David F Treagust

List of Publications by Year
in descending order

246 papers	11,474 citations	36203 51 h-index	37111 96 g-index
252 all docs	252 docs citations	252 times ranked	4083 citing authors

#	Article	IF	Citations
1	Conceptual change: A powerful framework for improving science teaching and learning. International Journal of Science Education, 2003, 25, 671-688.	1.0	782
2	Development and use of diagnostic tests to evaluate studentsâ€™ misconceptions in science. International Journal of Science Education, 1988, 10, 159-169.	1.0	522
3	Inquiry in science education: International perspectives. Science Education, 2004, 88, 397-419.	1.8	512
4	A typology of school science models. International Journal of Science Education, 2000, 22, 1011-1026.	1.0	375
5	Secondary students' mental models of atoms and molecules: Implications for teaching chemistry. Science Education, 1996, 80, 509-534.	1.8	325
6	Students' understanding of the role of scientific models in learning science. International Journal of Science Education, 2002, 24, 357-368.	1.0	281
7	Learning about atoms, molecules, and chemical bonds: A case study of multiple-model use in grade 11 chemistry. Science Education, 2000, 84, 352-381.	1.8	266
8	The role of submicroscopic and symbolic representations in chemical explanations. International Journal of Science Education, 2003, 25, 1353-1368.	1.0	266
9	Current Realities and Future Possibilities: Language and science literacyâ€"empowering research and informing instruction. International Journal of Science Education, 2006, 28, 291-314.	1.0	261
10	Learning in Science â€" From Behaviourism Towards Social Constructivism and Beyond. , 1998, , 3-25.		234
11	Diagnosing secondary students' misconceptions of photosynthesis and respiration in plants using a two-tier multiple choice instrument. Journal of Biological Education, 1987, 21, 203-211.	0.8	209
12	Conceptual change: a discussion of theoretical, methodological and practical challenges for science education. Cultural Studies of Science Education, 2008, 3, 297-328.	0.9	192
13	A multidimensional framework for interpreting conceptual change events in the classroom. Science Education, 1997, 81, 387-404.	1.8	182
14	The development of a two-tier multiple-choice diagnostic instrument for evaluating secondary school studentsâ€™ ability to describe and explain chemical reactions using multiple levels of representation. Chemistry Education Research and Practice, 2007, 8, 293-307.	1.4	178
15	Development and application of a diagnostic instrument to evaluate grade-11 and -12 students' concepts of covalent bonding and structure following a course of instruction. Journal of Research in Science Teaching, 1989, 26, 301-314.	2.0	168
16	Teaching with analogies: A case study in grade-10 optics. Journal of Research in Science Teaching, 1993, 30, 1291-1307.	2.0	152
17	Conceptual difficulties experienced by senior high school students of electrochemistry: Electric circuits and oxidation-reduction equations. Journal of Research in Science Teaching, 1992, 29, 121-142.	2.0	148
18	Conceptual difficulties experienced by senior high school students of electrochemistry: Electrochemical (galvanic) and electrolytic cells. Journal of Research in Science Teaching, 1992, 29, 1079-1099.	2.0	143

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19	Exploring conceptual change in genetics using a multidimensional interpretive framework. Journal of Research in Science Teaching, 1998, 35, 1031-1055.	2.0	142
20	Investigation of secondary school, undergraduate, and graduate learners' mental models of ionic bonding. Journal of Research in Science Teaching, 2003, 40, 464-486.	2.0	139
21	Investigating a grade 11 student's evolving conceptions of heat and temperature. Journal of Research in Science Teaching, 1999, 36, 55-87.	2.0	127
22	Grade-12 students' misconceptions of covalent bonding and structure. Journal of Chemical Education, 1989, 66, 459.	1.1	125
