

## Sahana Murthy

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Inter-Disciplinary Program in Educational Technology

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### Education

<b>Ph.D.</b> , Physics. Rutgers University.	May 2004
<b>M.Sc.</b> , Physics. Indian Institute of Technology Bombay.	June 1997
<b>B.Sc.</b> , Physics. University of Mumbai.	June 1995

### Professional Experience

<i>Associate Professor</i>	Inter-Disciplinary Programme in Educational Technology, Indian Institute of Technology Bombay	September 2014 - date
<i>Assistant Professor</i>	Inter-Disciplinary Programme in Educational Technology, Indian Institute of Technology Bombay	March 2009 - date
<i>Lecturer</i>	Experimental Study Group, Massachusetts Institute of Technology	September 2006 - January 2009
<i>Post-doctoral Associate</i>	Center for Educational Computing Initiatives, Massachusetts Institute of Technology	September 2005 - August 2006.
<i>Post-doctoral Associate</i>	Physics Education Research group, Rutgers University	November 2003 - August 2005.

### Ph. D students

7 graduated (5 as sole or primary guide, 2 as co-guide)

5 ongoing (1 submitted, 1 each in 5<sup>th</sup>, 4<sup>th</sup>, 3<sup>rd</sup> and 2<sup>nd</sup> year)

### Post docs mentored

1 Institute post-doc (2016-17)

2 post-docs (current)

### Courses taught

IIT Bombay:

- ET 801: Introduction to educational technology (PhD core course); 8 offerings 2010-18
- ET 804: Research methods in educational technology (PhD elective); 5 offerings 2011-18
- ET 803: Advanced topics in cognition (PhD elective); 2 offerings 2015-17
- PH 108: Electricity and magnetism (1<sup>st</sup> year core course); 2010

MIT:

- Mechanics (Physics 1<sup>st</sup> year course)
- Electricity and magnetism (Physics 1<sup>st</sup> year course) in TEAL studio format
- How learning changes the brain (Project-based course)

## Publications

### Peer-reviewed journals

1. Is this Solution Pink Enough? A Smartphone Tutor to Resolve the Eternal Question in a Phenolphthalein-based Titration. Rathod, Balraj, Murthy, Sahana and Bandyopadhyay, Subhajit. *Accepted in The Journal of Chemical Education* (2019).
2. MEttLE: A Modelling-based Learning Environment for Undergraduate Engineering Estimation Problem Solving. Aditi Kothiyal and Sahana Murthy. *Research and Practice in Technology Enhanced Learning*, November 2018.
3. Interest-driven creator theory: towards a theory of learning design for Asia in the twenty-first century. Tak-Wai Chan, Chee-Kit Looi, Wenli Chen, Lung-Hsiang Wong, Ben Chang, Calvin C. Y. Liao, Hercy Cheng, Zhi-Hong Chen, Chen-Chung Liu, Siu-Cheung Kong, Heisawn Jeong, Jon Mason, Hyo-Jeong So, Sahana Murthy, Fu-Yun Yu, Su Luan Wong, Ronnel B. King, Xiaoqing Gu, Minhong Wang, Longkai Wu, Ronghuai Huang, Rachel Lam, Hiroaki Ogata. *Accepted in Journal of Computers in Education*, 1-27. September 2018.
4. Personalized affective feedback to address students' frustration in ITS. Ramkumar Rajendran, Sridhar Iyer, Sahana Murthy. *IEEE Transactions on Learning Technologies*, 2018.
5. CuVIS: An interactive tool for instructors to create effective customized learning designs with visualizations. Gargi Banerjee and Sahana Murthy. *Australasian Journal of Educational Technology*, 34(2), 2018.
6. MIC-O-MAP: A technology enhanced learning environment for developing micro-macro thinking skills. Anura Kenkre and Sahana Murthy. *Research and Practice in Technology Enhanced Learning*, 12(1), 23, 2017.
7. Designing Reciprocative Dynamic Linking to improve learners' Representational Competence in interactive learning environments. Mrinal Patwardhan and Sahana Murthy. *Research and Practice in Technology Enhanced Learning*, **12**:10, 2017.
8. ET4ET: A large-scale professional development program on effective integration of educational technology for engineering faculty. Sahana Murthy, Sridhar Iyer and Jayakrishnan Warriem. *Educational Technology & Society*, vol. 18(3), pp. 16-28, 2015.
9. Effect of active learning using program visualization in technology constrained college classrooms. Gargi Banerjee, Sahana Murthy and Sridhar Iyer. *Research and Practice in Technology Enhanced Learning*, vol. 10(1), pp. 1-25, 2015.
10. When does higher degree of interaction lead to higher learning in visualizations? Exploring the role of 'Interactivity Enriching Features'. Mrinal Patwardhan and Sahana Murthy. *Computers & Education*, vol. 82, pp. 292-305, 2015.
11. A theory-driven approach to predict frustration in an ITS. Ramkumar Rajendran, Sridhar Iyer, Sahana Murthy, Campbell Wilson and Judithe Sheard. *IEEE Transactions on Learning Technologies*, **6** (4), pp. 378-388, 2013.
12. Design based research to create instructional design templates for learning objects. Sameer Sahasrabudhe, Sahana Murthy and Sridhar Iyer. *New Frontiers in Education*, vol.46(1), pp.27-46, 2013.
13. Applying traditional animation principles for creating learning objects. Sameer Sahasrabudhe, Sahana Murthy and Sridhar Iyer. *New Frontiers in Education*, vol.45(2), pp.81-99, 2012.
14. Design and evaluation of OSCAR physics learning objects. A. Kenkre and S. Murthy. *Journal of Research: The Bede Athenaeum* 3 (1), 6-10, 2012.

