



Shri Aillak Pannalal Digamber Jain Pathashala's

WALCHAND INSTITUTE OF TECHNOLOGY

(An Autonomous Institute)

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1. Title of the Practice:

"Incorporating Hackathons into Engineering Education: A Best Practice to foster innovations and enhance Problem-Solving Skills"

2. Objectives of the Practice:

- To introduce engineering students to the concept of hackathons and the benefits.
- To develop strategies and recommendations for maximizing the benefits of hackathons including guidance on how to prepare for and participate in hackathons.
- To foster innovation, enhance problem-solving skills, and provide practical exposure to real world challenges.
- To build the soft skills amongst the students.

3. The Context

The concept of hackathons has a long history that dates back to the late 1990s. A hackathon is a collaborative event where participants come together to solve problems or create new products or solutions. Hackathons often involve participants working together in teams to develop prototypes, test ideas, and create solutions to specific challenges or problems. Hackathons can last for a few hours or several days, and they are often structured to involve a series of challenges or tasks that participants must complete. Hackathons are a great way for participants to learn new skills, connect with others, and develop new ideas and solutions. Hackathons are now a common feature of the tech industry and are often used as a way for companies to generate new ideas and solutions, develop prototypes, and test new technologies. As a result, hackathons are incorporated by universities and other organizations as a way to encourage innovation and problem-solving among students. Hackathons have become increasingly popular in engineering colleges in recent years. Hackathons are an important part of the current landscape and are likely to continue to play a significant role in the development of new ideas and solutions in the future. Thus, hackathons have been widely encouraged at Walchand Institute of Technology as a way to foster innovation.

3.1 Potential benefits of Hackathons for engineering colleges:

- **Encouraging problem-solving skills:** Hackathons can be a great way for engineering students to develop and practice problem-solving skills. By working on real-world challenges and problems, students can gain valuable experience in finding and implementing solutions.
- **Promoting innovation and creativity:** Hackathons can encourage engineering students to think creatively and come up with innovative solutions to problems. This can be a valuable skill in the field of engineering, where the ability to think creatively and come up with new ideas is often critical.
- **Building teamwork and collaboration skills:** Hackathons often involve students working in teams, which can be a great way for them to develop teamwork and collaboration skills. These skills are often critical in the engineering field, where projects are often complex and require the contributions of many different people.
- **Connecting with industry professionals:** Hackathons can provide opportunities for engineering students to connect with industry professionals and experts, which can be a valuable learning experience and can help students to build their networks.

4. The Practice

At Walchand Institute of Technology, the process of incorporating hackathons into engineering education follows a well-defined framework that encompasses several stages from planning to execution. The institute recognizes the value of hackathons as a means to foster innovation, enhance problem-solving skills, and provide practical exposure to real-world challenges. The following are the stages involved in the execution of this best practice:

I. Pre-Hackathon preparation:

A. Planning Stage:

i. Identify the objectives: The institute sets clear objectives for conducting hackathons, such as promoting creativity, collaboration, and practical learning among students.

ii. Define the scope: Determine the scope of the hackathon, including the theme, problem statement, and desired outcomes.

iii. Formulate teams: Create diverse teams comprising students from different disciplines to encourage cross-functional collaboration and the exchange of ideas.

B. Preparatory Stage:

i. Provide guidance and resources: Conduct an in house pre-hackathon workshops to equip participants with the necessary technical skills, tools, and methodologies required for problem

solving.

ii. Mentoring and support: Assign faculty mentors to guide and support the student teams throughout the hackathon process, providing insights, expertise, and advice.

C. Execution Stage:

i. Kick-off event: Organize a formal kick-off event to inspire participants, introduce the problem statements, and explain the evaluation criteria and rules.

ii. Time-bound competition: Allocate a specific time frame for teams to work on their solutions, simulating a competitive environment to enhance focus and productivity.

iii. Collaborative workspace: Provide a well-equipped workspace where teams can brainstorm, design, develop, and test their solutions.

iv. Continuous evaluation: Conduct regular check-ins and progress reviews to monitor the teams' development and provide constructive feedback.

