

Students implement projects for real-life clients: Experiences from an Instruction Systems Design course

Sridhar Iyer

Educational Technology, IIT Bombay



PPCCLT Talk

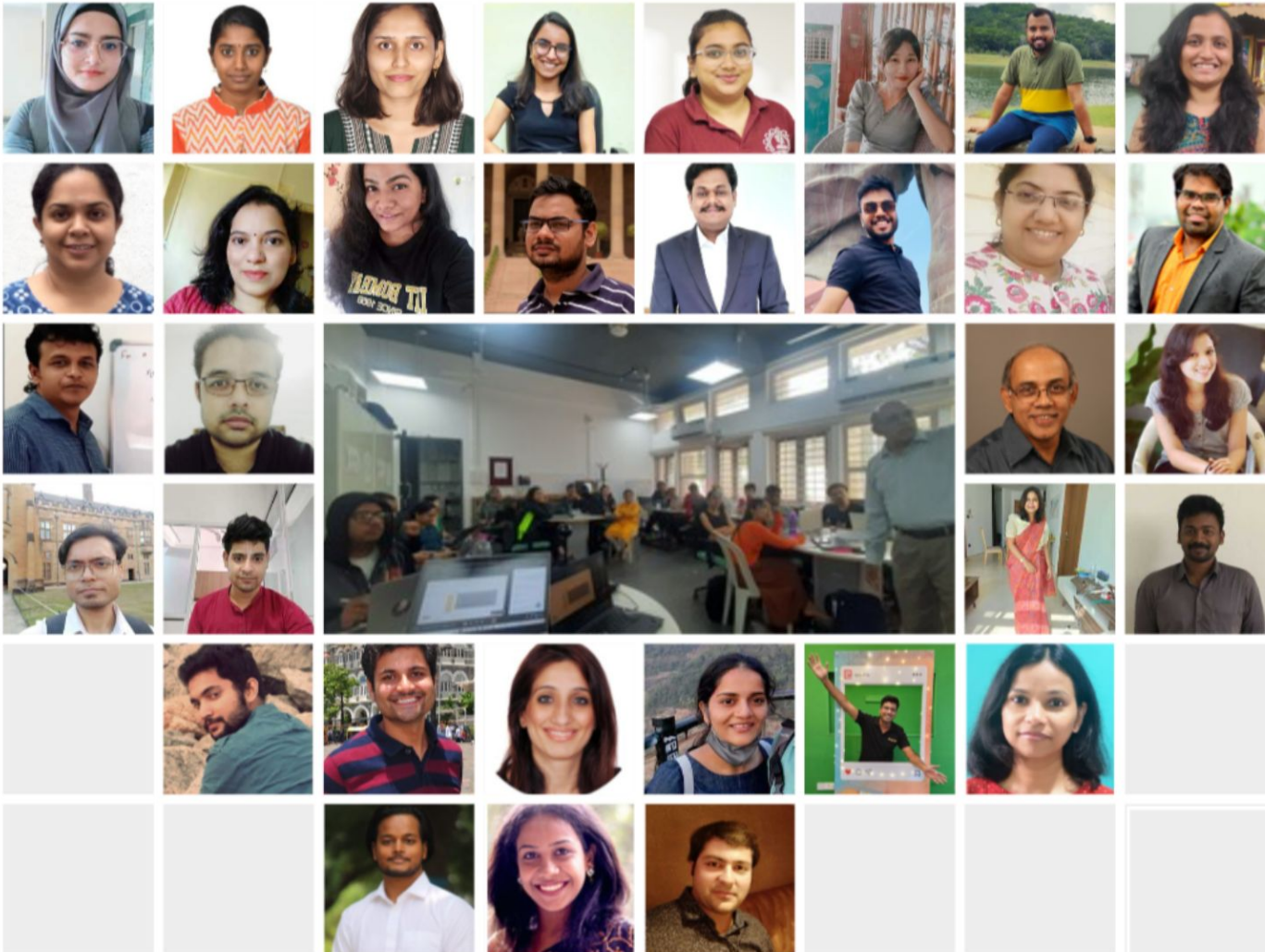
IIT Bombay, March 2024

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Acknowledgements - ISD course team



Instructors - Sridhar Iyer and Syaamantak Das

Teaching Assistant - Vishwas Badhe

Research Assistants - Sunita Raste, Daevesh Singh, Alekh V

Website management - Sunny Prajapati

Credit students - Nisumba Soodhani, Sandeep Yadav, Sunny Prajapati, Ashish Garg, Nandipati Kisore, Avijit Pandey, Sonika Pal, Kritika, Zun Phoo Mo, Arjun Prasad

Audit students - Ulfa Khwaja, David John, Indrayani Nishane, Rajashri Priyadarshini, Spruha Satwalekar, Jyoti Kolap.

Sit-through students - Amit Paikrao, Antony Prakash, Ishika, Sumitra Sadhukhan, Meera Pawar, Suprabha Jadhav, Setu Maheshwari, Ramdas Rai, Veenita Shah, Sheeja Vasudevan, Anveshna Srivastava

Post-course summer interns - Arjun Prasad, Zun Phoo, Sonika Pal, Nisumba Soodhani, Avijit Pandey

Talk Abstract - No need to read this

Courses that are practice-oriented often have projects as an important component to foster student learning. However, simplistic projects fail to sustain student interest. On the other hand, working on complex projects can be daunting for students who are learning the concepts and skills for the first time. This talk presents a solution to addresses these challenges.

This solution, implemented in an instruction systems design course, involves taking up a real-life project from a client and immersing students across diverse batches to carry it out. This talk will describe the course execution, followed by research findings on student interest, engagement and learning, and end with a discussion on the feasibility of adopting a similar approach in other courses.

What is this talk really about?

I did something atypical in a course last year.

I am going to tell you the story of the course - what, why, how, what happened, etc.

At the end,

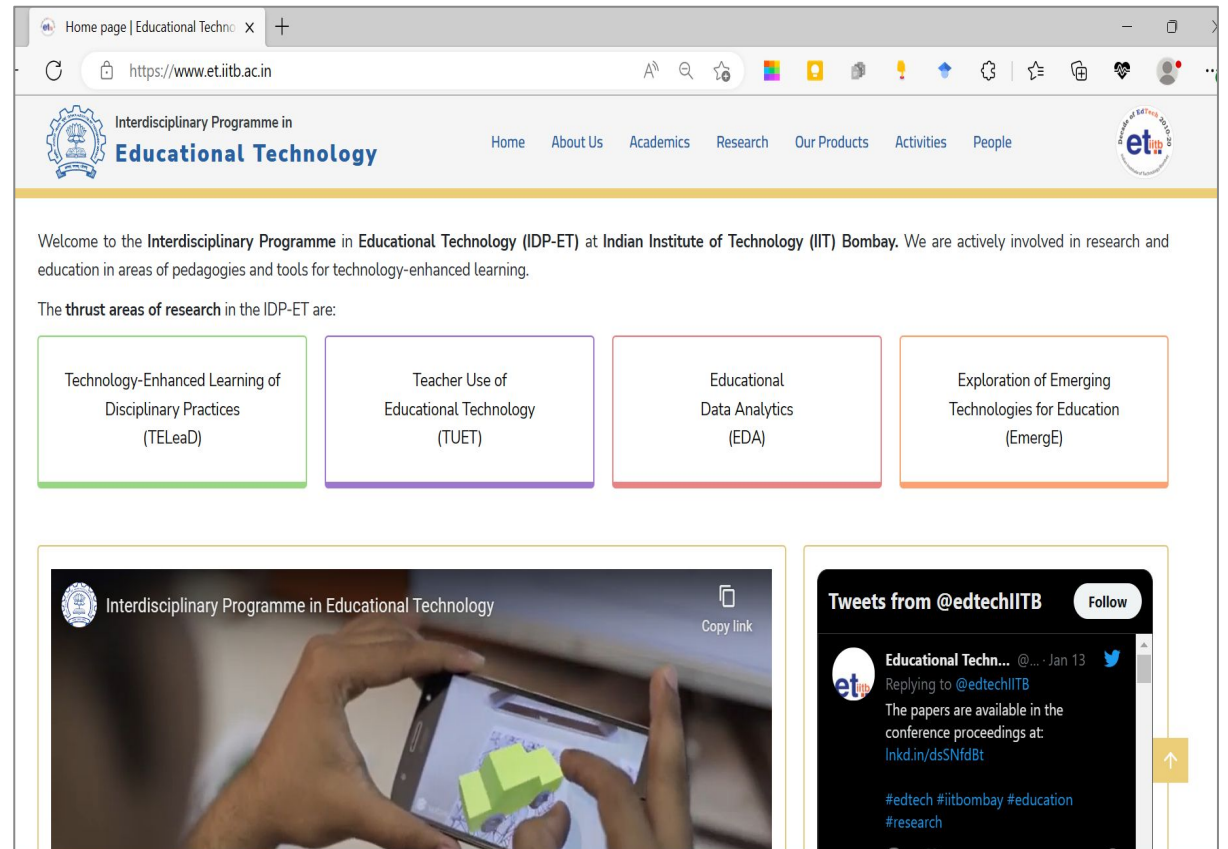
- If you find that it was an interesting story, our time has been well spent.
- If you engage in a discussion/debate on some points of the story, it is great.
- If this story triggers some idea that you might try in your course, it is a bonus.