15. Using action research to improve learning and formative assessment to conduct research. E. Etkina, A. Karelina, S. Murthy and M. Ruibal-Villasenor. *Physical Review Special Topics, Physics Education Research*, **5**, 010109, 2009.
16. Scientific abilities and their assessment. E. Etkina, A. Van Heuvelen, S. White-Brahmia, D. Brookes, M. Gentile, S. Murthy, D. Rosengrant, and A. Warren. *Physical Review Special Topics, Physics Education Research*, **2**, 020103, 2006.
17. Using introductory labs to engage students in experimental design. Eugenia Etkina, Sahana Murthy and Xueli Zou. *American Journal of Physics*, **74**, 979, 2006.
18. Compressibility divergence and the finite temperature Mott transition. G. Kotliar, S. Murthy and M. J. Rozenberg. *Physical Review Letters*, **89**, 046401, 2002.
19. Haldane Gap in S=2 XXZ quantum anti-ferromagnet. C. Y. Kadolkar, N. Goveas, D. K. Ghosh and S. Murthy. *Journal of magnetism and magnetic materials*, **177-181**, Part 1, 638, 1998.

#### *Invited*

1. Physics Education Research in the Laboratory Setting. Sahana Murthy. Physics News: Bulletin of Indian Physics Association, Special Issue on Physics Education Research. Guest Editor Arvind Kumar. No. 4, Vol. 41, 20-32, October 2011.

#### *Book Chapters*

1. S. Murthy, J. M. Warriem and S. Iyer. Technology Integration for Student-Centered Learning: A Model for Teacher Professional Development Programs. In "*Emerging Practices in Scholarship of Learning and Teaching in a Digital Era*", Eds. S.C. Kong, T. L. Wong, M. Yang, C. F. Chow, and K. H. Tse. Singapore, Springer, 2017.
2. S. Murthy, S. Iyer, and M. Mavinkurve. Pedagogical framework for developing thinking skills using smart learning environments. In "*Learning, Design and Technology - An international compendium of theory, research, practice and policy*". Eds. J. M. Spector, B. Lockee and M. D. Childress. Switzerland, Springer International Publishing, 2016.