23	Evaluating Secondary Studentsâ€™ Scientific Reasoning in Genetics Using a Twoâ€Tier Diagnostic Instrument. International Journal of Science Education, 2010, 32, 1073-1098.	1.0	119
24	Development of an instrument for assessing classroom psychosocial environment at universities and colleges. Studies in Higher Education, 1986, 11, 43-54.	2.9	117
25	Validity and use of an instrument for assessing classroom psychosocial environment in higher education. Higher Education, 1986, 15, 37-57.	2.8	117
26	The Complexity of Teaching and Learning Chemical Equilibrium. Journal of Chemical Education, 1999, 76, 554.	1.1	117
27	Understanding needs embodiment: A theoryâ€guided reanalysis of the role of metaphors and analogies in understanding science. Science Education, 2012, 96, 849-877.	1.8	115
28	Teaching Science Effectively With Analogies: An Approach for Preservice and Inservice Teacher Education. Journal of Science Teacher Education, 1998, 9, 85-101.	1.4	114
29	Development and application of a two-tier multiple choice diagnostic instrument to assess high school students' understanding of inorganic chemistry qualitative analysis. Journal of Research in Science Teaching, 2002, 39, 283-301.	2.0	111
30	Using an analogical teaching approach to engender conceptual change. International Journal of Science Education, 1996, 18, 213-229.	1.0	105
31	Introduction: Macro, Submicro and Symbolic Representations and the Relationship Between Them: Key Models in Chemical Education. Models and Modeling in Science Education, 2009, , 1-8.	0.6	105
32	Science teachersâ€™ use of analogies: observations from classroom practice. International Journal of Science Education, 1992, 14, 413-422.	1.0	103
33	Evaluating students' misconceptions by means of diagnostic multiple choice items. Research in Science Education, 1986, 16, 199-207.	1.4	102
34	An interpretive examination of high school chemistry teachers' analogical explanations. Journal of Research in Science Teaching, 1994, 31, 227-242.	2.0	92
35	An Investigation into the Relationship between Studentsâ€™ Conceptions of the Particulate Nature of Matter and their Understanding of Chemical Bonding. International Journal of Science Education, 2008, 30, 1531-1550.	1.0	91
36	Teaching and Learning with Analogies. , 2006, , 11-24.		87

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37	The modelling ability of non-major chemistry students and their understanding of the sub-microscopic level. Chemistry Education Research and Practice, 2007, 8, 274-292.	1.4	86
38	Modelling in Science Lessons: Are There Better Ways to Learn With Models?. School Science and Mathematics, 1998, 98, 420-429.	0.5	83
39	Learners' Mental Models of Chemical Bonding. Research in Science Education, 2001, 31, 357-382.	1.4	82
40	Genetics Reasoning with Multiple External Representations. Research in Science Education, 2003, 33, 111-135.	1.4	79
41	Students' understanding of light and its properties: Teaching to engender conceptual change. Science Education, 1992, 76, 653-672.	1.8	74
42	Learners' mental models of metallic bonding: A cross-age study. Science Education, 2003, 87, 685-707.	1.8	74
43	Understanding genetics: Analysis of secondary students' conceptual status. Journal of Research in Science Teaching, 2007, 44, 205-235.	2.0	72
44	Using Large-scale Assessment Datasets for Research in Science and Mathematics Education: Programme for International Student Assessment (PISA). International Journal of Science and Mathematics Education, 2007, 5, 591-614.	1.5	66
45	Correct Interpretation of Chemical Diagrams Requires Transforming from One Level of Representation to Another. Research in Science Education, 2008, 38, 463-482.	1.4	64
46	Students' Understanding of the Descriptive and Predictive Nature of Teaching Models in Organic Chemistry. Research in Science Education, 2004, 34, 1-20.	1.4	61
47	Learning bioscience in nursing education: perceptions of the intended and the prescribed curriculum. Learning in Health and Social Care, 2005, 4, 203-216.	0.6	60