Agenda

- Story in brief
- Diving into details
- Discussion

Educational Technology, IIT Bombay

- Established 2010 as an interdisciplinary program
- 6 core faculty
- PhD: 44 current, 20 alumni
- MTech: 12 current, 16 alumni
- Research - different thrust areas
- Development - MOOCs, Resources
- Outreach - Consultancy, FDPs



www.et.iitb.ac.in

Instruction Systems Design (ISD) course

ET 614 - Instructional Systems Design

Credits - 6



- I. What is instructional systems design? Why is it required? What do instructional designers do?
- II. Learning theories and how they inform instructional systems design
- III. Basic processes of instructional design; Needs assessment and instructional goals
- IV. Learning objectives, Taxonomies of cognitive levels
- V. Assessment: Diagnostic, Formative, Summative
- VI. Effective teaching-learning strategies
- VII. Technology-enhanced learning environments
- VIII. Models of instructional design
- IX. Evaluation of instructional systems

More specifically, 2023 offering focused on:

- ID models - ADDIE, SAM
- ID frameworks - LCM model, TPACK
- ID tools - Animaker, h5p, ...
- Project-Based Learning
- Real-life client

The problem with course projects

Projects are important in practices-oriented courses.

Toy projects don't sustain interest.

- Students may do it for the grade; Not everyone participates.

Suppose we move from toy projects to real life projects.

- They are challenging to execute within a course. More so when the course contents and practices are new for the students.

Suppose we entice senior students also to participate.

- How?

The solution overview

1. Find an interesting real-life project, from an actual client:
 - PwD cell project - Need for sensitization training modules
 - Contributing to it was naturally attractive to ET students
2. Immerse students across diverse batches to carry it out:
 - Entice senior students with “new learnings”, deeper content and beyond
 - Make mixed groups to offset the daunting effect
3. Keep options open for scaling down the project dynamically:
 - Just in case ...

What did the students achieve?

On 13th Jan 2023, we started from:

iv. Awareness/ Career

To create awareness among the functionaries of higher education about the specific educational needs of differently-abled persons.

On 13th April 2023, we reached: <https://sites.google.com/view/iitb-pwdcell-training>

Including multiple SME/Stakeholder interviews, Expert reviews and User study.

In May-June, a few students continued to work on refining the material, for release to public.

On 13th July, we handed the website over to PwD cell; It is linked from IITB main website.

Training resources website



Disability Awareness

Home

Locomotor Disability

Visual Impairment

ADHD & Learning Disabilities (LD)

Autism

Deaf or Hard of Hearing

Additional resources

About us

Disability Awareness



It Matters and We care !

This website has been created as a resource to make people aware towards inclusivity of persons with disabilities (PwD), in the context of IIT Bombay. Although there are several stakeholders involved in the IITB community, this resources primarily caters to teachers and peers of persons with disabilities. **To know more, click on the links below...**



Component materials

Scenario-based learning activities

PwD Sensitization

Home

Locomotor Disability

Visual Impairment

ADHD & Learning Disabilities (LD)

Autism

Deaf or Hard of Hearing

Additional resources

About us

Scenario

Scenario_non academic2

Ya.. let's do it

Check your learning

Thank you for trying out H5P. To get started with H5P read our [getting started guide](#)

How can colleges and educators support students with locomotor disabilities in managing their mental health challenges?

- Providing physical therapy services
- Offering counseling services and support groups
- Encouraging participation in extracurricular activities
- Limiting academic expectations and requirements

Check

Reuse Embed



Sensitization Videos

Guidelines

Points to remember while interacting with DHH individuals

- To gain attention of a DHH individual, gently tap on their shoulder.
- Always try to communicate with DHH individual in a well light environment.
- Don't chew, don't smoke or don't look away while talking with DHH individual.

Posters

BEING INCLUSIVE FOR VISUALLY IMPAIRED

Supporting persons with visual impairment

CHALLENGES FACED

- COMMUTING IN PUBLIC TRANSPORT
- CROSSING THE ROAD
- READING SIGN BOARDS

SUPPORT WE CAN GIVE

- PROVIDE SAFE & SUFFICIENT SPACE TO BOARD AND GET DOWN
- ASK FIRST -> LET THEM HOLD-YOUR ARMY -> MOVE SLOWLY
- HELP IN NAVIGATING HOSTEL, LECTURE HALL, LIBRARY

How can you make classroom more accommodating for DHH individuals?

✓ Use silent fans/devices to keep such noise to minimum +1

Use subtitles in videos

Use sound proofing to avoid external noise coming to class

1/3

Reflection questions with feedback



Inspiring stories

Was it any good? - Usefulness and Usability study

Participants:

- 38 participants (iitb students)

Survey(Google form):

- 15 questions on 5 criteria
- Likert Scale: *1-Strongly Disagree, ..., 5-Strongly Agree*

Module's evaluations:

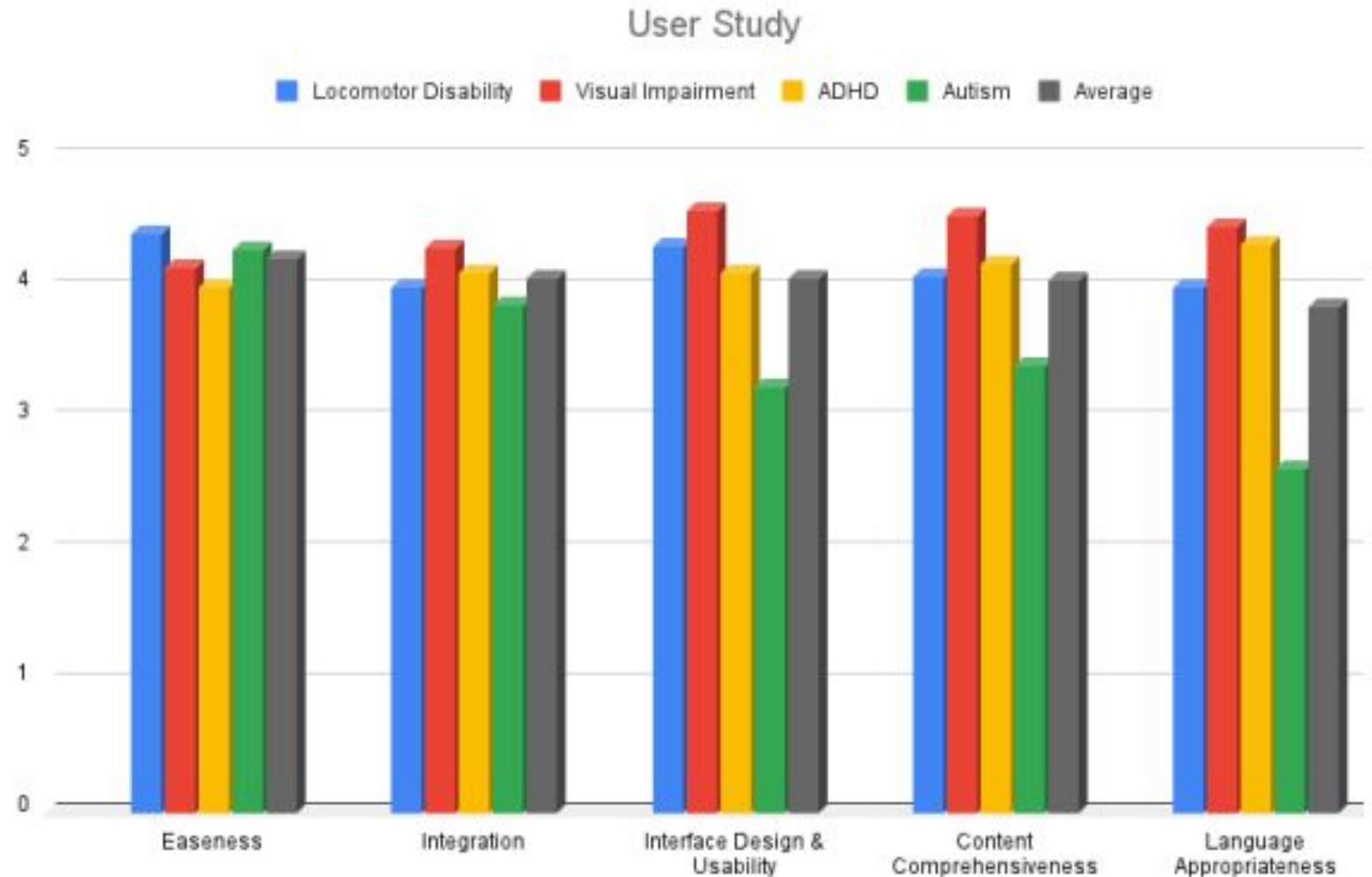
M1: Locomotor Disability (by 8 users)

M2: Visual Impairment (by 13 users)

M3: ADHD (by 9 users)

M4: Autism (by 8 users)

Overall Score: 4



How did we get there?