#### *International peer-reviewed conference proceedings*

1. Narasimha Swamy K L, Pankaj Chavan and Sahana Murthy. StereoChem: Augmented Reality 3D Molecular Model Visualization App for Teaching and Learning of Stereochemistry. IEEE 18<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2018), Mumbai, India. July 9-13, 2018.
2. Navneet Kaur, Rumana Pathan, Ulfa Khwaja and Sahana Murthy. GeoSolvAR: Augmented Reality based solution for visualizing 3D solids. IEEE 18<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2018), Mumbai, India. July 9-13, 2018.
3. Aditi Kothiyal and Sahana Murthy. Exploring How Students Learn Estimation Using a Modelling-based Learning Environment. 13<sup>th</sup> International Conference of the Learning Sciences (ICLS 2018), London, UK. June 23-27, 2018.
4. Aditi Kothiyal and Sahana Murthy. Examining Student Learning of Engineering Estimation from METTLE. 25<sup>th</sup> International Conference on Computers in Education, (ICCE 2017), Christchurch, New Zealand. December 4-8, 2017.
5. Lakshmi T G, Soumya Narayana, Harshavardhan Penugonda, Dhirendra Vaidya, Vishvendra Poonia, Swaroop Ganguly and Sahana Murthy. PIVOTeeING: A Flipped Approach in a

- Postgraduate Solid State Devices Course. 25<sup>th</sup> International Conference on Computers in Education, (ICCE 2017), Christchurch, New Zealand. December 4-8, 2017.
6. Anura Kenkre and Sahana Murthy. Learning of Micro-Macro Thinking in Analog Electronics via MIC-O-MAP TEL Environment. IEEE 17<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2017), Timisoara, Romania, July 3-7, 2017.
  7. Ashutosh Raina, Lakshmi Ganesh and Sahana Murthy. CoMBaT: Wearable Technology Based Training System for Novice Badminton Players. IEEE 17<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2017), Timisoara, Romania, July 3-7, 2017.
  8. Soumya Narayana, Prajish Prasad, Lakshmi T.G. and Sahana Murthy. Geometry via Gestures: Learning 3D geometry using gestures. Proceedings of the 8<sup>th</sup> IEEE International Conference on Technology for Education (T4E 2016) Mumbai, India, December 2-4, 2016.
  9. Anurag Deep, Sahana Murthy and P. Jayadeva Bhat. Geneticus investigatio: An agent-based modeling system for teaching-learning hypothetico-deductive reasoning in Mendelian genetics. Proceedings of the 8<sup>th</sup> IEEE International Conference on Technology for Education (T4E 2016) Mumbai, India, December 2-4, 2016.
  10. Jayakrishnan Warriem, Sahana Murthy and Sridhar Iyer. Shifting focus from learner completion to learner perseverance: Evidence from a teacher professional development MOOC. 24<sup>th</sup> International Conference on Computers in Education, (ICCE 2016), Mumbai, India. Nov 28- Dec 2, 2016.
  11. Anura Kenkre and Sahana Murthy. Students learning paths in developing micro-macro thinking: productive actions for exploration in MIC-O-MAP learning environment. 24<sup>th</sup> International Conference on Computers in Education (ICCE 2016), Mumbai, India. Nov 28- Dec 2, 2016.
  12. Lakshmi T.G., Prajish Prasad, Soumya Narayana, Sahana Murthy and Sanjay Chandrasekharan. Geometry via Gestures: Design of a gesture based application to teach 3D geometry. In Proceedings of Workshop on Emerging Pedagogies for Computer-Based Learning in the International Conference on Computers in Education (ICCE 2016), Mumbai, India, 2016.
  13. Anurag Deep, Prajish Prasad, Soumya Narayana, Maiga Chang, Sahana Murthy. Game Based Learning of Blood Clotting Concepts. IEEE 16<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2016), Austin, Texas, USA. July 25-28, 2016.
  14. Aditi Kothiyal, Sahana Murthy and Sanjay Chandrasekharan. Hearts pump and hearts beat”: Engineering estimation as a form of model-based reasoning. 12<sup>th</sup> International Conference of the Learning Sciences (ICLS 2016), Singapore. June 20-24, 2016.
  15. Anurag Deep, Sahana Murthy and P. J. Bhat. Designing a Technology Enhanced Learning environment for hypothetico-deductive reasoning in genetics. 6<sup>th</sup> International conference to review research on Science, Technology and Mathematics Education (epiSTEME 6), Mumbai, India, December 15-18, 2015.
  16. Vasanta Akondy and Sahana Murthy. From novice to expert instructional designer: A training based on cognitive apprenticeship model. Proceedings of the 7<sup>th</sup> IEEE International Conference on Technology for Education (T4E 2015), Warangal, India, December 10-12, 2015.
  17. Mrinal Patwardhan and Sahana Murthy. How reciprocative dynamic linking supports learners' representational competence: An exploratory study. 23<sup>rd</sup> International Conference on Computers in Education, (ICCE 2015), Hangzhou, China. November 30- December 4, 2015.
  18. Jayakrishnan Warriem, Sahana Murthy and Sridhar Iyer. Sustainability at scale: Evidence from a large scale teacher professional development program. 23<sup>rd</sup> International Conference on Computers in Education, (ICCE 2015), Hangzhou, China. November 30- December 4, 2015.

