

Keyword Index

| | |
|--|---------------|
| 3D modeling | 591 |
| 4Ps model of marketing | 481 |
| 5G communication technology | 465 |
| 5G laboratory | 465 |
| 5G networks | 17 |
| 5G virtual simulation | 465 |
| ABET | 730 |
| ability training | 758 |
| Academic difficulties | 752 |
| Academic Performance | 133 |
| academic performance | 606, 628, 643 |
| Access | 568 |
| Accessibility in education | 174 |
| accompanying programming teaching | 792 |
| accreditation | 730 |
| Accreditation Board for Engineering and Technology engineering education | 730 |
| across disciplines | 433 |
| active learning | 180, 506, 621 |
| Active learning | 538 |
| Active Learning | 33, 141, 145 |
| active learning pedagogy | 208 |
| adaptive learning | 518 |
| advocacy | 636 |
| affective skills | 649 |
| agent-based simulation | 615 |
| AI | 69 |
| AI chatbot | 41 |
| AI education popularization | 120 |
| AI feedback | 399 |
| AI games | 120 |
| AI in education | 155 |
| AI tools | 27 |
| airborne bus | 758 |
| analytics | 194 |
| Anatomy | 251 |
| Andragogy | 538 |
| app development | 443 |
| ARCS | 310 |
| Artificial intelligence | 310 |
| artificial intelligence | 273, 338, 437 |
| Artificial Intelligence | 91, 120 |

| | |
|--|----------------------------------|
| artificial intelligence education | 661 |
| Artificial intelligence education for K-12 | 738 |
| Assessment | 128, 487 |
| assessment test | 744 |
| assessments | 27 |
| Assistive technologies | 174 |
| Asynchronous learning | 722 |
| attainment | 606 |
| attitude | 443 |
| Audio analysis | 91 |
| Audio classification | 64 |
| Auditory Stimuli | 700 |
| Augmented reality | 230 |
| Authentic Assessment | 347 |
| authentic assessment | 329 |
| Authentication | 587 |
| auto-grading | 393 |
| Automated feedback system | 364 |
| automated grading | 329 |
| Automatic Essay Grading | 657 |
| Automatic sign language translator | 174 |
| avionics | 758 |
| | |
| Bayesian Probability | 587 |
| Behavior Analysis | 41 |
| biological information | 704 |
| bioreactor | 370 |
| Block-based | 765 |
| Blockly | 765 |
| Bloom's taxonomy | 287 |
| | |
| C# | 765 |
| Calculation abilities | 778 |
| Career decision-making | 303 |
| case study | 47 |
| causal inference | 615 |
| Challenge-Based Learning | 303 |
| Challenges | 21, 27 |
| Chat-bot Applications | 682 |
| chatbot | 427 |
| chatGPT | 273 |
| ChatGPT | 27, 104, 128, 155, 287, 457, 771 |
| cheating detection | 170 |
| cheating prevention | 170 |
| Chemistry lab teaching | 611 |
| Circular Economy | 41 |
| Class participation | 208 |
| classifier | 643 |

| | |
|---|-------------------|
| classroom | 321 |
| Classroom engagement | 64 |
| clinical history-taking | 427 |
| Clustering | 258 |
| code debugging | 786 |
| Code explanations | 771 |
| code reading | 786 |
| Cognitive abilities | 411, 752 |
| Cognitive diagnostic assessment | 752 |
| collaborative filtering | 661 |
| collaborative learning | 120, 378 |
| Collaborative learning | 473, 542 |
| collusion | 170 |
| communication tools | 602 |
| community partners | 201 |
| competitor analysis | 481 |
| Complex Systems | 73 |
| Comprehension | 722 |
| computational thinking | 1, 518 |
| computational time | 643 |
| Computer Graphics | 251 |
| computer network | 506 |
| computer science | 495, 649 |
| Computer science education | 722 |
| Computer supported collaborative learning | 509 |
| computer system education | 792 |
| Computer-based testing (CBT) | 752 |
| Computer-based training | 310 |
| computing | 407 |
| computing education | 83, 180, 338, 443 |
| Concept Inventories | 811 |
| Confidentiality | 587 |
| confirmatory factor analysis | 628 |
| Constructive Alignment | 487 |
| Constructive Response Test | 657 |
| constructivism | 449 |
| content-based filtering | 661 |
| Continued Intention | 133 |
| controlled experiment | 338 |
| course design | 27, 216, 343, 636 |
| Course Modeling | 579 |
| COVID-19 | 615 |
| COVID-19 pandemic | 817 |
| CPS | 354 |
| creativity | 298 |
| critical reflection | 433 |
| Critical thinking | 298 |
| Cross-cultural learning | 557 |