Cohort	Instructor's Learning Objectives	No. of Students	Group A	Group B	Group C	Group D	Float
X Credit students (1st year)	Same as specified for the course. They should be able to apply ID models, create content, design instruction units, evaluate, ...	X	2	2	3	3	-
Y Mostly Audit students (senior batches)	1) Learn to plan larger scale ISD (training for pwc cell). 2) Gain Mentoring skills - what prompts and scaffolds to provide to cohort X. 3) Gain teaching skills - by observing instructor.	Y	3	3	3	2	3
Z Mostly Sit-through (senior and post-docs)	1) Make connections across topics. 2) Reflect on instructor's actions. 3) Provide Mentoring support to cohort X and Y.	Z	1	1	1	1	2 + 4

Instructor actions

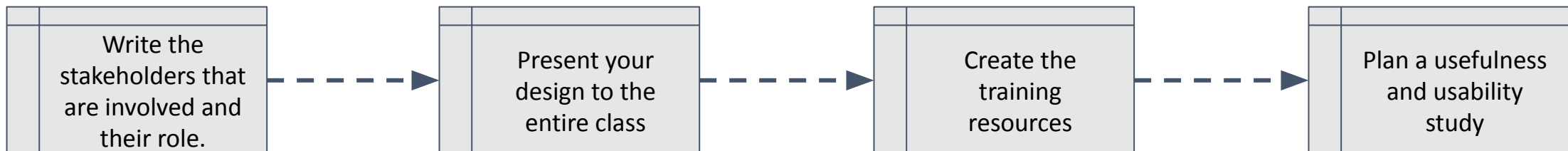
- **Cultivating enthusiasm for the course**
 - Identifying a meaningful real-life project aligned to the course
 - Defining benefits for each cohort
- **Creating meaningful learning activities**
 - Alignment of interest with course goals
 - Scoping of the project
- **Supporting collaboration across the cohorts**
 - Providing roles and responsibilities
 - Respecting learners' autonomy

Group work execution



Cohort	Role
X Credit students	Learning technical concepts and exploring new ideas through application of industry practices
Y (seniors)	Mentor Cohort X in application of idea using their prior knowledge. Learn larger scale project mgmt.
Z (senior and post-docs)	Provide directions to others (without thrusting own ideas). Learn PBL course orchestration.

Focus questions



Project timeline

Client Meeting

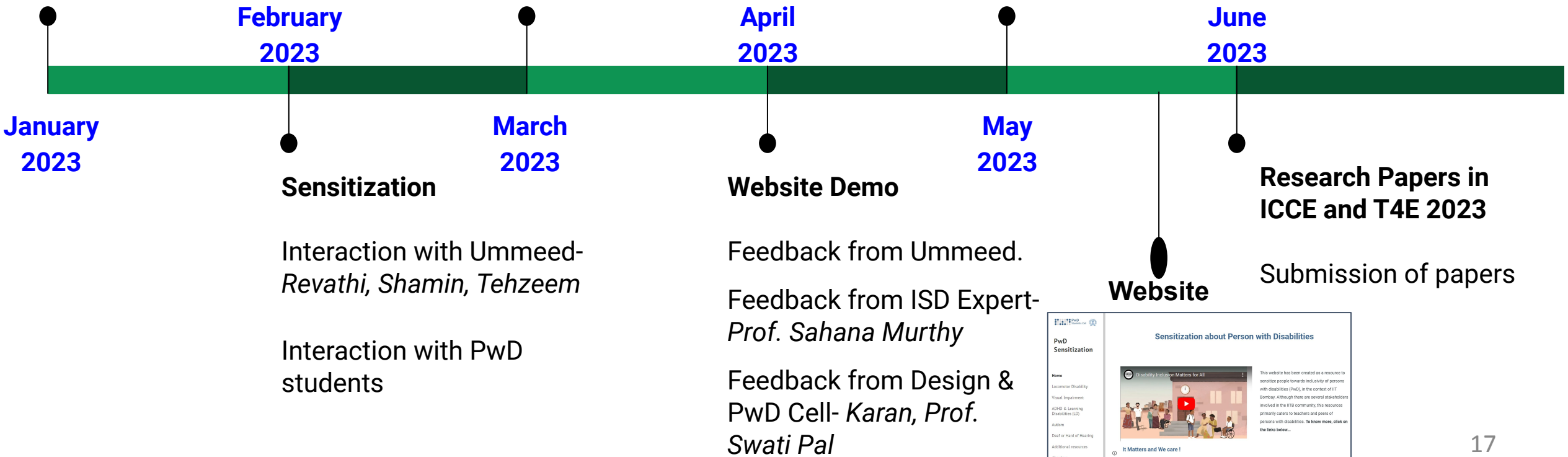
Meeting with PwD Cell
i/c - Prof. Swati Pal

Design Consultancy

Feedback from Design
Expert- *Karan*

PwD Cell Internship

Creation of module videos
Feedback from PwD cell members



Reflection Spot

Predict what all learning might have happened in the course?

Research studies

Forum	Link to Paper	Detailed Slides
ICCE 2023	Badhe V., et. al., Sustaining students' interest in an instructional system design (ISD) course by leveraging interest-driven creator theory , 31st International Conference on Computers in Education (ICCE) 2023	<u>Interest</u>
T4E 2023	Nisumba S. K., et.al., Students' Point Of View of Real-Life Project-based Learning , International Conference on Technology 4 Education (T4E) 2023	<u>Learning</u>
T4E 2023	Shah, V., et. al., Sustaining Learner Engagement: Integrating Project-Based Learning & Cross-Cohort Approach , International Conference on Technology 4 Education (T4E) 2023	<u>Engagement</u>
T4E 2023	Srivastava A., et. al., Investigating budding instructional systems designers' sense of agency, and learning in a multi-cohort complex community , International Conference on Technology 4 Education (T4E) 2023	<u>Agency</u>
T4E 2023	Khwaja U., et. al., Orchestrating Active Learning in Hybrid Classroom: A Case Study and Recommendations For Instructors , International Conference on Technology 4 Education (T4E) 2023	<u>Hybrid</u>
ISLS 2024	Philip A., et. al., Triggering Social-Emotional and Ethical Learning: A Case Study in a PBL Course , ISLS 2024, to appear.	SEEL

What did the students learn? - few quotes

ISD Content:

- “Implementation of ISD concepts like ADDIE & SAM model in project.”
- “Learned how to create and present scenarios.”
- “Learned new tools to create content.”

ISD Processes:

- “Hands-on experience made the learning process more interesting and inspiring”
- “Importance of review and proper feedback through bottom and horizontal approach.”

Collaboration:

- “Working within group can give us a lot of benefits as we can get different points of view”

Social Emotional Learning:

- “Development of empathy, not only towards PwD, but also to all the people around me.”

Was there sustained engagement?

Challenge:

Instructors must continually develop new strategies to capture learner engagement and ensure effective learning in the classroom [Xie 2021].

Broad findings:

Students expressed that PBL with real-life project and cross-cohort approach was useful for sustaining engagement.

Evidence:

88.9% of learners: Class activities associated with the project were rewarding for overall learning experience.

77.8% of learners: learnt significantly from others during their cross-cohort interactions.

Homework 0:

- 26 learners, 125 reflections.
- Considerable word count of 26,999.
- Express thoughtful reflections, emphasizing their engagement with the course.

Was there sustained interest?

Challenge:

Sustaining students' interest in a semester-long project becomes a key challenge for course facilitators. (Blumenfeld, 1991).

Broad finding:

Students expressed that the social value of the PwD website project and its potential impact has helped them to maintain an interest and moral responsibility at a high level.