19. Gargi Banerjee and Sahana Murthy. CuVIS tool to develop instructors' competency in creating meaningful learning designs. 23<sup>rd</sup> International Conference on Computers in Education, (ICCE 2015), Hangzhou, China. November 30- December 4, 2015.
20. Aditi Kothiyal and Sahana Murthy. Exploring student difficulties in divide and conquer skill with a mapping tool. Workshop on Technology Enhanced Learning on Thinking Skills (TELoTS), at the 23<sup>rd</sup> International Conference on Computers in Education, (ICCE 2015), Hangzhou, China. November 30- December 4, 2015.
21. Madhuri Mavinkurve and Sahana Murthy. Design of TEL environment to develop Multiple Representation thinking skill. Workshop on Technology Enhanced Learning on Thinking Skills (TELoTS), at the 23<sup>rd</sup> International Conference on Computers in Education, (ICCE 2015), Hangzhou, China. November 30- December 4, 2015.
22. Madhuri Mavinkurve and Sahana Murthy. Development of engineering design competencies using TELE-EDesC: Do the competencies transfer? IEEE 15<sup>th</sup> International Conference on Advanced Learning Technologies (ICALT 2015), Hualein, Taiwan, July 7-9, 2015.
23. Aditi Kothiyal, Bipin Rajendran and Sahana Murthy. Delayed Guidance: A teaching-learning strategy to develop ill-structured problem solving skills in engineering. 3<sup>rd</sup> International Conference on Learning and Teaching in Computing and Engineering (LaTiCE 2015), Taipei, Taiwan. April 9-12, 2015.
24. Deepti Reddy, Shitanshu Mishra, Ganesh Ramakrishnan and Sahana Murthy. Thinking, pairing, and sharing to improve learning and engagement in a Data Structures and Algorithms (DSA) class. 3<sup>rd</sup> International Conference on Learning and Teaching in Computing and Engineering (LaTiCE 2015), Taipei, Taiwan. April 9-12, 2015.
25. Anura Kenkre and Sahana Murthy. A self-study learning environment for modeling abilities: Do all learners take the same learning path? Proceedings of the 6<sup>th</sup> IEEE International Conference on Technology for Education (T4E 2014) Kollam, India, December 18-21, 2014.
26. Abhinav Anand, Aditi Kothiyal, Bipin Rajendran and Sahana Murthy. Guided Problem Solving and Group Programming: A technology-enhanced teaching-learning strategy for engineering problem Solving. Proceedings of the 6th IEEE International Conference on Technology for Education (T4E 2014) Kollam, India, December 18-21, 2014.
27. Rwitajit Majumdar, Aditi Kothiyal, Prajakt Pande, Harshit Agarwal, Ajith Ranka, Sahana Murthy and Sanjay Chandrasekharan. The enactive equation: Exploring how multiple external representations are integrated, using a fully controllable interface and eye-tracking. Proceedings of the 6th IEEE International Conference on Technology for Education (T4E 2014) Kollam, India, December 18-21, 2014.
28. Gargi Banerjee, Mrinal Patwardhan and Sahana Murthy. Learning design framework for constructive strategic alignment with computer-based visualizations. 22nd International Conference on Computers in Education, (ICCE 2014), Nara, Japan. November 30- December 4, 2014.
29. Jayakrishnan M. Warriem, Sahana Murthy and Sridhar Iyer. A2I: A model for teacher training in constructive alignment for use of ict in engineering education. 22nd International Conference on Computers in Education, (ICCE 2014), Nara, Japan. November 30- December 4, 2014.
30. Anura Kenkre, Sahana Murthy and Madhuri Mavinkurve. Development of predict-test-revise modeling abilities via a self-study learning environment. 22nd International Conference on Computers in Education, (ICCE 2014), Nara, Japan. November 30- December 4, 2014.
31. Madhuri Mavinkurve and Sahana Murthy. Self-assessment rubrics as metacognitive scaffolds to