D. In house Presentation Stage:

i. Final solution showcase: Allocate a specific time for teams to present their solutions to a panel of judges, faculty members, and industry experts.

ii. Evaluation and feedback: Assess each team's solution based on predefined criteria, including innovation, technical proficiency, feasibility, and impact. Provide constructive feedback to help teams improve their ideas and implementations.

E. Learning and Reflection:

i. Post-hackathon debrief: Conduct a debriefing session to reflect on the hackathon experience, discuss lessons learned, and identify areas for improvement.

ii. Knowledge sharing: Encourage participants to share their experiences, insights, and learnings with the wider engineering community through presentations, papers, or workshops.

iii. Recognize achievements: Acknowledge and appreciate the efforts and achievements of the participating teams through certificates, awards, or public recognition.

II. Finale Hackathon preparation:

A. Practice and prepare: Mentors can help students to practice and prepare for the presentation and showcase of their projects at the end of the hackathon. This could involve rehearsing the presentation, developing visual aids or materials, and getting feedback and guidance on the content and delivery of the presentation.

B. Onsite support: During the hackathon, mentors can provide ongoing support and guidance to students as they work on their projects. This could involve helping students to troubleshoot technical issues, offering suggestions and ideas, and providing feedback and guidance on the progress of the project.

C. Focus on key areas: Mentors can help students to identify the key areas that will be most important for winning the hackathon, such as innovation, problem-solving, or technical expertise. They can provide guidance and support to help students focus on these areas and develop their skills and knowledge in these areas.

D. Debrief and reflect: After the hackathon, mentors can help students to debrief and reflect on the experience. This could involve discussing the challenges and successes of the hackathon, assessing the skills and knowledge gained, and identifying any areas for improvement in future hackathons.

By following this process, the institute effectively incorporates and train students for participating in hackathons, helping them to develop important skills, make connections, and gain valuable experience that will serve them well in their careers.

5. Evidence of Success

Students have participated in various hackathons organized at state/national/international level and won various prizes including Smart India Hackthon, Toycathon, Assam Police Hackathon, Synfig Studio 2D animation Hackathon and other various hackathons organized by industries and institutes.

- **Smart India Hackathon (SIH) 2023-24**

Hackathons have emerged as a transformative approach in engineering education, fostering creativity, critical thinking, and problem-solving skills. The institute has made significant efforts to inculcate this culture of innovation and entrepreneurship among its students, starting with initiatives like internal hackathons and active participation in national-level events. The Smart India Hackathon (SIH) 2023, launched on 23rd August 2023, served as a nationwide platform to address real-world challenges and promote a culture of innovation and startups. The event followed a structured timeline with key milestones, including registration and idea submission until 31st October 2023, an Internal Hackathon on 20th September 2023, and rigorous idea evaluation from 1st to 20th November 2023. Out of 79 participating teams, 48 from the software category and 31 from the hardware category, five teams were selected for the Grand Finale after a meticulous screening process. Team EcoProtector emerged as the winner, securing the first prize worth INR 1 Lakh. The IDE Bootcamp Phase II, held from 29th January to 2nd February 2024, provided participants with technical guidance and entrepreneurial insights, preparing them for the Grand Finale. SIH 2023 underscored the importance of integrating hackathons into education, enabling students to develop practical solutions to societal issues while enhancing their technical and entrepreneurial capabilities. The success of Team EcoProtector and the overall outcomes demonstrate the impact of such initiatives in nurturing innovation and preparing students for future challenges.

- **Smart India Hackathon (SIH) 2022**

Institute has started participation in SIH since 2018. As per rules & regulations stated by MHRD, institute organized internal hackathon and submitted idea proposals. No of teams participated in SIH Grans finale are 1, 2 and 3 in the year 2018,2019 and 2020 respectively.

In SIH 2020, First prize for tagline is awarded to the Team BUGZERO of WIT. This year our 7 teams (5 teams for software Edition and 2 teams for hardware edition) got qualified for grand finale. Three teams in software edition and one team in hardware edition are winners.

