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Online education tools and flipped (reverse) class models for teaching and learning and pedagogic and andragogic approaches to self-learning have become quite mature in the last few years because of the revolution in video, interactive software and social learning tools. Open Educational resources of dependable quality and variety are also becoming available throughout the world making the current era truly a renaissance period for higher education using Internet. In my presentation, I shall highlight structured course content preparation online in several areas of spectroscopy and also the design and development of virtual lab tools and kits for studying optical spectroscopy.

Both elementary and advanced courses on molecular spectroscopy are currently under development jointly with researchers in other institutions in India. I would like to explore participation from teachers throughout the world in the teaching-learning process using flipped class methods for topics such as experimental and theoretical microwave spectroscopy of semi-rigid and non-rigid molecules, molecular complexes and aggregates. In addition, courses in Raman, Infrared spectroscopy experimentation and advanced electronic spectroscopy courses are also envisaged for free, online access. The National Programme on Technology Enhanced Learning (NPTEL) and the National Mission on Education through Information and Communication Technology (NMEICT) are two large Government of India funded initiatives for producing certified and self-learning courses with financial support for moderated discussion forums. The learning tools and interactive presentations so developed can be used in classrooms throughout the world using flipped mode of teaching. They are very much sought after by learners and researchers who are in other areas of learning but want to contribute to research and development through inter-disciplinary learning. NPTEL is currently experimenting with Massive Open Online Course (MOOC) strategy, but with proctored and certified examination processes for large numbers in some of the above courses.

I would like to present a summary of developments in these areas to help focus classroom (online and offline) learning of Molecular spectroscopy.