# QUANTUM UNIVERSITY

## **Student Centric Methods**



Annual Report on Problem Solving Methodologies

Academic Year (2021-2022)



# ANNUAL REPORT PROBLEM SOLVING LEARNING METHODOLOGIES



Academic Year (2021-2022)

Registrar Quantum University



#### **Problem Solving Learning Methodologies**

#### **2021-2022**

Problem-Based Learning (PBL) is an innovative educational approach that redefines the traditional classroom dynamic by placing students at the forefront of their learning experience. In this methodology, students actively engage in the learning process by tackling real-world, open-ended problems within collaborative group settings.

The essence of PBL lies in its emphasis on cultivating essential problem-solving skills. Instead of relying on traditional lecture-based instruction, PBL encourages students to delve into authentic challenges that mirror those they might encounter in their future careers. This hands-on approach not only deepens their understanding of the subject matter but also equips them with critical thinking, communication, and teamwork skills.

Central to PBL is the concept of student empowerment. By immersing themselves in collaborative group work, students take ownership of their learning journey. This not only enhances their motivation and self-directed learning skills but also fosters a sense of responsibility and independence. In this active learning environment, students become more than passive recipients of information; they become problem-solvers, applying theoretical knowledge to real-world scenarios.

#### **Problem Solving Methods**

- ·Technical Quiz
- Project Work and Demonstration
- Project Competition
- Research Paper Presentation/RIC
- Presentation
- ·Case Studies
- Hackathon-Problem Selection and Solving

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#### **Problem Solving Learning**

#### Session- 2021-2022

#### 1. Google Development Students Club Program

Quantum University, a registered Google Developer Student Club (DSC) in Uttarakhand, offers students the privilege to participate in various skill-enhancing programs provided by Google. Mr. Nilesh Kumar, a 3rd-year B. Tech. a student specializing in cybersecurity successfully cracked the selection process for the Google DSC program. Consequently, he was granted the opportunity to complete a 3-month certification program offered by Google from 1st May to 15th August 2021.

#### Overview of the Program:

- Google Developer Student Club (DSC): Quantum University is recognized as a Google DSC in Uttarakhand, allowing its students to access a plethora of skill-enhancing programs and resources provided by Google.
- **Participant:** Mr. Nilesh Kumar, a 3rd-year B. Tech. a student specializing in cybersecurity was selected to participate in the Google DSC program.
- **Certification Program:** Mr. Kumar completed a 3-month certification program facilitated by Google from 1st May to 15th August 2021.

- **Specialized Knowledge:** Through the certification program, Mr. Nilesh Kumar gained specialized knowledge in cybersecurity, a field of increasing importance in today's digital landscape.
- Technical Skills Enhancement: Participation in the program enabled Mr. Kumar to enhance his technical skills in areas relevant to cybersecurity, such as network security, cryptography, and ethical hacking.
- **Professional Development:** Engaging in the Google DSC program facilitated Mr. Kumar's professional development by providing exposure to industry-standard practices and tools used in cybersecurity.
- **Networking Opportunities:** The program allowed Mr. Kumar to network with peers, mentors, and professionals in the cybersecurity domain, expanding his professional network and fostering collaboration opportunities.



• **Recognition and Validation:** Completion of the certification program from Google serves as a validation of Mr. Kumar's skills and expertise in cybersecurity, enhancing his credibility and employability in the field.

**Conclusion:** Quantum University's participation in the Google Developer Student Club program, coupled with Mr. Nilesh Kumar's successful completion of the certification program, exemplifies the institution's commitment to providing students with opportunities for skill development and professional growth. Through access to programs like Google DSC, students like Mr. Kumar can acquire specialized knowledge, enhance their technical skills, and establish themselves as competent professionals in their respective fields. Moving forward, continued participation in such programs will further strengthen Quantum University's reputation as a hub for nurturing talent and fostering innovation in the field of technology.



### Google Developer Student Clubs

Quantum University

#### About GDSC

Google Developer Student Clubs (GDSC), is a program by Google for university students to help them learn various technologies such as Cloud Computing, Application Development, Machine Learning & AI, Web Development, and help them grow in their leadership and management skills.

Google, once a year selects one student from Universities or Colleges across the world through an application & personal interview process carried out by Google executives. The selected students are then designated as Google DSC Leads, and are responsible for successfully conducting Workshops, Bootcamps & informative sessions on various in their institutes which are funded and supported by Google.

#### About GDSC Quantum University - Roorkee

Quantum University - Roorkee has also become a part of the Google Developers Ecosystem.

Nilesh Kumar (of B.Tech Cyber Security, 3rd Year), cracked the Google Developer Student Clubs selection process (including of Application Round & Personal Interview Round) that spanned over 3 Months (from May 2021 to August 2021) and brought Google Developer Student Clubs to Quantum University for the academic session 2021-22.