Each team received cash prize of Rs. 1, 00,000/-

- **UNESCO-India-Africa Hackathon 2022**

Out of winning teams 2 students qualified for UNESCO-India-Africa Hackathon 2022 and one student was the winner for the same. His team received cash prize of Rs. 3,00,000/-

- **Toycathon 2022 Physical Edition**

One Team is winner for Toycathon 2022 Physical Edition Grand Finale at Galgotias University nodal centre. Team received Cash prize of Rs. 25000, trophy and certificates.

- **RIT HACKATHON**

Two teams won at national level event RIT-Hackathon 2022.

6. Problems Encountered and Resources Required

Problems Encountered (2023)

In 2023, participants faced several challenges during the hackathon, including:

1. **Time Constraints:** In addition to the usual challenges of balancing hackathon tasks with other commitments, students had to contend with end-semester exams. With only four days between exams and the hackathon, managing preparation time became even more crucial.
2. **Team Dynamics:** Diverse skills, personalities, and work styles within teams continued to pose challenges, particularly affecting communication and decision-making.
3. **Limited Resources:** Due to the time crunch and the need for quick solutions, participants often had to work with limited resources, pushing them to be more resourceful in finding alternatives.
4. **Technical Challenges:** Encountering unfamiliar technologies or tools continued to be a hurdle, requiring quick troubleshooting and debugging efforts.
5. **Pressure to Perform:** The added pressure of both exams and the hackathon heightened expectations from judges and sponsors, creating a stressful environment.

Despite these challenges, students developed strategies and collaborated effectively to overcome them and achieve successful outcomes.

Strategies for Overcoming Challenges (2023)

1. **Time Management:** Prioritizing tasks and breaking down projects into smaller components were critical in managing the limited time between exams and the hackathon. Tools like project management software were essential for tracking progress and meeting deadlines.
2. **Resourcefulness:** With limited resources, participants made use of open-source software, online tools, and collaborations with mentors or external partners to find creative solutions.
3. **Troubleshooting:** Participants remained proactive in resolving technical difficulties by seeking help from mentors or utilizing online resources and forums for quick solutions.
4. **Communication:** Clear communication within teams was key to overcoming challenges. Establishing roles, holding regular check-ins, and staying organized with project management tools helped keep everyone on the same page.
5. **Self-Care:** Managing stress and fatigue was more important than ever. Participants prioritized

- breaks, adequate sleep, and healthy meals to maintain their focus and energy.
6. **Managing Pressure:** Given the heightened expectations, focusing on learning and growth rather than just the final outcome helped reduce pressure. Setting realistic goals and seeking support from mentors and teammates were vital in maintaining morale.

Resources Required (2023)

The resources required in 2023 were similar to previous years, with specific needs based on the problem statement. Key resources included:

1. **Infrastructural Resources:** Hardware, software, and data were crucial to the development process.
2. **Human Resources:** Mentors and domain experts were essential for both development and deployment, providing guidance and expertise throughout the process.

Time management became even more important in 2023 due to the proximity of end-semester exams, which required additional focus on balancing both academic and hackathon preparation.

7. Note:

Throughout this entire process, Walchand Institute of Technology prioritizes creating a supportive and inclusive environment that fosters collaboration, teamwork, and the exchange of innovative ideas. The institute ensures that the hackathon experience is seamlessly integrated with its educational objectives, equipping students to tackle real-world engineering challenges while honing their innovation and problem-solving skills. By embracing hackathons as a cornerstone of engineering education, Walchand Institute of Technology strives to cultivate a dynamic and enriching learning atmosphere that empowers students to craft innovative solutions and excel in their engineering careers.

Looking ahead, the institute encourages students to participate in upcoming hackathons, seeing them as invaluable opportunities to challenge themselves, collaborate with peers, and make meaningful contributions to society through technology. With each event, Walchand Institute of Technology remains committed to inspiring and preparing the next generation of engineers to innovate, lead, and succeed in an ever-evolving world.