48	A stratified study of studentsâ€™ understanding of basic optics concepts in different contexts using twoâ€tier multipleâ€choice items. Research in Science and Technological Education, 2009, 27, 253-265.	1.4	60
49	The role of cognitive factors in chemistry achievement. Journal of Research in Science Teaching, 1987, 24, 145-160.	2.0	59
50	The nature and extent of analogies in secondary chemistry textbooks. Instructional Science, 1994, 22, 61-74.	1.1	58
51	An Evaluation of a Teaching Intervention to Promote Studentsâ€™ Ability to Use Multiple Levels of Representation When Describing and Explaining Chemical Reactions. Research in Science Education, 2008, 38, 237-248.	1.4	57
52	Introduction to Multiple Representations: Their Importance in Biology and Biological Education. Models and Modeling in Science Education, 2013, , 3-18.	0.6	57
53	Learning to teach primary science through problem-based learning. Science Education, 1998, 82, 215-237.	1.8	56
54	In search of explanatory frameworks: an analysis of Richard Feynman's lecture 'Atoms in motion'. International Journal of Science Education, 2000, 22, 1157-1170.	1.0	55

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55	Title is missing!. Research in Science Education, 2001, 31, 589-615.	1.4	55
56	Images of electricity: how do novices and experts model electric current?. International Journal of Science Education, 1996, 18, 163-178.	1.0	54
57	Identification of secondary students' misconceptions of covalent bonding and structure concepts using a diagnostic instrument. Research in Science Education, 1986, 16, 40-48.	1.4	52
58	Student Achievement and Science Curriculum Development Using a Constructive Framework. School Science and Mathematics, 1991, 91, 172-176.	0.5	52
59	The evolution of an approach for using analogies in teaching and learning science. Research in Science Education, 1993, 23, 293-301.	1.4	50
60	Student perceptions of the social constructivist classroom. Science Education, 1997, 81, 561-575.	1.8	49
61	Studentsâ€™ attitudes, self-efficacy and experiences in a modified process-oriented guided inquiry learning undergraduate chemistry classroom. Chemistry Education Research and Practice, 2017, 18, 340-352.	1.4	49
62	Analogies in chemistry textbooks. International Journal of Science Education, 1995, 17, 783-795.	1.0	48
63	The role of analogies in promoting conceptual change in biology. Instructional Science, 1996, 24, 295-320.	1.1	48
64	The development of an instrument for assessing students' perceptions of teachers' knowledge. International Journal of Science Education, 2000, 22, 385-398.	1.0	48
65	Studentsâ€™ perceptions of the role of models in the process of science and in the process of learning. Research in Science and Technological Education, 2005, 23, 195-212.	1.4	48
66	How Can Conceptual Change Contribute to Theory and Practice in Science Education?. , 2012, , 107-118.		48
67	Achieving Greater Feedback and Flexibility Using Online Pre-Laboratory Exercises with Non-Major Chemistry Students. Journal of Chemical Education, 2007, 84, 884.	1.1	44
68	Research data necessary for meaningful review of grade ten high school genetics curricula. Journal of Research in Science Teaching, 1984, 21, 197-209.	2.0	43
69	Chemistry: A matter of understanding representations. Advances in Research on Teaching, 0, , 239-267.	0.2	43
70	Using Exploratory Talk to Enhance Problem-solving and Reasoning Skills in Grade-7 Science Classrooms. Research in Science Education, 2006, 36, 381-401.	1.4	43
71	Studentsâ€™ Learning Strategies With Multiple Representations: Explanations of the Human Breathing Mechanism. Science Education, 2014, 98, 840-866.	1.8	43
72	Using assessment as a guide in teaching for understanding: A case study of a middle school science class learning about sound. Science Education, 2001, 85, 137-157.	1.8	42