#### Note:

Across India, there are 323 Registered Google DSCs and only 2 across Uttarakhand, namely GDSC Quantum University & GDSC Graphic Era.



#### **♦ Coogle Developer Student Clubs**

#### Dear Nilesh,

Congratulations! We are thrilled to inform you that you have been selected as a Google Developer Student Club Lead for your campus!



You are joining an amazing community of student leads who will be representing hundreds of colleges and universities across the globe.

You were selected because you are a leader who believes that technology can do extraordinary things for the world. You have taken on the responsibility to help students grow as developers and empower these students to impact their communities with technology. Through this experience you will not only be leaving a legacy of impact but also growing as an individual and contributing in a meaningful way to the greater developer ecosystem.

#### CERTIFICATE OF APPRECIATION

This Certificate is presented to

#### Nilesh Kumar

for outstanding performance in the 30 Days of Google Cloud program as a "Campus Facilitator" in 2021.



Tanvi Somani

Tanvi Somani

Program Manager, Google Developers India

Date of Issue: 2nd November, 2021

Google Cloud

Images of certificates Bestowed by Google to Mr. Nilesh



#### 2. Codex Activities for Students

From 12th May to 12th August 2021, the Department of Computer Science and Engineering organized a series of problem-solving events aimed at enhancing the problem-solving skills of students, particularly in the domain of software development. The events included various activities such as programming language certificate programs, Deloitte and STEM virtual experience programs, and hackathons. A total of 323 students participated in these activities.

#### **Event Activities:**

#### 1. Programming Language Certificate Programs:

- Offered by Great Learning Academy, Deloitte, and STEM virtual Experience program.
- · Focused on enhancing proficiency in various programming languages crucial for software development.

#### 2. Hackathons:

- Hosted and organized during the event period.
- · Provided students with practical problem-solving experiences in a competitive environment.

**Objective:** The primary objective of the program was to assist students in refining their problem-solving skills, particularly in the context of software development. By engaging in diverse activities ranging from certificate programs to hackathons, students were exposed to real-world challenges and opportunities to apply their theoretical knowledge in practical scenarios.

- **Enhanced Problem-Solving Skills:** Participants had the opportunity to tackle real-world problems in various domains, thereby enhancing their ability to identify, analyze, and solve complex issues.
- **Proficiency in Programming Languages:** Through certificate programs, students gained proficiency in programming languages, which are essential for software development, thereby improving their employability prospects.
- **Collaboration and Teamwork:** Hackathons encouraged collaboration and teamwork among participants, fostering communication skills and the ability to work effectively in a team environment.
- **Creative Thinking:** The diverse range of activities challenged students to think creatively and innovatively to solve problems, thereby expanding their problem-solving repertoire.



**Conclusion:** The problem-solving event organized by the Department of Computer Science and Engineering provided an excellent platform for students to enhance their problem-solving skills in the field of software development. Through a series of activities including certificate programs and hackathons, participants gained valuable practical experience and knowledge, which will undoubtedly benefit them in their academic and professional endeavors.

Overall, the event was a success in achieving its objectives and contributing to the skill development of the participating students.

	_	QUANTUM UNIVER	SITY		
		CODEX ACTIVITIES (Establish	ned In 2021)		
No.	Activities		*		
1	Workshop	Github (Open Source)	6 Hours (85 Students)		
	0.0000000000000000000000000000000000000	Web Designing (HTML, CSS, JS, Bootstrap) - (6 Hours)	6 Hours (82 Students)		
		BackEnd Development (PHP, MySQL, AJAX, jQuery) - (6 Hours)	6 Hours (78 Students)		
		React Native Workshop (Online Mode)	4 Hours (200+ Students Joined)		
2	Competition/Programs	POTP (Placement Oriented Training Program) on (Full Stack Development)	1 Month (30 Students)		
2	Competition/Programs	HACK12 - Hackathon Event	12 Hours Competitions (25 Team - 4 members each team (total of 100 students		
		Quiz Competition on Engineer's Day	Total of 125 Students		
		Quiz Compension on Engineer's Day	Total of ALD Statement		
3	Projects	Admin Office (Martyrs Wall - Designing)			
		University Online Quiz Portal			
		QLRC (Quantum Learning Resource Center)			
		DHAROHAR – Website			
		DHAROHAR – Brochure			
		DHAROHAR – Poster			
		DHAROHAR – Rule Book			
		UDDAN (Sports Club) - Poster, Logo, T-Shirt Design			
		Gardening Club - Designing work			
		SJA - Alumni (Mobile Application & Web-Application)	St. Joseph's Academy, Dehradun (S.J.A.)		
		ShareX (Lockdown Project shoutout by Quantum University)	20 50 50		
		Dezk (A remote application for Desktop or Laptops) - (Designed by CodeX Core Team)			
		Designing works for Quantum School of Technology (Quantum University)			
		Designing works for Quantum School of Bussiness (Quantum University)			
		Designing works for Qcafe			
		Engineer's Day Posters & Invitations			