- improve design thinking. Workshop on Technology Enhanced Learning of Thinking Skills, in the Proceedings of the 22nd International Conference on Computers in Education. Japan: Asia-Pacific Society for Computers in Education.
32. Aditi Kothiyal, Sahana Murthy and Sridhar Iyer. Think-Pair-Share in a large CS1 class: Does learning really happen? Proceedings of the 19<sup>th</sup> Annual ACM conference on Innovation and Technology in Computer Science Education (ITiCSE 2014), Uppsala, Sweden, June 23-25, 2014.
  33. Shitanshu Mishra, Sridhar Iyer and Sahana Murthy. Effect of a 2-week Scratch Intervention in CS1 on learners with varying prior knowledge. Proceedings of the 19<sup>th</sup> Annual ACM SIGCSE conference on Innovation and Technology in Computer Science Education (ITiCSE 2014), Uppsala, Sweden, June 23-25, 2014.
  34. Jayakrishnan M. Warriem, Sahana Murthy and Sridhar Iyer. Training in-service teachers to do action research in educational technology. Proceedings of the 5th IEEE International Conference on Technology for Education (T4E 2013) Kharagpur, India, December 18-20, 2013.
  35. Sahana Murthy and Sridhar Iyer. Guidelines and Templates for Planning, Conducting and Reporting Educational Technology Research (Tutorial). Proceedings of the 5th IEEE International Conference on Technology for Education (T4E 2013) Kharagpur, India, December 18-20, 2013.
  36. Madhuri Mavinkurve and Sahana Murthy. Comparing self-learning behavior of low and high scorers in computer based visualization for engineering design competencies. 21st International Conference on Computers in Education, (ICCE 2013), Bali, Indonesia. November 18-22, 2013.
  37. Gargi Banerjee, Sahana Murthy and Sridhar Iyer. Program visualization: Effect of viewing vs. responding on student learning. 21st International Conference on Computers in Education, (ICCE 2013), Bali, Indonesia. November 18-22, 2013.
  38. Jayakrishnan M. Warriem, Sahana Murthy and Sridhar Iyer. A model for active learning in synchronous remote classrooms: Evidence from a large-scale implementation. In 21st International Conference on Computers in Education, (ICCE 2013), Bali, Indonesia. November 18-22, 2013.
  39. A. Kothiyal, R. Majumdar, S. Murthy and S. Iyer. Effect of Think-Pair-Share in a large CS1 class: 83% sustained engagement. Proceedings of the ACM Ninth International Computing Education Research Workshop, (ICER 2013), San Diego, USA, August 12-14, 2013.
  40. Sridhar Iyer and Sahana Murthy. Demystifying networking: teaching non-majors via analogical problem-solving. ACM Symposium on Computer Science Education (SIGCSE 2013), Denver, USA, March 2013.
  41. Sameer Sahasrabudhe, Sahana Murthy and Sridhar Iyer. Embedding visual communication principles in Instructional Design phase of Learning Object creation process. World Conference on Education and Multimedia (ED-MEDIA 2012), Denver, USA, March 2012.
  42. M. Mavinkurve and S. Murthy. Interactive visualizations to teach design skills. Workshop on Computer-Supported Visualization, Modeling, and Simulation for Learning in the 20<sup>th</sup> International Conference on Computers in Education (ICCE 2012), Singapore, November 26-30, 2012.
  43. G. Banerjee and S. Murthy. Effect of instructors' pedagogy and TPACK on integration of computer based visualizations. Workshop on Computer-Supported Visualization, Modeling, and Simulation for Learning in the 20th International Conference on Computers in Education (ICCE 2012), Singapore, November 26-30, 2012.
  44. A. Kenkre, G. Banerjee, M. Mavinkurve and S. Murthy. Identifying Learning Object Pedagogical Features to Decide Instructional Setting. Proceedings of the 4th IEEE International Conference on Technology for Education (T4E 2012), Hyderabad, India, July 18-20, 2012.