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73	The Particulate Nature of Matter: Challenges in Understanding the Submicroscopic World. , 2002, , 189-212.		42
74	EVALUATING STUDENTSâ€™ UNDERSTANDING OF KINETIC PARTICLE THEORY CONCEPTS RELATING TO THE STATES OF MATTER, CHANGES OF STATE AND DIFFUSION: A CROSS-NATIONAL STUDY. International Journal of Science and Mathematics Education, 2010, 8, 141-164.	1.5	42
75	Secondary Students' Understanding of Gravity and the Motion of Planets. School Science and Mathematics, 1989, 89, 380-391.	0.5	40
76	Towards a Coherent Model for Macro, Submicro and Symbolic Representations in Chemical Education. Models and Modeling in Science Education, 2009, , 333-350.	0.6	40
77	Implications of research on studentsâ€™ understanding of electrochemistry for improving science curricula and classroom practice. International Journal of Science Education, 1990, 12, 147-156.	1.0	39
78	Title is missing!. Instructional Science, 2001, 29, 45-85.	1.1	39
79	Exploring Tertiary Students' Understanding of Covalent Bonding. Research in Science and Technological Education, 2002, 20, 241-267.	1.4	39
80	Assessing Studentsâ€™ Conceptual Understanding in Science: An introduction about a national project in Taiwan. International Journal of Science Education, 2007, 29, 379-390.	1.0	39
81	Studentsâ€™ understanding of boiling points and intermolecular forces. Chemistry Education Research and Practice, 2009, 10, 265-272.	1.4	39
82	Evaluation of Studentsâ€™ Understanding of Thermal Concepts in Everyday Contexts. International Journal of Science Education, 2012, 34, 1509-1534.	1.0	38
83	A comparative analysis of analogies in secondary biology and chemistry textbooks used in Australian schools. Research in Science Education, 1995, 25, 221-230.	1.4	36
84	Analogies in Biology Education: A Contentious Issue. American Biology Teacher, 1997, 59, 282-287.	0.1	35
85	The Taiwan National Science Concept Learning Study in an International Perspective. International Journal of Science Education, 2007, 29, 391-403.	1.0	35
86	A historical analysis of electric currents in textbooks: A century of influence on physics education. Science and Education, 1994, 3, 131-154.	1.7	33
87	The Efficacy of Problem-based Learning in an Analytical Laboratory Course for Pre-service Chemistry Teachers. International Journal of Science Education, 2014, 36, 79-102.	1.0	33
88	Immersive virtual reality for science learning: Design, implementation, and evaluation. Studies in Science Education, 2023, 59, 205-244.	3.4	32
89	Conceptual change in learning genetics: an ontological perspective. Research in Science and Technological Education, 2004, 22, 185-202.	1.4	31
90	Conceptual Change: Still a Powerful Framework for Improving the Practice of Science Instruction. , 2012, , 43-54.		31

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91	Conflict within dyadic interactions as a stimulant for conceptual change in physics. International Journal of Science Education, 1987, 9, 203-216.	1.0	30
92	A brief history of a science teacher professional development initiative in Indonesia and the implications for centralised teacher development. International Journal of Educational Development, 2003, 23, 201-213.	1.4	30
93	Relationship between affect and achievement in science and mathematics in Malaysia and Singapore. Research in Science and Technological Education, 2012, 30, 225-237.	1.4	29
94	Teachers' Thoughts about Changing to Constructivist Teaching/Learning Approaches within Junior Secondary Science Classrooms. Journal of Education for Teaching, 1994, 20, 97-112.	1.1	27
95	A case study of two exemplary biology teachers. Journal of Research in Science Teaching, 1991, 28, 329-342.	2.0	26
96	Students' dilemmas in reaction stoichiometry problem solving: deducing the limiting reagent in chemical reactions. Chemistry Education Research and Practice, 2009, 10, 14-23.	1.4	26
97	Prospective pedagogy for teaching chemical bonding for smart and sustainable learning. Chemistry Education Research and Practice, 2014, 15, 435-446.	1.4	26