*S17: The motivation for taking this course was to contribute to the project as the **project outcome had huge implications on someone's academic life.***

*S4: "In every class, **the engagement is different.** We will **not just sit and look at the slides prepared by the instructor.**"*

*S5: "I will **get to learn more about designing various training materials for PwD cell** which is **aligning with my interest to join this course**."*

*S13: "PwD project has a **non-academic context.** We can **relate the theories** which we are learning, being applied to this project as well. This broadening of the horizon of application of what we are **learning beyond the typical academics-related projects** gives us a **new perspective.**"*

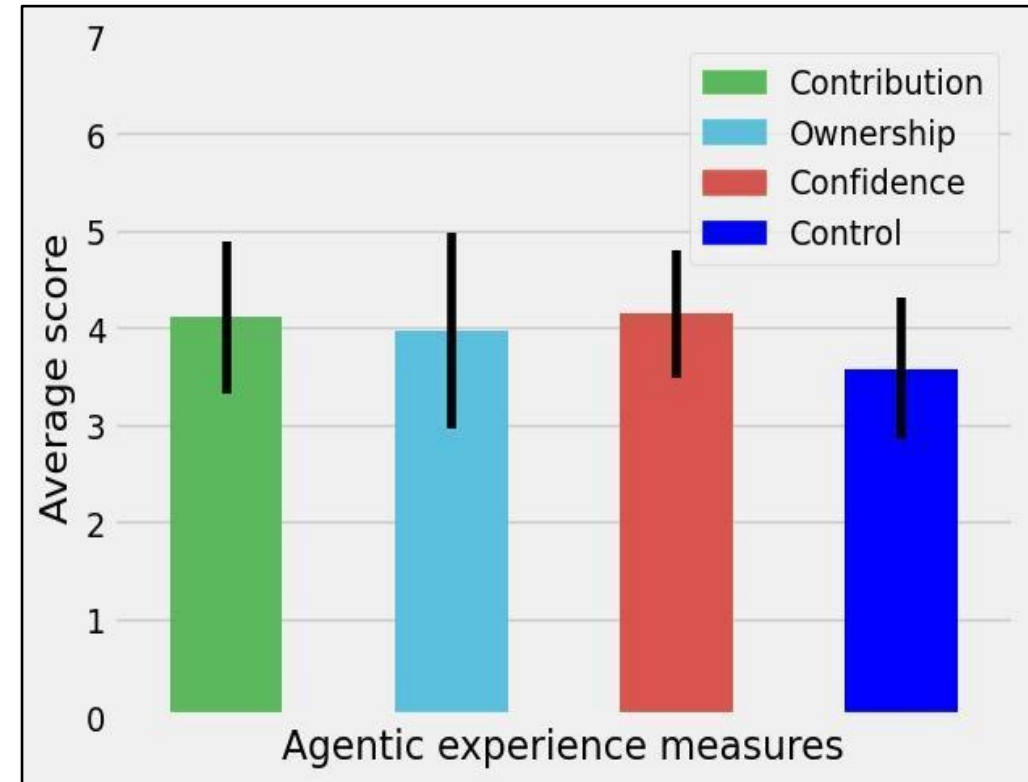
What about Agency in a multi-cohort class?

Challenge:

There's always a risk that low achievers could become *passive* in the presence of high achievers (Mulryan, 1992).

Broad Findings:

- Both the 'X' and 'Y' students displayed a high sense of agency while designing the ISD module.
- The interactions between the 'X' cohort and others included conflicts-disagreements and agreement-support.



1-1.80 = 'very low', 1.81-2.60 = 'low', 2.61-3.40 = 'neutral', 3.41-4.20 = 'high', and 4.21-5.00 = 'very high' measure of experience.

What was the effect of having multiple cohorts?

Cohort X: “Interactions in ISD class include senior students, postdocs and the instructor. Their contributions to the discussions are always enriching. Discussions with classmates are of course fruitful but such cross-cohort discussion leads to more learning.”

Cohort Y: “It brings specific dialogues or conversations from different places and time (courses that were attended in different years or projects where I did not participate).”

Cohort Z: “For me interacting with juniors has always been useful, they ask questions that make me reflect on my prior knowledge more deeply.”

Course outcomes

For students:

- Content learning - ISD concepts
- Practices learning - ISD execution
- Social-emotional learning - PwD awareness, empathy
- Teamwork experience
- Increased confidence to execute real-life projects

For society:

- pwd website

For instructors:

- Sustained learner interest and engagement
- Multiple types of student learning
- Contributed to PwD cell
- Fun

For ET researchers:

- papers

Takeaway

In practice-oriented courses, learning of conceptual knowledge is necessary but not sufficient. Students need to apply their skills, that too in authentic settings.

One way to make this happen in a course: Do project based learning, with real-life clients and stakeholders, and get diverse cohorts of students to participate.

Diving into Details

A – How was the ISD course structured?

B - How well did the students do the project?

C – How much learning happened?

D – How could this be replicated?

Project based learning (PBL)

PBL definition - (Wikipedia 2022)

- ❑ students acquire knowledge through exploration of real-world challenges.

PBL benefits (Kokotsaki et al, 2016)

- ❑ Known to be effective for learning
- ❑ Driven by active engagement and collaboration

Challenges with PBL (Aldabbu, 2018)

- ❑ Insufficient training in collaboration
- ❑ Engaging different learners
- ❑ Suitable tasks based on skills

Cohorts and Groups

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ISD course process

- Learning by doing
 - Every concept and skill had to be applied in the project context
- Project
 - Formation of Persons with Disability (PwD) cell at IITB
 - Need for sensitization of IITB community
 - Creation of website - <https://sites.google.com/view/iitb-pwdcell-training/>
- Multiple perspectives reviews
 - Client - PwD cell; Stakeholders - PwD students; Users - IITB community;
 - Content accuracy - Subject matter experts from [Ummeed](#);
 - Pedagogical appropriateness - ISD experts

Client, Stakeholder and SME interaction

Interview with Convener of PwD student Cell IITB:

- Led to creating a list of training topics and target populations.

Interview with PwD student (also a member of above Cell):

- Led to identification of areas to focus and corresponding needs.

Interaction with Ummeed team (Subject Matter Experts):

- Led to focus on Disability Awareness as the theme.

Acquiring subject matter expertise

- Sensitization Workshop
- Resources - videos, writeups
- Content review



Group themes

Four groups created

- depending on IITB needs and number of students in the course

Groups:

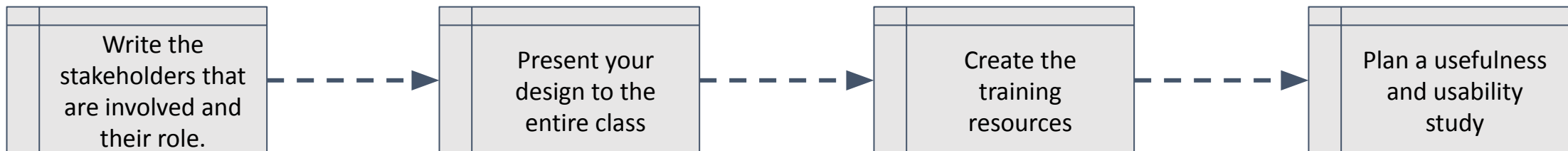
- Locomotor disability
- Visual impairment
- Autism
- ADHD / LD