List of activities done under the Codex Activities





#### **Hackathon-12 Promotional Image**



Image of certificate gained by Mr. Naureen from Great Learning Academy





#### Image of certificate gained by Mr. Priyansh from STEM connect virtual experience program







Images from the STEM Virtual Experience Program Organised to Foster the Problem-Solving Learning Capabilities of Students



# 3. Projects Submission by students related to real-life problems faced in real-life

On 22 August 2021, the Civil Engineering Department at Quantum University assigned project works to its students with the aim of inspiring and motivating them towards advanced learning. The projects were designed to address real-life problems, with a focus on issues related to overbridges and flyovers.

#### **Event Details:**

- Assignment of Projects: The Civil Engineering Department assigned project works to the students, providing them with an opportunity to delve into real-life problems and propose innovative solutions.
- **Nature of Projects:** The projects were diverse and varied, covering topics such as the design and construction of overbridges, flyovers, and other civil engineering structures.
- **Student Participation:** A total of 65 students from the Civil Engineering class actively participated in the project work assignment, showcasing their enthusiasm and interest in advancing their learning.
- **Duration:** The project work assignment spanned over a specified period, allowing students ample time to research, plan, and execute their projects.

- Enhanced Problem-Solving Skills: Through engagement in project works, students developed critical thinking and problem-solving skills by tackling real-life challenges in the field of civil engineering.
- **Application of Theoretical Knowledge:** The project works provided students with an opportunity to apply theoretical concepts learned in the classroom to practical situations, thereby reinforcing their understanding of key principles.
- Hands-On Experience: By actively participating in project works, students gained valuable hands-on experience in various aspects of civil engineering, including design, construction, and project management.
- Innovation and Creativity: Students were encouraged to think innovatively and propose creative solutions to the problems addressed in their projects, fostering a culture of innovation within the department.
- Collaboration and Teamwork: Project work promoted collaboration and teamwork among students, as they worked together to brainstorm ideas, divide tasks, and achieve common goals, thereby enhancing their interpersonal skills.



**Conclusion:** The project work assignment organized by the Civil Engineering Department at Quantum University proved to be an effective means of inspiring and motivating students toward advanced learning. By engaging in real-life problem-solving, students not only enhanced their technical skills but also developed important soft skills such as critical thinking, teamwork, and creativity. Such initiatives play a crucial role in preparing students for the challenges of the real world and fostering a culture of innovation within the department.

















In the pictures, Civil Engineering students display their problem-solving skills through practical project work on Bridges and Flyover models



#### 4. Guest Lecture on "Well Logging Techniques"

The Department of Civil Engineering organized a guest lecture on "Well Logging Techniques" on 07-11-2021 at the Mini Auditorium, aiming to enhance students' problem-solving skills within the civil engineering paradigm. Mr. D S Dang, a retired Deputy Director from IIP Dehradun, served as the guest speaker for the lecture. More than 45 students from the civil engineering department joined the event.

#### **Event Proceedings:**

- · The lecture commenced at 11:00 AM with all Civil Engineering students gathering in the mini auditorium.
- · Mr. Saurav Sharma, an Assistant Professor from the Civil Engineering Department, introduced Mr. D. S. Dang to the audience.
- · Mr. Karan Babbar, the Coordinator of the Civil Engineering Department, facilitated Mr. Dang.
- · Mr. Dang began the lecture by providing an overview of upstream and downstream processes, followed by a detailed discussion on well-logging techniques.
- · Various well-logging processes including Logging History, SP log, GR log, Resistivity Log, Density Log, Porosity Log, Neutron Log, and Calliper log were covered during the presentation.
- · A break was scheduled from 1:00 PM to 1:45 PM, after which the post-lunch session commenced at 2:00 PM.
- $\cdot$  In the post-lunch session, Mr. Dang explained the interpretation of logging data in a manner that was easy to understand for the students.
- ·The second session concluded at 3:00 PM, with both sessions being deemed interesting and informative by the attendees.