| | |
|------------------------------------|----------|
| Cross-curricular | 265 |
| curriculum design | 194 |
| curriculum intervention | 525 |
| customised programming assignments | 661 |
| cyclomatic complexity (CC) | 575 |
| data analytics | 606 |
| Data Mining | 258 |
| data science | 194 |
| data science education | 615 |
| database design | 329 |
| Database exercises | 771 |
| deep learning | 437 |
| delivery skills | 80 |
| Democratizing education | 587 |
| Dependency theory | 329 |
| design education | 280 |
| design thinking | 343, 481 |
| Design thinking | 265 |
| developing country | 273 |
| difference analysis | 595 |
| differential approach | 318 |
| digital assistant | 69 |
| Digital game-based learning | 778 |
| digital game-based learning | 411 |
| digital leadership | 817 |
| Digital pedagogy | 230 |
| digital puzzles | 419 |
| digital quiz | 47 |
| digital storytelling | 57 |
| disadvantaged | 515 |
| discussion | 825 |
| distance education | 80 |
| Distance Learning | 33 |
| distance learning | 80 |
| Distance learning | 530 |
| distributed online judge system | 792 |
| divide-and-conquer | 287 |
| drone | 469 |
| drone-aimed learning (DAL) | 469 |
| DSMRI | 73 |
| dunning-kruger effect | 159 |
| Dynamic partial reconfiguration | 188 |
| e-exams | 170 |
| E-Learning | 310 |
| e-learning | 457 |
| e-portfolio | 449 |

| | |
|---------------------------------|--------------------|
| Economy | 258 |
| education | 27, 69, 495 |
| education model | 69 |
| educational data mining | 643 |
| educational innovation | 238, 242, 525 |
| Educational innovation | 99, 611 |
| Educational Robotics | 473 |
| educational technology | 419 |
| Educational technology | 230 |
| Educators | 21 |
| educators | 27 |
| effective collaboration process | 223 |
| effectiveness | 433 |
| Electrical Engineering | 669 |
| electroencephalogram | 704 |
| electronics | 149 |
| emotions | 247 |
| engagement | 57, 201 |
| engineering | 407 |
| Engineering Courses | 145 |
| engineering design | 734 |
| engineering education | 343, 378, 443, 621 |
| Engineering Education | 73, 501, 538, 811 |
| Engineering education | 230, 293 |
| English learning | 509 |
| English oral presentations | 399 |
| Entrepreneurial University | 9 |
| Entrepreneurship | 166 |
| Entrepreneurship Education | 358 |
| Equal opportunities | 174 |
| Equity | 568 |
| error classification | 595 |
| exam success | 449 |
| Exercise Generation | 579 |
| experiential education | 166 |
| experiential learning | 194, 386, 407, 738 |
| experimental teaching | 758 |
| exploratory factor analysis | 628 |
| eye gaze feature | 825 |
| eye tracking | 825 |
| eye-tracking measurement | 786 |
| facial expression | 704 |
| facial expressions | 247 |
| fair student participation | 208 |
| fault diagnosis | 437 |
| Field programmable gate arrays | 188 |
| flight simulator | 469 |

| | |
|------------------------------------|--------------------|
| Flipped Classroom | 141, 145 |
| flipped learning | 506 |
| Formative Feedback | 487 |
| formative feedback | 803 |
| Furniture design | 265 |
| future of education | 69 |
| Game Development | 559 |
| game-based learning | 419 |
| Game-based learning | 611 |
| GAMEX | 238 |
| gamification | 238, 334, 518 |
| Gamification | 611 |
| gear | 437 |
| gender | 693 |
| Gender Equity | 715 |
| generative AI | 457 |
| Generative AI | 128, 811 |
| generative artificial intelligence | 803 |
| global engineers | 318 |
| Good Practice | 145 |
| group-based learning | 280 |
| hackathon | 407 |
| Halstead difficulty (HD) | 575 |
| hands-on activities | 506, 621 |
| harassment | 693 |
| hardware security | 334 |
| heart rate | 704 |
| Heutagogy | 538 |
| Higher education | 364, 525 |
| Higher Education | 303, 611 |
| higher education | 180, 242, 386, 708 |
| Higher education Engineering | 17 |
| Higher Education in India | 568 |
| Human Computer Interaction | 473 |
| Human-Computer Interaction | 542 |
| hybrid learning | 481 |
| hyflex learning | 159 |
| immersion | 321 |
| independent learning | 518 |
| industrial robotics | 242 |
| Industry engagement | 347 |
| industry-education integration | 677 |
| Infocomm Technology Education | 347 |
| Informal STEM Learning | 73 |
| information judgment | 155 |