98	Understanding interactions in face-to-face and remote undergraduate science laboratories: a literature review. Disciplinary and Interdisciplinary Science Education Research, 2019, 1, .	1.6	26
99	Evaluation of an intervention instructional program to facilitate understanding of basic particle concepts among students enrolled in several levels of study. Chemistry Education Research and Practice, 2011, 12, 251-261.	1.4	25
100	Analytical framework for student-generated drawings. International Journal of Science Education, 2019, 41, 2296-2322.	1.0	25
101	Examining the construction process: A study of changes in level 10 students' understanding of classical mechanics. Journal of Research in Science Teaching, 1997, 34, 571-593.	2.0	24
102	Adjusting claims as new evidence emerges: Do students incorporate new evidence into their scientific explanations?. Journal of Research in Science Teaching, 2018, 55, 526-549.	2.0	24
103	What do students really learn from interactive multimedia? A physics case study. American Journal of Physics, 2004, 72, 1351-1358.	0.3	23
104	Application of a conceptual conflict teaching strategy to enhance student learning of acids and bases. Research in Science Education, 1988, 18, 53-63.	1.4	22
105	SECURING A FUTURE FOR CHEMICAL EDUCATION. Chemistry Education Research and Practice, 2004, 5, 5-14.	1.4	22
106	The effect of integrated course and faculty development: Experiences of a university chemistry department in the Philippines. International Journal of Science Education, 2005, 27, 985-1006.	1.0	21
107	Secondary Studentsâ€™ Stable and Unstable Optics Conceptions Using Contextualized Questions. Journal of Science Education and Technology, 2014, 23, 238-251.	2.4	21
108	Science Teacher Education in Australia: Initiatives and Challenges to Improve the Quality of Teaching. Journal of Science Teacher Education, 2015, 26, 81-98.	1.4	21

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109	A review of teacher development reforms in Indonesian secondary science: The effectiveness of practical work in biology. Research in Science Education, 1997, 27, 581-597.	1.4	20
110	The Status of Science Classroom Learning Environments in Indonesian Lower Secondary Schools. Learning Environments Research, 2004, 7, 43-63.	1.8	20
111	A sustained multidimensional conceptual change intervention in grade 9 and 10 science classes. International Journal of Science Education, 2020, 42, 703-721.	1.0	20
112	Student misconceptions about light: A comparative study of prevalent views found in Western Australia, France New Zealand, Sweden and the United States. Research in Science Education, 1987, 17, 156-164.	1.4	19
113	Developing preservice teachers' pedagogical reasoning ability. Research in Science Education, 1995, 25, 291-305.	1.4	19
114	Motivational Aspects of Learning Genetics with Interactive Multimedia. American Biology Teacher, 2004, 66, 277.	0.1	19
115	Compatibility between cultural studies and conceptual change in science education: there is more to acknowledge than to fight straw men!. Cultural Studies of Science Education, 2008, 3, 387-395.	0.9	19
116	Is it harder to know or to reason? Analyzing two-tier science assessment items using the Rasch measurement model. Asia-Pacific Science Education, 2015, 1, .	0.7	19
117	Primary School Teachersâ€™ Understanding of Science Process Skills in Relation to Their Teaching Qualifications and Teaching Experience. Research in Science Education, 2017, 47, 257-281.	1.4	19
118	An Investigation of Science Teaching Practices in Indonesian Rural Secondary Schools. Research in Science Education, 2004, 34, 455-474.	1.4	18
119	Emphasizing Multiple Levels of Representation To Enhance Students' Understandings of the Changes Occurring during Chemical Reactions. Journal of Chemical Education, 2009, 86, 1433.	1.1	18