- **Enhanced Understanding:** Students gained a deeper understanding of well logging techniques and their applications in evaluating formation and formation fluids.
- **Problem-Solving Skills:** Exposure to real-world applications of civil engineering concepts helped students develop problem-solving skills within the civil engineering paradigm.
- · **Industry Insights:** Insights shared by Mr. Dang, a retired industry professional, provided students with valuable insights into industry practices and challenges.
- **Communication Skills:** The lecture format enabled students to improve their communication skills by actively engaging in discussions and asking questions.
- · **Networking Opportunities:** Students had the opportunity to network with the guest speaker and faculty members, potentially opening doors to future collaborations and opportunities.



**Conclusion:** The guest lecture on well logging techniques proved to be a valuable learning experience for Civil Engineering students at Quantum University. By bridging the gap between theoretical knowledge and practical applications, the lecture contributed to the development of students' problem-solving abilities and provided insights into the workings of the civil engineering industry. Such events play a crucial role in enriching students' educational experiences and preparing them for future professional endeavors.





Mr. D. S. Dang, Deputy Director (Retired), IIP Dehradun Sharing Secrets of Well Logging Techniques to Civil Engineering Students



#### 5. Technical Event (Hackathon) for Problem solving purposes

On March 7, 2022, the Department of Computer Science and Engineering of Quantum University organized a technical event in the form of a Hackathon to enhance the problem-solving capabilities of its students. The event aimed to provide a platform for students to demonstrate their technical skills, collaborative spirit, and innovative problem-solving abilities.

#### **Event Overview:**

- **Objective:** The primary goal of the event was to bolster the problem-solving capabilities of Quantum University students.
- **Turnout:** The Hackathon witnessed an impressive turnout, with 94 students actively participating in the competition.
- **Engagement:** The high level of engagement demonstrated by the participants underscored their eagerness to embrace challenges and contribute to the event's success.
- **Competition Structure:** Participants engaged in a competitive yet friendly environment, striving to secure the coveted first place. The event's structure encouraged collaboration, creativity, and strategic thinking among the participants.

#### **Learning Outcomes:**

- Enhanced Problem-Solving Skills: Participants had the opportunity to tackle real-world problems within a limited timeframe, enhancing their ability to analyze, strategize, and implement effective solutions.
- **Technical Proficiency:** Through hands-on experience gained during the Hackathon, students further developed their technical skills in programming, data analysis, and problem-solving.
- **Collaborative Spirit:** The event fostered teamwork and collaboration among participants, emphasizing the importance of working together to achieve common goals.
- Innovative Thinking: Participants were encouraged to think innovatively and creatively to devise unique solutions to the challenges presented during the competition.
- **Time Management:** The time-constrained nature of the Hackathon encouraged participants to prioritize tasks effectively and manage their time efficiently, a crucial skill in both academic and professional settings.

**Conclusion:** The Quantum University Hackathon held on March 7, 2022, was a resounding success in achieving its objectives of enhancing problem-solving capabilities and fostering a spirit of innovation among students. Through active participation in the event, students not only honed their technical skills but also developed crucial soft skills such as teamwork, creativity, and time management.



Moving forward, similar events should be organized regularly to provide students with continuous opportunities for skill development and experiential learning in a competitive yet supportive environment. Overall, the Hackathon served as a testament to Quantum University's commitment to nurturing well-rounded individuals equipped with the skills necessary to thrive in the ever-evolving technological landscape.

			EVI	ENT REPORT		
			Sess	ion :- 2021-22		
1.)	Event ID :- 2	0212490				
2.)	Name of The Eve	ent :- Techn	ical Event			
3.)	Organizing Depa	rtment/ Club	/Society :-	DEPARTMENT OF COMPUTER	SCIENCE AND	ENGINEERING
4.)	Organizing Co-O	rdinator :-	SANDHYA SAM	ANT		
5.)	Date Start :-	07/03/2022		Date Finished :-	08/03/2022	
6.)	Time Start :-	9:00AM		Time Finished :-	3:30PM	
7.)	Title :- HACK1	2 inter-college	open hackatho	n		
8.)	Invited Guest/P	erformer :-	Honorable Vice	Chancellor, Director QST , D	Pean Academics	,Director QSB
9.)	Affiliation of Gue	est :- Quantu	m university			
10.)	Audience (Depar	Marie Contract	4 th / CSE, B.	/ CSE, B.Tech / 2 nd / CSE-C Tech / 4 th / CSE-CSCQ, B.1 5 th / CSE-CSCQ, BCA / 2 nd	ech / 4 th / CSI	E-AIML, B.Tech / 6 th /
11.)	Number of atten	dees :- 94				
12.)	Venue :- Shy	amji auditorium				
13.)	Brief Summary :	- Students c	reated the proj	ect		
14.)	Course OutCome	<u>s:-</u>				
S.No.	Course	Year/Sem	Branch	Subject	co	PO





Pictures from Inter College Open Hackathon Challenge Aimed to enhance problem solving skills of the participants