| | |
|--|----------|
| information retrieval | 155 |
| information security | 506 |
| Innovation | 9, 265 |
| inquiry-based learning | 591 |
| instructional design | 708 |
| Integrated circuit | 677 |
| integrated STEM | 734 |
| Integrity | 587 |
| Interactive learning environments | 473, 542 |
| intercultural and interdisciplinary method | 318 |
| Interdisciplinary Research | 9 |
| internship | 433 |
| interview | 565 |
| intrinsic motivation | 57 |
| introductory computer science education | 506 |
| Introductory Programming | 559 |
| IoMusT | 748 |
| IoT | 354 |
| IQ-mobile race | 611 |
| junior high school students | 247 |
| K-12 schools | 53 |
| K-means | 258 |
| Kahoot | 149 |
| kindergarten teachers | 817 |
| knowledge map | 744 |
| Knowledge-Economy | 9 |
| Kolb's learning cycle | 501 |
| Kusho | 557 |
| laboratory course | 334 |
| language proficiency | 606 |
| Large Language Models | 542 |
| Leadership Identity | 800 |
| learner | 515 |
| learners' multiple characteristics | 223 |
| learning | 321, 515 |
| learning analytics | 378, 704 |
| learning assistant | 69 |
| Learning evaluation | 251 |
| learning experience platform | 378 |
| Learning from failure | 293 |
| learning management system | 708 |
| Learning Objectives | 579 |
| Learning Outcomes | 487 |
| Learning programming | 364 |
| Lecture Free Learning | 33 |

| | |
|--|--------------|
| lecturer training | 708 |
| lesson planning | 216 |
| lifelong | 515 |
| lifelong learning | 69 |
| linear algebra | 649 |
| LMS | 549 |
| logical thinking skills | 575 |
| Loose parts | 298 |
| machine learning | 194 |
| Mahara | 449 |
| Managers | 21 |
| Math Courses | 141 |
| mathematical expressions | 602 |
| Mathematical games | 778 |
| mathematical input interfaces | 602 |
| mathematical motivation | 803 |
| mathematics education | 602 |
| meaningful learning | 238 |
| Mechanical Engineering | 657 |
| mechatronics | 242 |
| Mel frequency cepstral coefficients (MFCC) | 64 |
| Memory Palace | 700 |
| Metacognitive abilities | 752 |
| metaverse | 591 |
| Method of Loci | 700 |
| Micro-controller | 354 |
| micro-credential | 565 |
| microelectronics courses | 688 |
| Microelectronics Specialty | 682 |
| micromodule | 433 |
| mindset | 318 |
| mixed reality | 419 |
| mobile learning | 602 |
| MOOC | 568 |
| Moodle | 449, 457 |
| motivation | 53, 201, 565 |
| Motivation | 141 |
| mouse-trap car project | 734 |
| MSME | 258 |
| Multi-agent learning | 509 |
| multi-disciplinary | 194, 201 |
| multi-modal programming behavior | 786 |
| multi-objective optimization | 223 |
| Multidisciplinary | 265 |
| Multidisciplinary Studies | 9 |
| multiple disciplines | 518 |
| Music Education | 748 |

| | |
|---------------------------------|----------|
| Musical Performance | 748 |
| Natural language | 771 |
| New Zealand | 495 |
| NL to SQL | 104 |
| normal forms | 329 |
| Novice learners | 364 |
| NPTEL | 568 |
| Nudging | 201 |
| OBE | 758 |
| on-demand learning | 247 |
| on-demand style | 549 |
| ongoing assessment | 223 |
| online assessment | 393 |
| online cheating | 329 |
| online coding platform | 393 |
| online education | 80, 518 |
| online exam | 549 |
| online exam system | 112 |
| Online Laboratories | 669 |
| online learning | 159, 738 |
| online platform | 399 |
| Online Whiteboard | 41 |
| Open Education Resources | 568 |
| optimal grouping and regrouping | 223 |
| outcomes | 565 |
| pandemic | 393 |
| PBL | 41, 318 |
| Pedagogy | 538 |
| peer learning | 649 |
| Performance Displaying Format | 133 |
| Physical education | 99 |
| physics | 621 |
| physiotherapy | 427 |
| plagiarism | 338 |
| policy | 515 |
| practice teaching | 677 |
| Precision learning | 310 |
| prevent cheating | 112 |
| principals | 817 |
| problem-based learning | 53 |
| problem-solving | 298 |
| product dissection | 621 |
| Productive failure | 473 |
| professional development | 495 |
| Professional Development | 800 |