120	Assessment of electrochemical concepts: a comparative study involving senior high-school students in Indonesia and Japan. Research in Science and Technological Education, 2011, 29, 169-188.	1.4	18
121	UNDERSTANDING ACIDâ€"BASE CONCEPTS: EVALUATING THE EFFICACY OF A SENIOR HIGH SCHOOL STUDENT-CENTRED INSTRUCTIONAL PROGRAM IN INDONESIA. International Journal of Science and Mathematics Education, 2011, 9, 1439-1458.	1.5	18
122	Determining the Intelligibility of Einsteinian Concepts with Middle School Students. Research in Science Education, 2020, 50, 2505-2532.	1.4	18
123	School and University Partnerships: The Role of Teacher Education Institutions and Primary Schools in the Development of Preservice Teachersâ€™ Science Teaching Efficacy. Australian Journal of Teacher Education, 2014, 39, .	0.4	18
124	NaÃ¯ve Studentsâ€™ Conceptual Development and Beliefs: The Need for Multiple Analyses to Determine what Contributes to Student Success in a University Introductory Physics Course. Research in Science Education, 2008, 38, 111-125.	1.4	17
125	Why Models are Advantageous to Learning Science. Educacion Quimica, 2009, 20, 12-17.	0.1	17
126	HIGH SCHOOL STUDENTSâ€™ PROFICIENCY AND CONFIDENCE LEVELS IN DISPLAYING THEIR UNDERSTANDING OF BASIC ELECTROLYSIS CONCEPTS. International Journal of Science and Mathematics Education, 2012, 10, 1325-1345.	1.5	17

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127	Teaching Science for Conceptual Change. , 0, , .		17
128	An Exploration of Secondary Studentsâ€™ Mental States When Learning About Acids and Bases. Research in Science Education, 2014, 44, 133-154.	1.4	17
129	What Do You Know about Alternative Energy? Development and Use of a Diagnostic Instrument for Upper Secondary School Science. International Journal of Science Education, 2015, 37, 210-236.	1.0	16
130	Interactive Immersive Virtual Reality to Enhance Studentsâ€™ Visualisation of Complex Molecules. , 2019, , 51-64.		16
131	The Efficacy of an Alternative Instructional Programme Designed to Enhance Secondary Studentsâ€™ Competence in the Triplet Relationship. Models and Modeling in Science Education, 2009, , 151-168.	0.6	16
132	An Evaluation of Curriculum Materials for Teaching Technology as a Design Process. Research in Science and Technological Education, 1992, 10, 203-217.	1.4	15
133	The Teaching and Learning of Electrochemistry. , 2002, , 317-337.		15
134	Linking the Macroscopic, Sub-microscopic and Symbolic Levels: The Case of Inorganic Qualitative Analysis. Models and Modeling in Science Education, 2009, , 137-150.	0.6	15
135	Inquiry-Based Chemistry Education in a High-Context Culture: a Qatari Case Study. International Journal of Science and Mathematics Education, 2017, 15, 1017-1038.	1.5	14
136	Science Teachersâ€™ Use of a Concept Map Marking Guide as a Formative Assessment Tool for the Concept of Energy. Educational Assessment, 2017, 22, 95-110.	0.6	14
137	Process-Oriented Guided Inquiry Learning (POGIL) as a Culturally Relevant Pedagogy (CRP) in Qatar: a Perspective from Grade 10 Chemistry Classes. Research in Science Education, 2020, 50, 813-831.	1.4	14
138	Secondary Students' Perceptions about Learning Qualitative Analysis in Inorganic Chemistry. Research in Science and Technological Education, 2001, 19, 223-234.	1.4	13
139	Measuring Student Attitude and Knowledge in Technology-Rich Biology Classrooms. Journal of Science Education and Technology, 2014, 23, 98-107.	2.4	13
140	Developing an understanding of undergraduate student interactions in chemistry laboratories. Chemistry Education Research and Practice, 2018, 19, 1186-1198.	1.4	13
141	An International Perspective of Monitoring Educational Research Quality: Commonalities and Differences. , 2009, , 107-137.		13
142	An Instrument for Assessing Students' Mental State and the Learning Environment in Science Education. International Journal of Science and Mathematics Education, 2005, 3, 625-637.	1.5	12