Group work execution

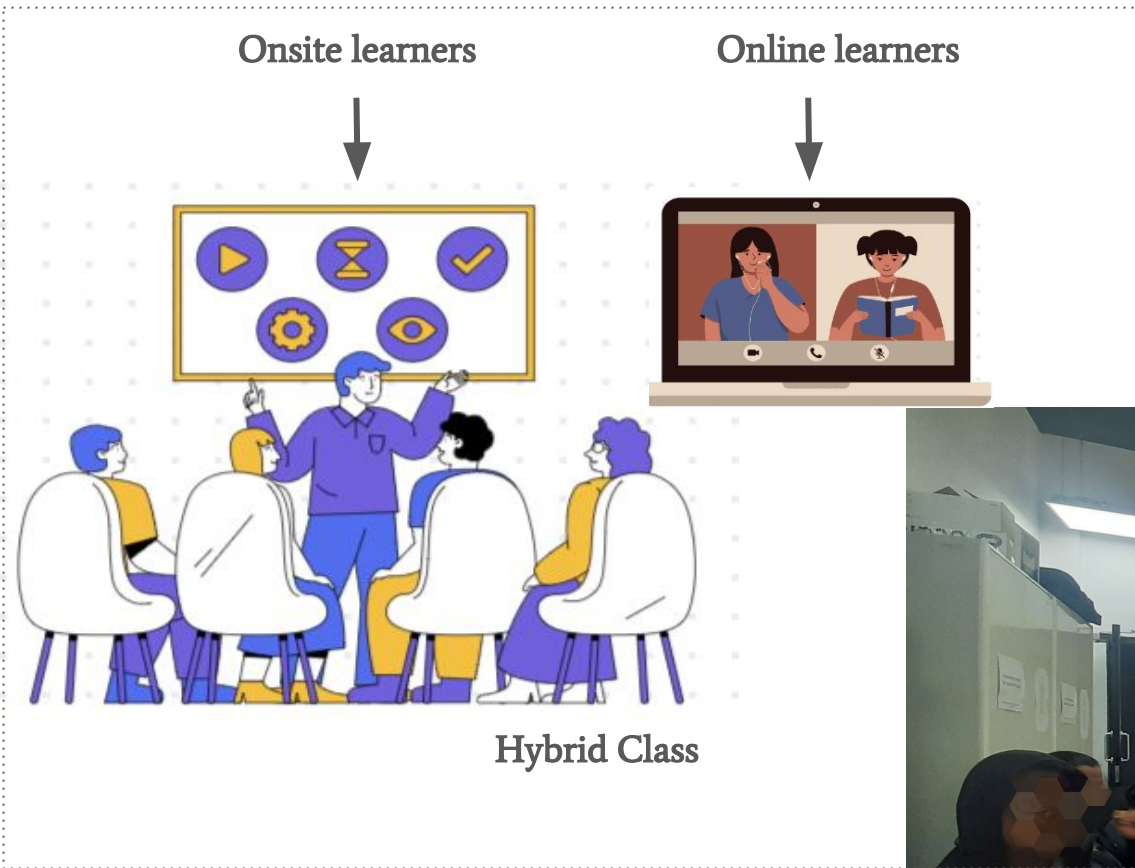


Cohort	Role
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Focus questions



Hybrid implementation

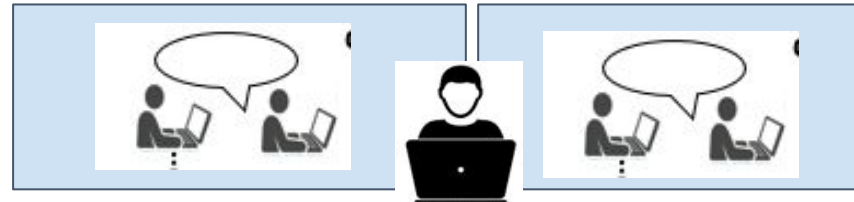


Classroom activities in hybrid mode

Online
Setup

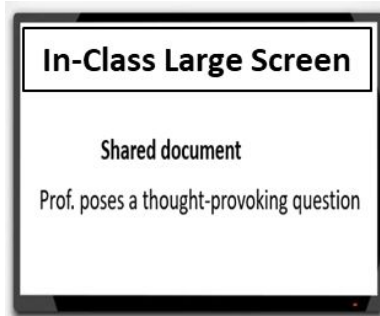


Online Students pair group discussion



Zoom breakout room

Offline
Setup



Offline Students pair group discussion



Responses and
Reflection in
Shared docs

Docs: Class-responses and Homework 0

Why is it important to write class re

Student responses:

- S1 - Recall of the discussion
 - S2 - Construct on various ideas
 - S3 - Peer learning
 - S4 - Expand our thinking
 - S5 - How I can incorporate others idea in my solution
 - S6 - Help students and instructors to construct more kno
 - S7 - Can Know one's own mistakes and same as 'S5'
 - S8 - Integrate all the ideas and incorporate any new mod
 - TA - Collective knowledge creation and it adds up to the s
- (knowledge points has transformed from individual to com

Led to:

Focused Participation

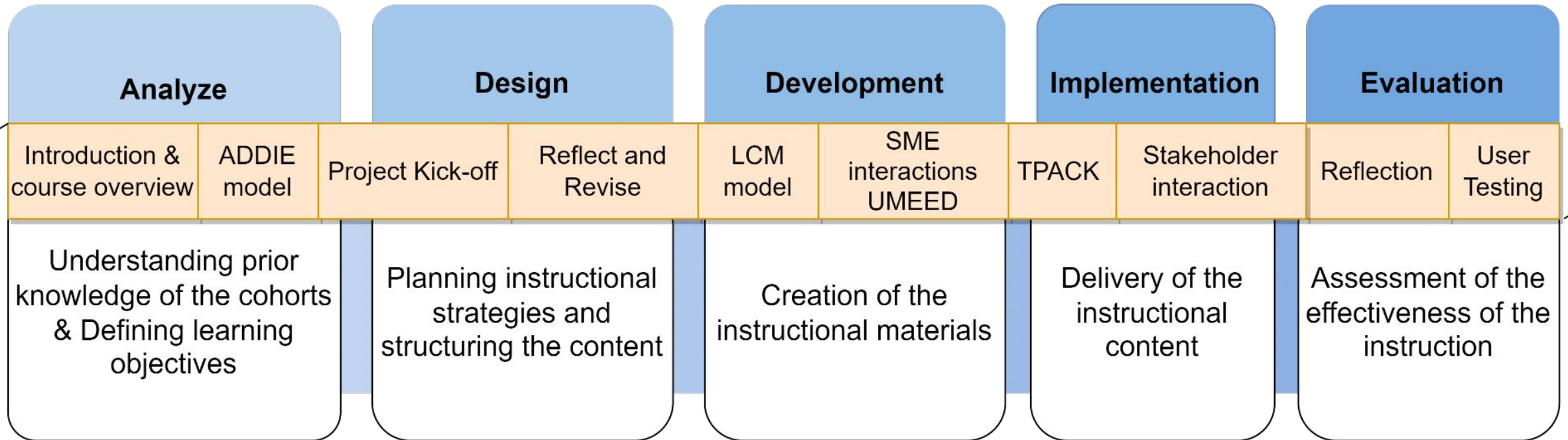
Individual Reflection and Sharing

Open Dialogue and Interaction

Peer learning

The screenshot shows a Google Docs document with a table of contents on the left and a main content area on the right. The table of contents includes items like 'Homework 0: Post-class Reflec...', 'Class 2 - ADDIE model', and 'Class X - Final reflections'. The main content area features three student comments, each with a blue header box containing the student's name. The first comment, from Student 1, discusses the ADDIE model and the 'review and revise' stage. The second comment, from Student 2, talks about a training context and 'shadowing'. The third comment, from Student 3, describes the ADDIE model's phases. Below the comments is a 'Feedback by student attending online' section with a blue header box and a comment from Student 1 dated Jan 19, 2023, asking for help with resources. A 'Show less' link is visible at the bottom of the feedback section. Three red circles labeled A, B, and C are overlaid on the image: A is at the bottom of the table of contents, B is at the bottom of the third student comment, and C is at the bottom of the feedback section.

Process walkthrough



This is a simplified linear view of the process followed.

Actual process was iterative, with feedback from multiple stakeholders periodically.