45. A. Diwakar, M. Patwardhan and S. Murthy. Pedagogical Analysis of Content Authoring Tools for Engineering Curriculum. Proceedings of the 4th IEEE International Conference on Technology for Education (T4E 2012), Hyderabad, India, July 18-20, 2012.
46. R. Rajendran, S. Iyer and S. Murthy. Literature Driven Method for Modeling Frustration in an ITS. IEEE 12th International Conference on Advanced Learning Technologies (ICALT), Rome, Italy, July 4-6, 2012.
47. M. Patwardhan and S. Murthy. Teaching-learning with interactive visualization: How to choose the appropriate level? IEEE International Conference on Technology Enhanced Education (ICTEE 2012), Amritapuri, India, January 3-5, 2012.
48. M. Mavinkurve and S. Murthy. Visualisation to enhance students' engineering design ability. IEEE International Conference on Technology Enhanced Education (ICTEE 2012), Amritapuri, India, January 3-5, 2012.
49. Gargi Banerjee and Sahana Murthy. Model for large scale development of learning objects. Proceedings of the 3rd IEEE International Conference on Technology for Education (T4E 2011), Chennai, India. July 14-16, 2011.
50. Madhulika Goyal and Sahana Murthy. Probing students' affective domain in an ICT-enriched course. epiSTEME-4, Homi Bhabha Centre for Science Education, Mumbai, January 2011.
51. Usha Viswanathan and Sahana Murthy. Raising students' cognitive levels, extending level of textbook questions: Can we do both? Proceedings of epiSTEME-4, Homi Bhabha Centre for Science Education, Mumbai, January 2011.
52. Sahana Murthy, Rohit Gujrati and Sridhar Iyer. Using System Dynamics to Model and Analyze a Distance Education Program. International Conference on Information and Communication Technologies and Development (ICTD) 2010, London, UK. December 2010.
53. Divya Tiwari, Richa Sehgal, Jayant Bansal and Sahana Murthy. Clicking away the distance from education. Proceedings of the 2nd IEEE International Conference on Technology for Education 2010 (T4E 2010), Mumbai, July 2010.
54. Madhulika Goyal and Sahana Murthy. Student perceptions in the use of new technologies in engineering courses. Proceedings of the International Workshop on Technology for Education (T4E 2009), Bangalore, August 2009.
55. Sahana Murthy. Peer-assessment of homework using rubrics. AIP Proceedings of the 2007 Physics Education Research Conference, Greensboro, NC. July 2007.
56. Eugenia Etkina, David T Brookes, Sahana Murthy, Anna Karelina, Maria Ruibal Villasenor, Alan Van Heuvelen. Developing and assessing student scientific abilities. STEM Assessment Conference, October 2006.
57. Eugenia Etkina and Sahana Murthy. Taking First Steps to Understand Transfer of Scientific Abilities. National Association of Research in Science Teaching, Conference Proceedings (NARST), San Francisco, CA. April 2006.
58. Eugenia Etkina and Sahana Murthy. Design labs: student expectations and reality. AIP Proceedings of the 2005 Physics Education Research Conference, Salt Lake City, UT. August 2006.
59. Sahana Murthy and Eugenia Etkina. Using experimental design problems to help students in a large enrollment class develop scientific abilities. National Association of Research in Science Teaching, Conference Proceedings (NARST), Dallas, TX. August 2005.
60. Sahana Murthy and Eugenia Etkina. Development of scientific abilities in a large class. AIP Proceedings of the 2004 Physics Education Research Conference, Sacramento, CA. August 2004.

### *Specifications and Technical Reports*

1. Sahana Murthy and Sridhar Iyer. Guidelines and Templates for Planning, Conducting and Reporting Educational Technology Research. Technical Report (TR-ET-2013-01), Inter-Disciplinary Program in Educational Technology, IIT Bombay, Dec 2013.
2. Sridhar Iyer, Farida Khan, Sahana Murthy, Vijayalakshmi Chitta, Malathy Baru and Usha Vishwanathan. CMC: A Model Computer Science Curriculum for K-12 Schools. Technical Report (TR-CSE-2013-52), Dept of Computer Science and Engg., IIT Bombay, June 2013.