| | |
|--|------------|
| Professional education | 99 |
| Professional Education. | 611 |
| professional topics | 83 |
| program complexity | 575 |
| Program repair | 364 |
| Programmable online exam | 112 |
| Programme Learning Outcome Evaluations | 347 |
| programming | 1, 83, 338 |
| programming attention | 786 |
| programming education | 595, 744 |
| Programming Education | 473 |
| Programming education | 765 |
| programming education for children | 575 |
| Project Based Learning | 347, 358 |
| project management | 378 |
| project-based learning | 280, 343 |
| Project-Based Learning (PBL) | 180, 559 |
| prototyping | 280 |
| psychology | 825 |
| puzzle box | 419 |
| puzzles | 411 |
| Query Equivalence | 104 |
| quiz tasks | 247 |
| Radar Visualisation of Student Performance | 133 |
| Reciprocal teaching | 557 |
| reflective learning | 280 |
| regular expression | 595 |
| remote laboratories | 242 |
| Remote laboratory | 188 |
| Remote Learning | 669 |
| research-oriented learning | 216 |
| Resilience | 41 |
| Reverse engineering | 621 |
| review | 83, 549 |
| rigid-flexible coupling dynamic analysis | 437 |
| Robot competition | 293 |
| Role reversal | 509 |
| scenario-based learning | 57 |
| science concept | 734 |
| scoping review | 83 |
| Scratch | 765 |
| seating position | 825 |
| secondary schools | 1 |
| self-directed learning | 120 |
| Self-regulated learners | 538 |

| | |
|-------------------------------------|----------|
| self-regulation learning | 149 |
| Singapore | 201 |
| Situated Motivation | 73 |
| Ski | 530 |
| Skill Evaluation | 358 |
| Skill learning | 530 |
| Sleep inducing. | 64 |
| small unmanned aircraft | 469 |
| social and professional topics | 83 |
| social innovation | 636 |
| social network analysis | 649 |
| society | 515 |
| Soft Skills | 21 |
| soft skills | 238 |
| software design | 661 |
| software engineering practices | 661 |
| Speaker diarization | 91 |
| SQL | 104, 393 |
| Stakeholders | 9 |
| standardized curriculum | 744 |
| STEAM education | 602 |
| STEM | 693 |
| STEM careers | 303 |
| STEM education | 636, 688 |
| STEM identity | 73 |
| STEM Participation | 715 |
| Stereoscopy | 251 |
| Strategies | 21 |
| structural equation modelling | 628 |
| Structural Equation Modelling (SEM) | 133 |
| structured conversations | 427 |
| Student engagement | 230, 303 |
| student engagement | 449 |
| Student Performance | 33 |
| Student preferences | 230 |
| student satisfaction | 449 |
| students | 53, 407 |
| Students Engagement | 141, 145 |
| sustainability | 386, 407 |
| sustainability competencies | 525 |
| sustainability project | 201 |
| sustainable development goals (SDG) | 636 |
| synchronous class | 481 |
| Systematic Review | 748 |
| | |
| Tankyu chart | 591 |
| Te Pūkenga | 21 |
| teacher influence | 208 |

| | |
|--|---------------|
| Teacher Leadership | 800 |
| teachers | 53 |
| Teaching analytics | 91 |
| Teaching Internet-of-Things | 17 |
| Teaching practices | 91 |
| Teaching Reform | 682 |
| teaching reform | 688 |
| technology | 565 |
| technology adoption | 273 |
| technology and society | 636 |
| technology enhanced participation | 208 |
| technology innovation | 166 |
| Technology integration | 99 |
| technology integration | 817 |
| Test-bed | 354 |
| testing effect | 47 |
| theoretical teaching | 677 |
| Theory of Planned Behavior (TPB) | 358 |
| training | 370 |
| Undergraduate Education | 682 |
| unified theory of acceptance and use of technology | 273 |
| unplugged activities | 1 |
| use behavior | 273 |
| user experience | 427 |
| UTAUT | 133 |
| value proposition | 378 |
| VARPLE | 469 |
| Venn Diagram | 587 |
| VET | 515 |
| Virtual Reality | 501 |
| virtual reality | 321, 370, 411 |
| virtual remote piloting | 469 |
| virtual teaching | 159 |
| Visual Line of Sight (VLOS) | 469 |
| Visualization | 251, 722 |
| web development | 180 |
| websites | 386 |
| Western China | 817 |
| Wind Turbine | 354 |
| Wireless IoT | 17 |
| woman labor market | 180 |
| Women in STEM | 715 |
| writing courses | 27 |
| Writing in space | 557 |

ZPD

310