Project timeline

Client Meeting

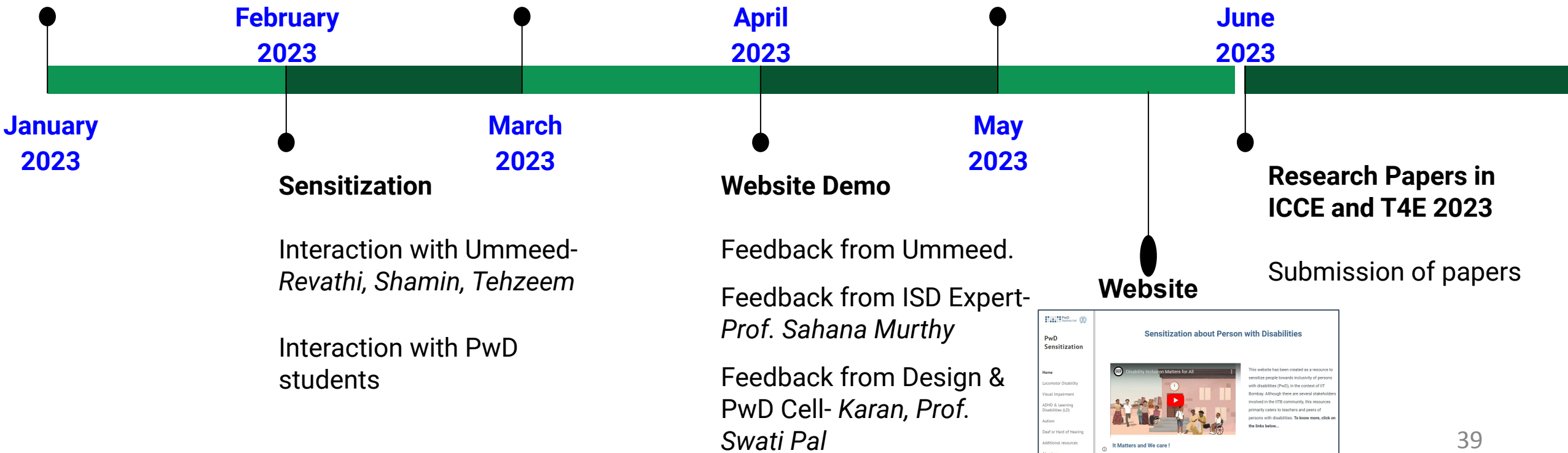
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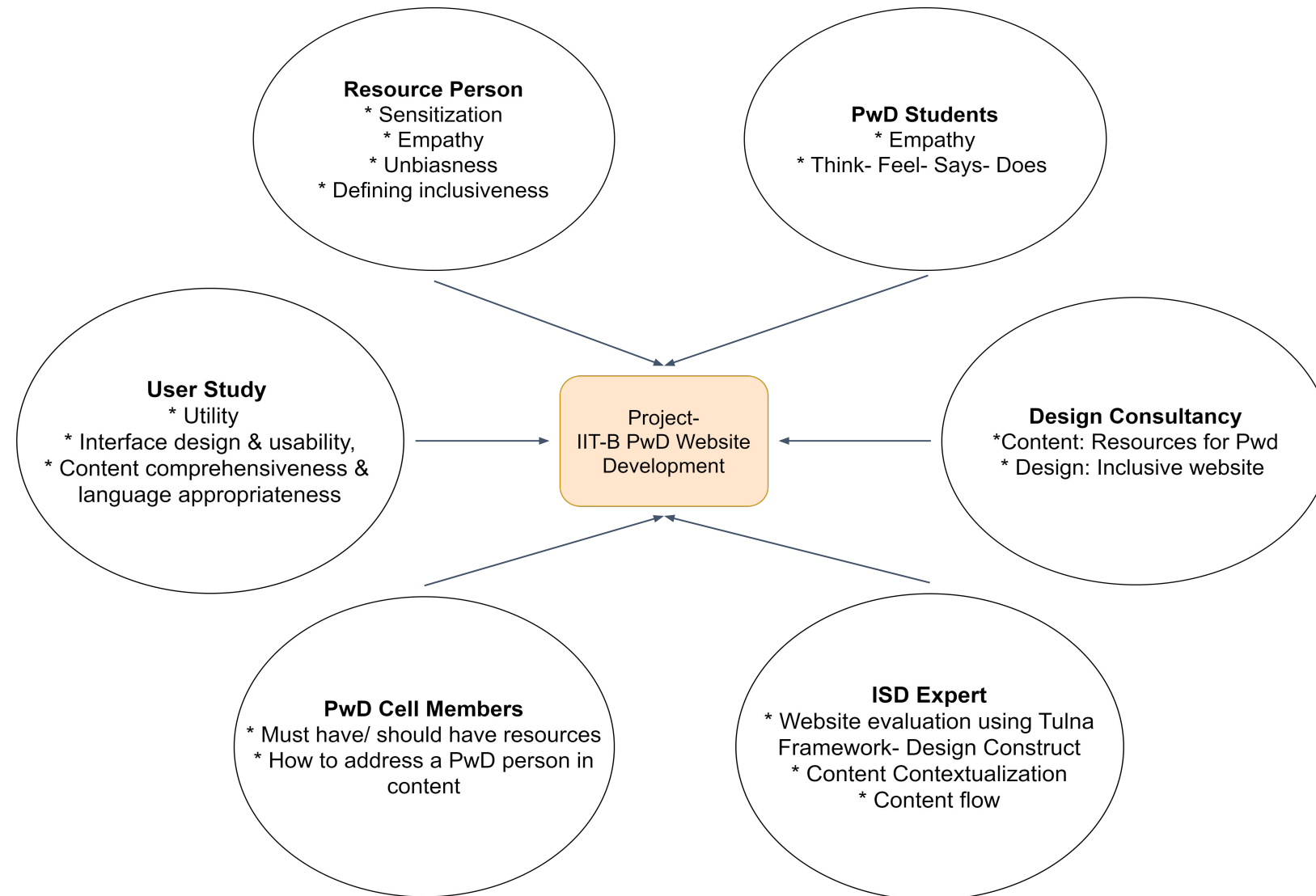
Feedback from Design
Expert- *Karan*

PwD Cell Internship

Creation of module videos
Feedback from PwD cell members



Variety of feedback sought



Course video

INSTRUCTIONAL SYSTEM DESIGN (ISD)

@

ET-IIT Bombay

Diving into Details

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B - How well did the students do the project?

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D – How could this be replicated?

Training website - resource materials

Scenario-based learning activities

PwD Sensitization

Home

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Visual Impairment

ADHD & Learning Disabilities (LD)

Autism

Deaf or Hard of Hearing

Additional resources

About us

Scenario

Scenario_non academic2

Ya.. let's do it

Check your learning

Thank you for trying out HSP. To get started with HSP read our [getting started guide](#)

How can colleges and educators support students with locomotor disabilities in managing their mental health challenges?

- Providing physical therapy services
- Offering counseling services and support groups
- Encouraging participation in extracurricular activities
- Limiting academic expectations and requirements

Check

Reuse Embed



Videos

Guidelines

Points to remember while interacting with DHH individuals

- To gain attention of a DHH individual, gently tap on their shoulder.
- Always try to communicate with DHH individual in a well light environment.
- Don't chew, don't smoke or don't look away while talking with DHH individual.

Posters

BEING INCLUSIVE FOR VISUALLY IMPAIRMENT

Supporting persons with visual impairment

CHALLENGES FACED

- COMMUTING IN PUBLIC TRANSPORT
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1/3

Reflection questions with feedback



Inspiring stories

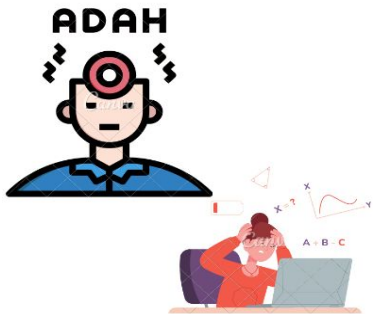
Modules



Locomotor Disability



Visual Impairment



ADHD & Learning Disabilities (LD)



Autism Spectrum Disorder

A fifth module on DHH (Deaf and hard of hearing) was added during summer internship

Overall template of each module

- Introduction (Text and Video)
- Sensitization activities (Empathize)
- Importance of inclusivity
 - Academic & non-academic scenarios
 - Check your understanding (with feedback)
- One small Step (Action)
- Inspiring stories
- Additional resources

Introduction videos for all 5 modules

5 modules (ADHD, Autism, Visual impairment, Locomotor disability, DHH).

Goals:

- Capture PwD challenges
- Sensitize viewer to being more inclusive
- Encourage viewer to go through module



[Video link](#)

Sensitization

Dyslexia is a learning disorder that affects reading, writing, and spelling skills. In India, dyslexia is not well understood, and there is a lack of awareness and support for individuals with this condition. Many people in India, including teachers and parents, may mistake dyslexia for laziness or a lack of intelligence.

DYSLEXIA

WHAT

DYSLEXIA IS A LEARNING DISORDER THAT INVOLVES DIFFICULTY READING DUE TO PROBLEMS IDENTIFYING SPEECH SOUNDS AND LEARNING HOW THEY RELATE TO LETTERS AND WORDS (DECODING).

ALSO CALLED A READING DISABILITY, DYSLEXIA IS A RESULT OF INDIVIDUAL DIFFERENCES IN AREAS OF THE BRAIN THAT PROCESS LANGUAGE.

CHALLENGES

THEY STRUGGLE TO LEARN PHONICS

THEY FACE DIFFICULTIES IN RHYMING WORDS

IT CAN AFFECT THEIR LEARNING

HOW

TO SUPPORT LEARNERS WITH DYSLEXIA, HAVE VISUAL REPRESENTATIONS

PROVIDE SUMMARIES OF LESSON TO BE TAUGHT BEFOREHAND

PROVIDE EXTRA TIME FOR READING & WRITING DURING EXAMS

PERMIT VERBAL RESPONSES


GRADE THEM ON CONTENT, NOT ON SPELLING OR READING FLUENCY

Academic and non-academic scenarios

INCLUSIVITY

Scenario

Scenario classroom
Avijit Pandey (IIT Bombay)



Check your learning

Thank you for trying out H5P. To get started with H5P read our [getting_started guide](#)

Which one of the following two notes is a better way to include as a guideline :


- "Please leave the first seat vacant for PWD students"
- Please leave at least one corner seat vacant for PWD students

Check

Reuse Embed H5P

Scenario

Scenario_non academic2
Arijan P



Ya.. let's do it

Check your learning

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- Limiting academic expectations and requirements

Check

Reuse Embed H5P

Scenario 3: Mess Food Queue
Avijit Pandey (IIT Bombay)



Now that you have looked at one such non-academic setting, let us also have a glimpse of another such scenario of a few students waiting impatiently in a queue in a hostel mess.