### *Editor of conference proceedings*

1. Viraj Kumar, Sahana Murthy, Kinshuk and Sridhar Iyer. Proceedings of the IEEE Ninth International Conference on Technology for Education (T4E 2018), Chennai, 2018. (indexed in IEEE Xplore digital library)
2. Maiga Chang, Nian-Shing Chen, Ronghuai Huang, Kinshuk, Kannan Moudgalya, Sahana Murthy and Demetrios G Sampson. Proceedings the 18<sup>th</sup> IEEE International Conference on Advanced Learning Technologies (ICALT 2018), Mumbai, India. (indexed in IEEE Xplore digital library)
3. Weiqin Chen, Jie-Chi Yang, Sahana Murthy, Su Luan Wong and Sridhar Iyer. Proceedings of ICCE 2016, the 24<sup>th</sup> International Conference on Computers in Education, India: Asia-Pacific Society for Computers in Education. 2016.
4. Viraj Kumar, Sahana Murthy and Kinshuk. Proceedings of the IEEE Eighth International Conference on Technology for Education (T4E 2016), Mumbai, 2016. (indexed in IEEE Xplore digital library)
5. S. Chandrasekharan, S. Murthy, G. Banerjee and A. Muralidhar (eds.). epiSTEME 6 International Conference to Review Research on Science, Technology and Mathematics Education, Conference Proceedings. India: Cinnamonteal. 2015.
6. Sahana Murthy and Kinshuk. Proceedings of the IEEE sixth international conference on Technology for Education, T4E 2014, Amritapuri, 2014. (indexed in IEEE Xplore digital library)
7. Sahana Murthy and Demetrios Sampson. Proceedings of the IEEE fourth international conference on Technology for Education, Hyderabad, 2012. (indexed in IEEE Xplore digital library)
8. Kinshuk and Sahana Murthy. Proceedings of the IEEE second international conference on Technology for Education, Mumbai, 2010. (indexed in IEEE Xplore digital library)

### **Workshops, Continuing Education Program courses, Blended MOOCs (in last 5 years)**

- TEQIP Senior Faculty Induction Workshop. Instructor for 4 sessions, January & June 2018.
- Pandit Madan Mohan Malviya National Mission on Teacher Training (PMMMNTT), Faculty induction program at IIT Bombay. Instructor for 2 lectures. December 2017.
- Pedagogy training for student-centered teaching-learning. 2-day in-house CEP course. REC Bijnor. November 9-10, 2017. *Jointly with Sridhar Iyer, Yogendra Pal, Anurag Deep.*
- Pedagogy for effective use of ICT for school teachers. 4-week MOOC on IITBombayX for school teachers and e-learning curriculum designers. Offered in Apr-May 2017, Enrolment 11478 and Sep-Oct 2017, Enrolment 2707. *Jointly with Sridhar Iyer, Sameer Sahasrabudhe, Gargi Banerjee.*
- Effective design of Outcome Based Education (OBE) for meaningful learning in engineering education. 2-day in-house CEP course. October 21-22, 2017. *Jointly with Sridhar Iyer, Madhuri Mavinkurve, Gargi Banerjee.*



- Pedagogy for online and blended teaching-learning process FDP101x & FDP201x. Faculty development program under IITBombayX. Co-instructor for multiple offerings in 2017-18.
- Moving from teacher-centric to student-centric teaching. Workshops for school principals, Next Education. September – November 2016.
- Strategies for developing effective e-learning content. In-house CEP course (2 days) for Next Education India Pvt Ltd. September 2-3, 2016.
- Educational Technology for Engineering Teachers. 8-week MOOC on IITBx platform, January 7 – March 7, 2016. (5000+ participants). *Jointly with Jayakrishnan Warriem and Sridhar Iyer.*
- 2<sup>nd</sup> Workshop on ‘Technology enhanced learning of thinking skills’, at the International Conference on Computers in Education, ICCE 2015, Hangzhou, China. Nov. 30, 2015.
- MEET Workshop – Mentoring educators in educational technology, IIT Bombay. Oct 23-25, 2015. *Jointly with Jayakrishnan Warriem, Rwitajit Majumdar and Sridhar Iyer*
- Pedagogy for effective use of educational technology in engineering education. 2-week equivalent workshop under Teach 10000 Teachers project, January 5-31, 2015. (4700 participants). *Jointly with Jayakrishnan Warriem and Sridhar Iyer.*
- Planning, Conducting and Reporting Educational Technology Research. Tutorial at the IEEE International Conference in Technology for Education, T4E 2014, Amritapuri. December 21, 2014.
- Peer-Instruction: An interactive learning strategy. How to promote student conceptual understanding in your course. IDP-ET workshop series. February 27, 2014.