143	On the Significance of Conceptual Metaphors in Teaching and Learning Science: Commentary on Lancor; Niebert and Gropengiesser; and Fuchs. International Journal of Science Education, 2015, 37, 958-965.	1.0	12
144	Latent constructs of the students' assessment of their learning gains instrument following instruction in stereochemistry. Chemistry Education Research and Practice, 2016, 17, 309-319.	1.4	12

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145	An alternative approach to student assessment for engineeringâ€“laboratory learning. Australasian Journal of Engineering Education, 2017, 22, 81-94.	0.2	12
146	Evaluation of the Predict-Observe-Explain Instructional Strategy to Enhance Studentsâ€™ Understanding of Redox Reactions. , 2014, , 265-286.		12
147	Gender-related differences of adolescents in spatial representational thought. Journal of Research in Science Teaching, 1980, 17, 91-97.	2.0	11
148	The presentation of gas properties in chemistry textbooks and as reported by science teachers. Journal of Research in Science Teaching, 1993, 30, 871-882.	2.0	11
149	Teacher training reforms in Indonesian secondary science: The importance of practical work in physics. Journal of Research in Science Teaching, 1999, 36, 357-371.	2.0	11
150	Exploring students' abilities to use two different styles of structural representation in organic chemistry. Canadian Journal of Science, Mathematics and Technology Education, 2005, 5, 133-152.	0.6	11
151	Village Eldersâ€™ and Secondary School Studentsâ€™ Explanations of Natural Phenomena in Papua New Guinea. International Journal of Science and Mathematics Education, 2005, 3, 213-238.	1.5	11
152	Evaluation of Students' Conceptual Understanding of Malaria. International Journal of Science Education, 2010, 32, 2497-2519.	1.0	11
153	Conclusion: Contributions of Multiple Representations to Biological Education. Models and Modeling in Science Education, 2013, , 349-367.	0.6	11
154	Sequential patterns of studentsâ€™ drawing in constructing scientific explanations: focusing on the interplay among three levels of pictorial representation. International Journal of Science Education, 2020, 42, 677-702.	1.0	11
155	Measuring students' attitudes and perceptions about technology: A multidimensional concept. Research in Science Education, 1989, 19, 221-230.	1.4	10
156	Learning genetics with computer dragons. Journal of Biological Education, 2003, 37, 96-98.	0.8	10
157	When a Bilingual Child Describes Living Things: An Analysis of Conceptual Understandings from a Language Perspective. Research in Science Education, 2007, 37, 291-312.	1.4	10
158	Design and Validation of an Instrument to Measure Studentsâ€™ Interactions and Satisfaction in Undergraduate Chemistry Laboratory Classes. Research in Science Education, 2021, 51, 1039-1053.	1.4	10
159	Analysis of Studentsâ€™ Diagrams Explaining Scientific Phenomena. Research in Science Education, 0, , 1.	1.4	10
160	Studentsâ€™ understanding of the emergent processes of natural selection: the need for ontological conceptual change. International Journal of Science Education, 2020, 42, 1485-1502.	1.0	10
161	An Investigation of Exemplary Biology Teaching. American Biology Teacher, 1988, 50, 142-147.	0.1	9
162	Student perceptions of instruction sheets in face-to-face and remotely-operated engineering laboratory learning. European Journal of Engineering Education, 2020, 45, 491-515.	1.5	9

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163	How to Outline Objectives for Chemistry Education and how to Assess Them. , 2013, , 37-65.		9
164	Multiple representations and studentsâ€™ conceptual change in science. , 2017, , 121-128.		9
165	What lower secondary students should understand about the mechanisms of inheritance and what they do understand following instruction. Research in Science Education, 1982, 12, 78-88.	1.4	8
166	Primary pre-service teachers' pedagogical reasoning skills. Research in Science Education, 1992, 22, 323-330.	1.4	8
