolescents with differing perceptions of school racial climate: A latent class analysis. *Science Education*, *107*(3), 651–676. <https://doi.org/10.1002/sce.21784>

**Abstract:** Racially minoritized groups are underrepresented in science, technology, engineering, and math (STEM) degree programs and careers, warranting the need to examine students' racialized experiences in K-12 settings that may influence their STEM persistence. In particular, the current study explored adolescent perceptions of school racial climate (SRC) as a potential contributor to pre-college racial disparities in STEM. We used latent class analysis to group adolescents based on their SRC perceptions and explored group differences in their interest in a STEM career and their belonging, psychological needs satisfaction, and engagement in STEM courses. Adolescent participants ( $N=412$ , 50.2% female, 36.9% male, 12.9% other/not reported,  $M_{\text{age}} = 15.72$  years, standard deviation = 1.24) attending five high schools in the Southeastern United States, were grouped into five classes based on their perceptions of SRC: Critical SRC (CritSRC), Average SRC, Average with Stereotyping, Positive SRC (PosSRC), and Positive with Stereotyping. Latent class membership differed by race, age, and learning environment. Results revealed that students with more positive perceptions of SRC reported greater belonging, engagement, and needs satisfaction in their STEM courses and more interest in a STEM career compared to students with CritSRC perceptions. Findings also indicated that White students were more likely than Black students to perceive a PosSRC. Recommendations for areas of future research and policy implications are discussed.

4. Žák, V., & Kolář, P. (2023). Physics curriculum in upper secondary schools: What leading physicists want. *Science Education*, *107*(3), 677–712. <https://doi.org/10.1002/sce.21785>

**Abstract:** This paper explores the views of leading Czech physicists regarding a physics curriculum for upper secondary schools. This paper presents the first part of an effort to define starting points for a new physics curriculum in Czechia (subsequent phases would analyze the opinions of other scientists, education experts, and physics teachers regarding the physicists' ideas) and create a new physics textbook for upper secondary schools. The methodology was inspired especially by the objectivist grounded theory. We conducted in-depth interviews about the upper secondary physics curriculum with 29 leading Czech physicists and identified 56 ideas (categories) that they agreed on (according to the interview analysis). Subsequently, a questionnaire was created based on these 56 ideas. Two years later, the same group of physicists were asked to express their opinions on the ideas on a 7-point Likert scale. The new survey sought to clarify the relevance and permanence of the ideas, and the physicists' willingness to collaborate on constructing a physics curriculum for upper secondary schools. Four core categories—students, physics, context, and math—were identified through a comparison of the relevance of the ideas. Additionally, we compared the questionnaire answers of a physicist with their opinions during the

interview and identified 43 ideas as permanent (in the 2-year interval). Surprisingly, 26 of the 29 researchers in the initial study completed the subsequent questionnaire survey and 13 among these expressed their willingness to contribute to the development of a physics textbook for upper secondary schools.

5. Wright, G. W., & Delgado, C. (2023). Generating a framework for gender and sexual diversity-inclusive STEM education. *Science Education*, 107(3), 713–740. <https://doi.org/10.1002/sce.21786>

**Abstract:** Students who identify as LGBTQ continue to report feelings of being unsafe at school because of their sexual orientation, gender identity, and gender expression. Access to a gender and sexual diversity (GSD)-inclusive curriculum and supportive teachers may positively improve the school climate for LGBTQ students, but these supports are often not included in STEM classrooms. One response is to ensure that STEM teachers are prepared to integrate GSD-inclusive STEM teaching into their classrooms. This review systematically analyzed the literature on supporting and affirming GSD in K-12 and higher education STEM education contexts. The 81 selected studies were qualitatively analyzed using inductive thematic analysis and epistemic network analysis, and the findings showed that GSD-inclusive STEM education literature coheres around six highly related constructs: Heteronormativity, Social Justice, Epistemic Knowledge of Science and Inquiry, Identity, Embodiment, and GSD language. Identifying these constructs, and the connections among them, led to the generation of an operational framework of GSD-inclusive STEM teaching that can inform and guide STEM teacher education programs and STEM teacher professional development to develop STEM educators' equity literacy around GSD to foster bias-free, equitable, inclusive STEM classrooms.