### Invited Talks

- Would technology help in making students better learners? CSI Mumbai TechNext India 2018. February 11, 2018
- Large-scale teacher professional development for effective technology integration. Theme-based invited speaker at the 25<sup>th</sup> International Conference on Computers in Education, (ICCE 2017), Christchurch, New Zealand. December 6, 2017.
- Student-centric techniques in f2f classrooms, flipped classrooms and MOOCs: improving learning and engagement. Invited talk at Engineering Conclave, IIT Madras. September 1, 2016.
- Active learning strategies for improving student learning and engagement. Invited talk in seminar on ‘Conversations Across Disciplines – Teaching & Learning’, IIT Gandhinagar. February 13, 2016.
- Active learning strategies for improving student learning and engagement. Colloquium in Department of Electrical Engineering, IIT Bombay. November 4, 2015.
- Learning from digital technologies – cognitive aspects. Invited guest lecture at Tata Institute of Social Sciences, (MA in Education course), TISS, Mumbai. May 21, 2015.
- Peer-Instruction: An interactive learning strategy to promote student conceptual understanding. Session in Symposium on teaching-learning in higher education, IIT Madras. May 28, 2014.
- Computer-based visualizations in facilitating learning: Some myths and realities. Invited talk at the National Symposium on Future Directions for Technology in Education. SNDT Women’s University. March 21, 2014.
- Academic excellence through quality technical education: Challenges and opportunities. Keynote speech at AICTE sponsored national seminar, Thakur College of Engineering and Technology, Mumbai. January 23, 2014.

- Interactive visualizations to develop scientific abilities. Invited seminar at Homi Bhabha Centre for Science Education, TIFR, Mumbai. November 22, 2012.
- Interactive visualizations to develop scientific abilities. Invited seminar at Freudenthal Institute of Science and Maths Education, Utrecht, Netherlands. June 28, 2012.
- Educational Technology: The Why, the What and some of the How. Invited talk at Symbiosis Internal Conference on Open and Distance Learning, Pune. February 23, 2011.

### **Consultancy**

- Evaluation of Train-the-trainer course. Naval Institute of Educational Training and Technology. 2017.
- Advice on R&D of current and future education projects. Next Education India Pvt Ltd. 2016-19.
- Designing pedagogy for FOSS training modules. In-Open Technologies. 2009-10.
- Designing Modules for Computer Teacher Training. In-Open Technologies. 2010-11.

### **Sponsored Projects**

- Pedagogy for effective use of ICT by School teachers. Sponsored by Next Education India Pvt Ltd. 2017-20.
- Next Education Research Lab. Endowed lab sponsored by Next Education India Pvt. Ltd. 2017-22.
- Benchmarking digital content. sponsored by Next Education India Pvt Ltd. 2016-18
- Project OSCAR, Open Source Courseware Animations Repository. (Co-PI). MHRD-NMEICT project. 2010-14.
- Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning. (PI). IITB Coordinator for MHRD-NMEICT project (anchored at IIT Kharagpur). 2010-13.
- OSCAR for physics higher education. (PI) Internally funded MHRD project. 2009-12.
- Learning-centered framework for evaluation of e-learning content. Seed Grant IRCC, IIT Bombay. 2009-14.

### **Professional Activities**

- Local Organizing Chair for IEEE 18<sup>th</sup> International Conference on Advanced Learning Technologies ICALT 2018, July 9-13, 2018.
- Executive Committee Member, Asia Pacific Society of Computers in Education 2014-date.
- International Program Co-Chair, 24<sup>th</sup> International Conference on Computers in Education, ICCE 2016.
- Program co-chair, IEEE International Conference on Technology for Education (T4E2010, T4E2012, T4E 2014, ICCE 2016, T4E 2016, ICALT 2018, T4E 2018)
- Steering committee member, IEEE International Conference on Technology for Education, T4E series, flagship ET conference in India.
- National Mission on Education through ICT projects: Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning. (PI), “Project OSCAR - Open Source Courseware Animation Repository” (co-PI).
- Reviewer for journals: ETR&D, ET&S, IEEE ToE, IEEE TLT, RPTEL.
- Program committee member for international conferences: ICALT, ICCE, CELDA, T4E, ICSLE.