167	Student Knowledge of Health and Fitness Concepts and its Relation to Locus of Control. School Science and Mathematics, 1993, 93, 355-359.	0.5	8
168	Motivational Aspects of Learning Genetics with Interactive Multimedia. American Biology Teacher, 2004, 66, 277-285.	0.1	8
169	Which form of assessment provides the best information about student performance in chemistry examinations?. Research in Science and Technological Education, 2013, 31, 49-65.	1.4	8
170	DESIGN, DEVELOPMENT AND VALIDATION OF A MODEL OF PROBLEM SOLVING FOR EGYPTIAN SCIENCE CLASSES. International Journal of Science and Mathematics Education, 2013, 11, 1157-1181.	1.5	8
171	Using a Discrepant Event to Facilitate Preservice Elementary Teachersâ€™ Conceptual Change about Force and Motion. Eurasia Journal of Mathematics, Science and Technology Education, 2019, 15, .	0.7	8
172	Secondary Biology Teachersâ€™ Use of Different Types of Diagrams for Different Purposes. Models and Modeling in Science Education, 2014, , 103-121.	0.6	8
173	Students' Knowledge of Energy and Attitudes to Energy Conservation. School Science and Mathematics, 1988, 88, 452-458.	0.5	7
174	Major Sources of Difficulty in Students' Understanding of Basic Inorganic Qualitative Analysis. Journal of Chemical Education, 2004, 81, 725.	1.1	7
175	The application of a CAL strategy in science and mathematics for disadvantaged Grade 12 learners in South Africa. International Journal of Educational Development, 2008, 28, 596-611.	1.4	7
176	High School and Preservice Chemistry Teacher Education Studentsâ€™ Understanding of Voltaic and Electrolytic Cell Concepts: Evidence of Consistent Learning Difficulties Across Years. International Journal of Science and Mathematics Education, 2022, 20, 1859-1882.	1.5	7
177	The circadian rhythm of body temperature of unrestrained oppossums, Didelphis Virginiana. Journal of Thermal Biology, 1979, 4, 251-255.	1.1	6
178	Using Projects to Teach Structural Engineering. Australian Journal of Structural Engineering, 2003, 4, 211-220.	0.4	6
179	Second-Year College Studentsâ€™ Scientific Attitudes and Creative Thinking Ability: Influence of a Problem-Based Learning (PBL) Chemistry Laboratory Course. , 2015, , 217-233.		6
180	Influence of Particle Theory Conceptions on Pre-service Science Teachersâ€™ Understanding of Osmosis and Diffusion. Journal of Biological Education, 2015, 49, 232-245.	0.8	6

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181	Learning Optics with Multiple Representations: Not as Simple as Expected. Models and Modeling in Science Education, 2017, , 123-138.	0.6	6
182	An Analysis of the Visual Representation of Redox Reactions in Secondary Chemistry Textbooks from Different Chinese Communities. Education Sciences, 2019, 9, 42.	1.4	6
183	Teachers' use of analogies in their regular teaching routines. Research in Science Education, 1989, 19, 291-299.	1.4	5
184	Physical and chemical change in textbooks: An initial view. Research in Science Education, 1996, 26, 129-140.	1.4	5
185	Monitoring teachersâ€™ referents for classroom practice using metaphors. International Journal of Science Education, 1997, 19, 183-192.	1.0	5
186	Kinetics of acid reactions: making sense of associated concepts. Chemistry Education Research and Practice, 2010, 11, 267-280.	1.4	5
187	Diagnostic assessment in chemistry. Chemistry Education Research and Practice, 2011, 12, 119.	1.4	5
188	Perceptions of the relative importance of student interactions for the attainment of engineering laboratory-learning outcomes. Australasian Journal of Engineering Education, 2020, 25, 155-164.	0.2	5
189	Teaching thermal physics to Year 9 students: the thinking frames approach. Physics Education, 2020, 55, 035007.	0.3	5
190	Development and validation of an instrument for assessing high-school studentsâ€™ perceptions of socio-scientific issues-based learning in biology. Learning Environments Research, 2021, 24, 223-237.	1.8	5
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