1. **Title of the Practice**: Project-based learning

2. **Objectives of the Practice**

   Objective 1: To improve the ability to apply theory to practice and vice versa
   
   Outcome: By executing the projects, students will be able to see the applicability of the learned theories which results in an enhanced understanding of the theoretical concepts. Also, the issues faced during the project execution enable the exploration of more theoretical concepts. As a result, students gain knowledge in an integrated manner due to mutual reinforcement of theory and practice.

   Objective 2: To improve the practical skills of the student.
   
   Outcome: Students will be able to get training on using the latest tools and methodologies to develop applications and build systems.

   Objective 3: To impart skills to identify research problems.
   
   Outcome: Normally, projects are defined by faculty members with a certain degree of unexpectedness or hypothesis testing. While doing the project, the student is forced to read the latest research papers related to that problem. As a result, there is a high probability that the students will be able to identify new research problems.

3. **The Context**

   The faculty members should be able to identify research projects. It is only possible if the faculty members carry out cutting-edge research. Also, the students who are getting admitted should be innovative. The research environment with MS and Ph.D. program will enable project-based learning. To implement the above practice, the university should be autonomous to modify the curriculum and enable project-based learning. Also, the institute should have a robust research-enabling curriculum.

4. **The Practice**

   It is expected that the graduates produced from Indian universities should possess theoretical and practical skills. The theoretical knowledge includes fundamental concepts regarding the subject. The practical skills include the ability to design systems, and tools and develop applications. In engineering education, theoretical concepts are imparted through classroom lectures and laboratory skills in dedicated laboratories. Unfortunately, enough practical knowledge is not gained due to the limited time available to impart practical skills. The issue of imparting practical education becomes unmanageable due to the diversity of the students. As a result, the students are not getting the expected practical and system development skills. The industry also feels that the level of practical skills exposed to the students is not up to the desired level. Human resources with sufficient system development and practical skills are imperative for accelerating India’s growth potential. As of now, several companies are operating their product and service industries in India. Also, to solve India’s economic problems and increase high GDP, it is important that we develop indigenous technologies. We cannot expect foreign skilled manpower to produce technologies and build systems to solve India’s problems. So, it is very necessary to impart skill-based education to current and next-generation students by developing institutes to impart skills.
At IIIT Hyderabad, we are striving to impart skills through project-based training. Besides research, high-quality teaching is the primary objective of the institute. As a result, anyone who joins this University, either faculty or student, has no confusion regarding expectations with respect to teaching. Project-based teaching is a part and parcel of the curriculum. The curriculum provides the flexibility for the faculty and teacher to opt for project-based learning and allows them to build a prototype by integrating several different concepts. As a result, learning becomes an enjoyable journey for both faculty and student. Like any new idea, the proposed mechanism also has constraints.

There are several constraints.

• If not implemented seriously, it will create a negative impact: The project-based learning should be taken seriously by faculty and students. It should contain an exploration and development part. The academic level should be defined properly.
• Unless faculty are interested, it is difficult to implement.
• The teaching should be of high quality, to encourage students for carrying out project-based learning. • The institute should have a research environment.

5. Evidence of Success

Several UG and PG students have opted for project-based learning. The research ideas identified through project-based learning have led to the production of research papers. The project-based learning has enabled UG students to work with MS/Ph.D. students. The learning has enabled them to participate in several competitions. The results indicate that students are liking the project-based learning system. During the year 200 students have opted for course projects. Social applications of our research are also very important to us. Institute’s Lab for Spatial Informatics has launched VRGeo, an open-source software for geospatial information. In addition, there are the following achievements in technical contests: IIIT-H represented India in the ACM ICPC 2012 international contest and the team came in the top 20. It represented India fourth year in a row. IIIT-H has been number 1 globally in Sphere Online Judge, a highly popular programming site with over 30,000 users.

6. Problems Encountered and Resources Required

Besides research, the university has set high-quality teaching as the main goal for the institute. Initially, it took a few years to set up the curriculum. After making several adjustments based on the feedback from students and faculty, project-based learning has been implemented smoothly. The project-based learning increases the academic load on the faculty. It requires more faculty members to manage the projects.

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