Check your understanding

Thank you for trying out H5P. To get started with H5P read our [getting_started guide](#)

What is an important consideration when providing assistance to a fellow college student with locomotor disability while they are traveling?

- Assuming that they are unable to travel independently
- Touching or moving their mobility aid without permission

What is one way to promote inclusivity in the classroom for students with locomotor disabilities?

(Choose the best one from the given options)

- Making assumptions about their abilities
- Ignoring their needs and treating them like everyone else

Check your understanding

What is one way to promote inclusivity in the classroom for students with locomotor disabilities?

(Choose the best one from the given options)

- Making assumptions about their abilities
- Ignoring their needs and treating them like everyone else
- Failing to provide accommodations to avoid drawing attention to their disability.
- Consulting with the student and their family to determine appropriate accommodations

 Check

Guidelines for faculty and TAs to support PwD

<https://docs.google.com/document/d/18wrrqIZXENUua5p9K5XqGHeUEvmqZJBuvEn-QCSpbCQ/edit>

Find a place that reduces the sensory stimulation

- Reserve the seats away from windows and doors for students with LD
- Keep their seats right in front of the class for better focus
- Avoid spaces with bright light



Work with their learning strengths and limitation

Use personalized solutions to use their learning strengths

Students that struggle with reading and writing could be given a laptop to type or a scribe during lecture
Assignments, projects or assessments could be redesigned to incorporate their strengths



One small step (call to action)

One small step



Support strategies by teachers before exams

There are some suggestive support strategies which teachers can use to help persons with autism before their exams, according to their needs.



Special arrangements during exams

Persons with autism can encounter significant challenges during exams. This video presents some suggestive arrangements to address challenges.

<https://youtu.be/7XIDsn2YS0M>

<https://youtu.be/Z1sxrP4Guec>

Inspiring Stories

Inspiring stories



Autism as a power instead of a setback...

Breaking barriers and stereotypes: Meet India's first model with autism who chose to use his condition as a superpower and walked the ramp for brands like Benetton, inspiring the special community to follow their passion.



Ranveer Saini's journey from autism to gold...

From diagnosis to gold medal: Meet Ranveer, the boy who shattered stereotypes about autism and proved that anything is possible with determination and hard work.

Additional Resources



Disability Awareness

Home

Locomotor Disability

Visual Impairment

ADHD & Learning Disabilities (LD)

Autism

Deaf or Hard of Hearing

Additional resources

About us

This section provides additional resources related to PwD sensitization

- [The Good crusaders Dr Vibha | What are developmental disabilities & how big is this problem in India? What is Family Centered approach in caring/therapy for such children](#)
- [Dr. Koyeli Sengupta, explains what Autism is](#)
- [5 Things to know about Autism](#)
- [Autism awareness video](#)
- [Down Syndrome - An Overview](#)
- [What is ADHD?](#)
- [How can we create an inclusive teaching culture in schools? Nita Luthria Row, Head of Junior school, Bombay International school](#)
- [UN Guidelines on People with Disabilities - 10 principles by UN for access to social justice for PwD](#)
- [Self-advocate for learning disabilities Moksha Parmar speaks about What would an ideal school look like for you?](#)
- [Down Syndrome - Success Stories](#)
- [3 Things to know about Participation of Children with Disabilities](#)
- [Know your Rights video \(About Disability Certificate, travel concessions, health insurance schemes etc\)](#)
- [How we can create a more inclusive world for kids with disabilities: TED Talks by Vibha Krishnamurthy](#)
- [Should schools support children according to their needs? | Chitra Vishwanath, Principal of Abhyudaya Municipal school](#)
- [Dr. Vibha Krishnamurthy | How to approach education for special needs kids?](#)
- [Signs Of Childhood Development Disabilities And How You Can Help](#)

Usefulness and Usability study

Participants:

- 38 participants (iitb population)

Survey(Google form):

- 15 questions on 5 criteria
- Likert Scale: *1-Strongly Disagree, ..., 5-Strongly Agree*

Module's evaluations:

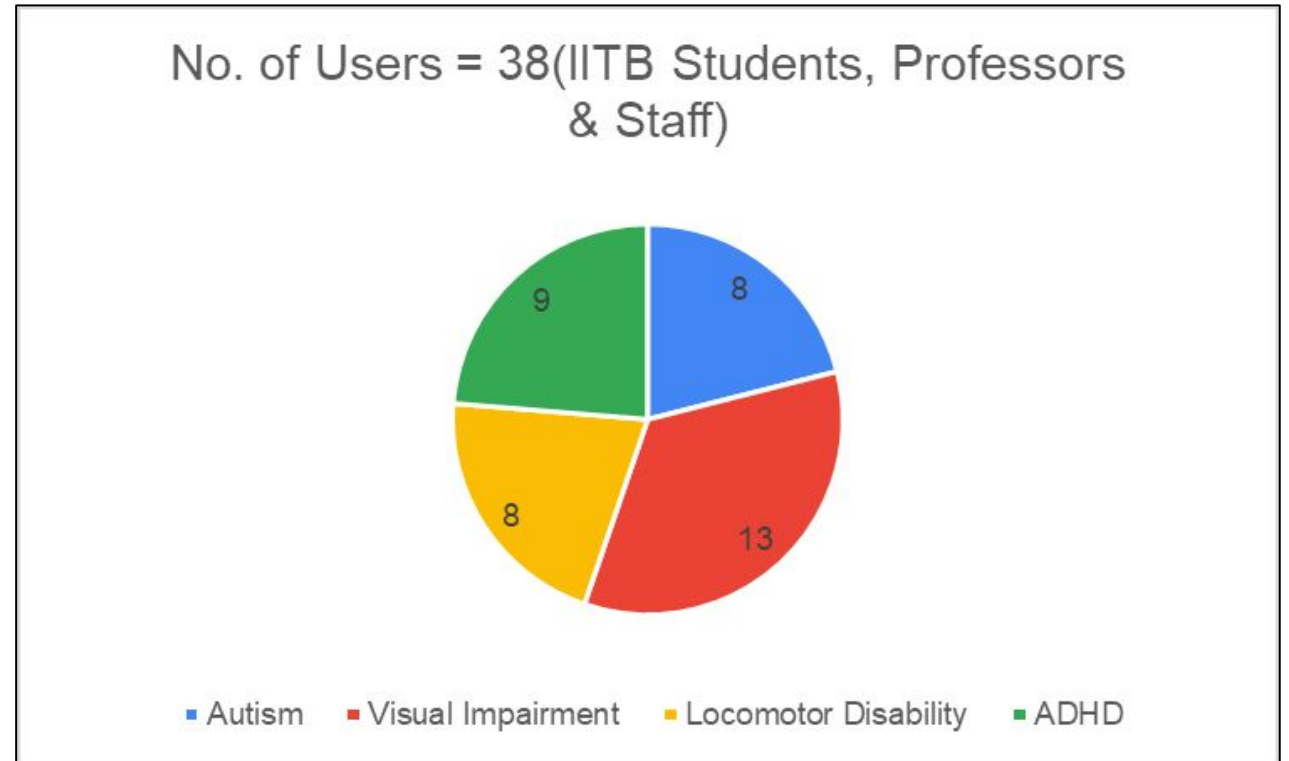
M1: Locomotor Disability (by 8 users)

M2: Visual Impairment (by 13 users)

M3: ADHD (by 9 users)

M4: Autism (by 8 users)

Overall Score: 4



User study - sample survey questions

Feedback for sensitization of Autism

I thought there was too much inconsistency in this Autism training module. *



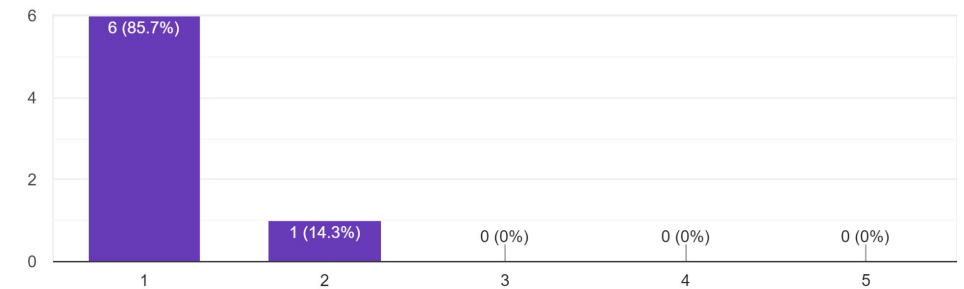
I would imagine that most people would learn to use this training module on sensitization towards Autism very quickly. *



The Autism training module design was distracting and did not let me focus on the content. *

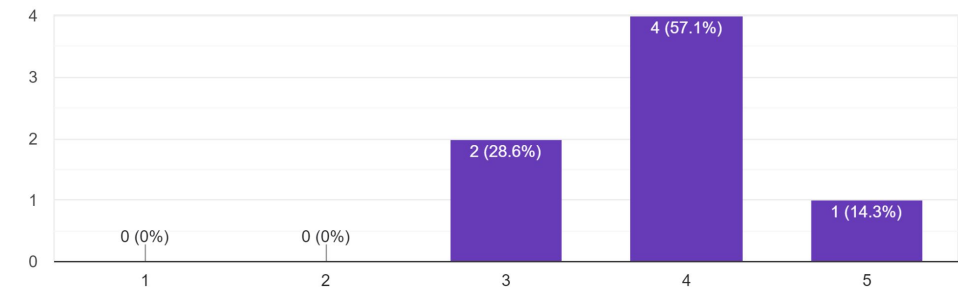
7. According to me, the training module design was distracting and did not let me focus on the content.