6. Tang, K. (2023). The characteristics of diagrams in scientific explanations: Multimodal integration of written and visual modes of representation in junior high school textbooks. *Science Education*, 107(3), 741–772. <https://doi.org/10.1002/sce.21787>

**Abstract:** There is a growing research examining the use of visual diagrams in scientific explanations. However, current research in this area is mostly based on case studies involving a few explanations from one or two topics in science. There are few systematic studies that examine more broadly how diagrams are used in relation to scientific explanations across a range of scientific texts. The aim of this study is to investigate the characteristics of diagrams in scientific explanations found in Grade 7–10 science textbooks covering many topics in biology, chemistry, earth and space sciences, and physics. The study is informed by the theories of systemic functional linguistics and social semiotics and applies a mixed methods approach to textbook analysis. A content analysis was first carried out to systematically identify the image functions (e.g., narrative, analytical, classificational) in all the diagrams ( $N = 749$ ) and compare their distributions across different genres (e.g., explanation, information, experiment). This is followed by a multimodal discourse analysis to understand how the various image functions are combined with the linguistic features of the written text in the construction of scientific explanations. Quantitative results reveal explanation diagrams are characteristically different from diagrams used in other genres in terms of a higher usage of narrative function, temporal function, and annotated caption. Qualitative results further show how these image functions are typically used to support the reasoning of the explanation focusing on dynamic

processes and time-bounded sequences. This study has implications to our understanding of how diagrams are used to support the construction of scientific explanations.

7. Rutt, A., & Mumba, F. (2022). Examining preservice science teachers' implementation of language- and literacy-integrated science through a cultural historical activity theory lens. *Science Education*. <https://doi.org/10.1002/sce.21775>

**Abstract:** The increasing attention in science education reform documents to language and literacy, coupled with the growing linguistic diversity of United States classrooms, means that science teacher educators and researchers are facing an important task of preparing secondary science preservice teachers (PSTs) to teach a language- and literacy-integrated form of science in linguistically diverse classrooms. Unfortunately, research in this field is in its nascency, and while some studies have addressed PSTs' instructional planning for and implementation of language- and literacy-integrated science instruction, none have considered the unique contextual factors that inform PSTs' uptake of these reform-oriented instructional practices, despite many studies suggesting student-teaching contexts are a key factor in PSTs' instructional decisions. The purpose of this multiple case study was to consider the unique contextual factors that supported and constrained three PSTs' uptake of language- and literacy-integrated science practices through a Cultural-Historical Activity Theory (CHAT) lens. Findings indicated that PSTs' implementation of language- and literacy-integrated science instruction was shaped by interactions among the mediating elements of their student teaching activity systems, including PSTs' division of labor with mentor teachers, the classroom and school norms, PSTs' perceptions of their classroom communities, and PSTs' past life experiences and resources. These findings highlight the roles that different elements of learning-to-teach contexts can play in PSTs' enactment of reform-oriented instruction. Implications for science teacher education, instruction for emergent bilinguals, and research are discussed.

8. Hohenstein, J., & Tenenbaum, H. R. (2022). Family conversations about species change as support for children's developing understandings of evolution. *Science Education*, 107(3), 810–834. <https://doi.org/10.1002/sce.21783>

**Abstract:** To examine the ways that 6- to 11-year-old children's conversation with their parents support their developing understandings of evolution, 49 parent–child dyads participated in a study with two elicited discussion tasks: origins of species and potential species change. Conversational data were transcribed, coded, and qualitatively and quantitatively analyzed to compare the appearance of reasoning in each type of task. Quantitative analyses revealed correlations between tasks in informed naturalistic reasoning as well as differences in the way reasoning was expressed in each task. In addition, parent–child dyads with older children were more likely to use informed naturalistic reasoning than parent–child dyads with younger children. A subset of the data was analyzed qualitatively and showed that irrespective of how much evolution reference was present in the conversation, parents supported their children's learning through scaffolding. However, greater amounts of nonscientific reasoning appeared in the groups with less evolution talk. This study demonstrates that family talk about evolution varies with context both within and between families.

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