7 responses



4. According to me, the various features in the locomotor disability training module are well integrated.

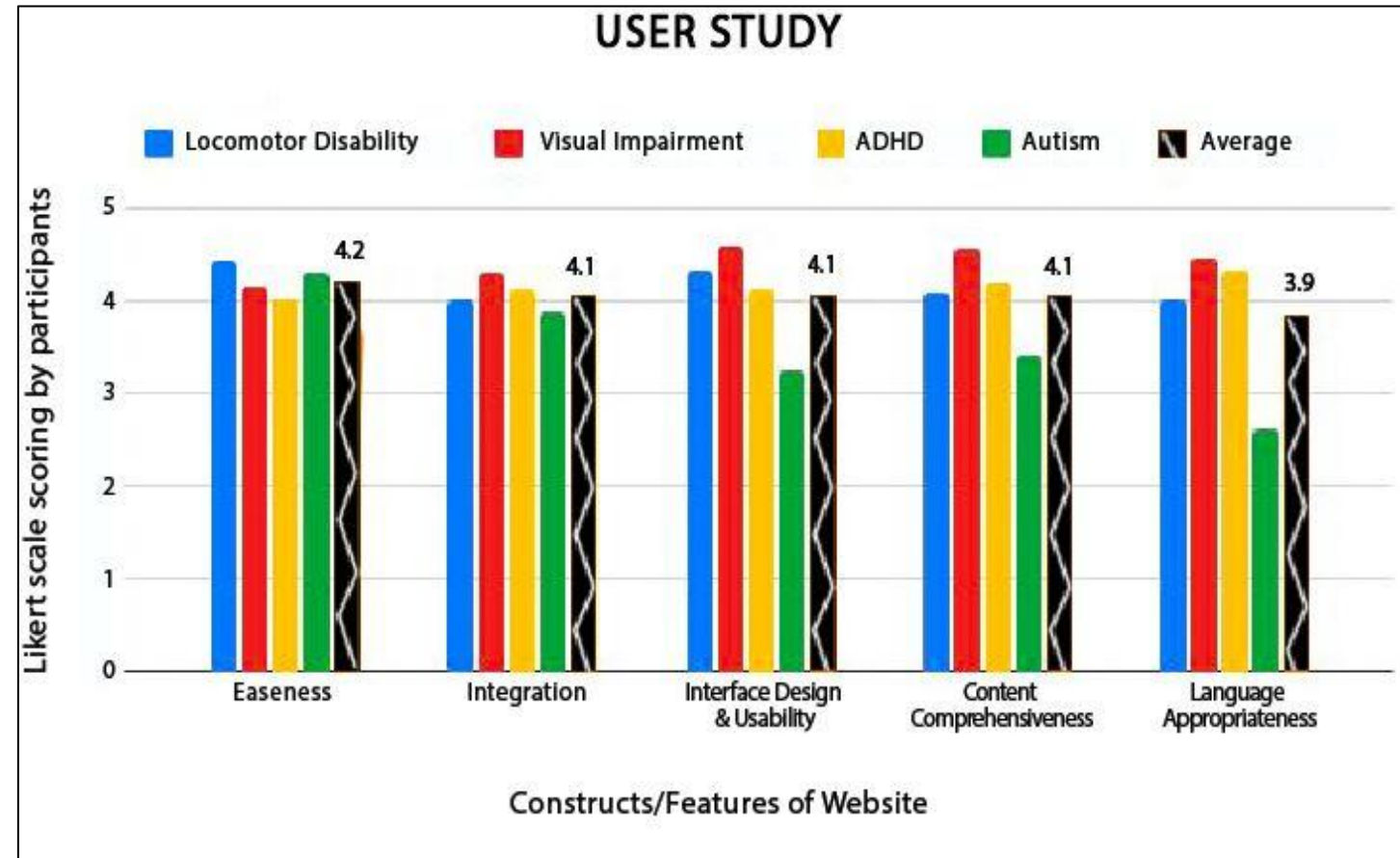
7 responses



User study - results

Constructs:

- **Easiness** (Ease of use or Ease of learning): ensures a smooth learning curve
- **Integration**: ensures seamless transition and flow across modules
- **Interface Design and Usability**: enhances user engagement and efficient navigation
- **Content Comprehensiveness**: targets completeness of learning experiences
- **Language Appropriateness**: facilitates effective communication



Diving into Details

A – How was the ISD course structured?

B - How well did the students do the project?

C – How much learning happened?

D – How could this be replicated?

Overarching Research Questions

What outcomes did we see?

What processes did we observe?

We = 2 instructors + 4 non-participating observers + some participants (after the course).

Data collection

- Students' written reflection (Homework 0).
- Semi-structured interviews of students (by RAs).
- Semi-structured interview of instructors at the end of the course.
- Surveys of interest, engagement and agency.
- In-class observations by RAs.
- Video recordings of group work.
- Final project.

publications - cohort R

Forum	Link to Paper	Detailed Slides
ICCE 2023	Badhe V., et. al., Sustaining students' interest in an instructional system design (ISD) course by leveraging interest-driven creator theory , 31st International Conference on Computers in Education (ICCE) 2023	<u>Interest</u>
T4E 2023	Nisumba S. K., et.al., Students' Point Of View of Real-Life Project-based Learning , International Conference on Technology 4 Education (T4E) 2023	<u>Learning</u>
T4E 2023	Shah, V., et. al., Sustaining Learner Engagement: Integrating Project-Based Learning & Cross-Cohort Approach , International Conference on Technology 4 Education (T4E) 2023	<u>Engagement</u>
T4E 2023	Srivastava A., et. al., Investigating budding instructional systems designers' sense of agency, and learning in a multi-cohort complex community , International Conference on Technology 4 Education (T4E) 2023	<u>Agency</u>
T4E 2023	Khwaja U., et. al., Orchestrating Active Learning in Hybrid Classroom: A Case Study and Recommendations For Instructors , International Conference on Technology 4 Education (T4E) 2023	<u>Hybrid</u>
ISLS 2024	Philip A., et. al., Triggering Social-Emotional and Ethical Learning: A Case Study in a PBL Course , ISLS 2024, to appear.	SEEL

What all learning happened? - focus on cohort X

01

Course related

- Learning **ISD models**
- Learning **new tech tools** for content creation (Animaker, Canva, H5P, BNIME, Google Sites, AI powered tools)
- Engaging in **hands-on experiences** through the project

02

Project-related learnings & skills

- **Collaboratively work** in a group
- **Accommodating diverse perspectives & ideas**
- Benefits of **regular feedback from the stakeholder**
- **Utilising ISD concepts** for research, design, creation & feedback
- **Creating inclusive environment** around us

Challenges faced and overcome - focus on cohort X

01

Course based challenges

- Learning new tools & applying them
- Making simple but engaging content

02

Incorporating a real-life project in the course

- Incorporating feedback
- Executing a real-life project
- Finishing within time constraints
- Managing diverse collaboration

03

General challenges

- Creating content (video, audio, script, poster)
- Technical issues, such as syncing audio with scripts and depicting disabilities
- Making website user friendly
- Making content engaging for the audience
- Structure & sequencing of content items

Reflections of cohort X - why did they succeed?

1. **Having a shared objective**

- to have meaningful discussions
- fostering a sense of teamwork among the members

2. **Open and constructive dialogue**

- leading to the exchange of valuable insights and the development of the project

3. **Scoping down the project**

- what to include and what to exclude
- defining boundaries and setting clear objectives
- focusing on what is essential and achievable items within the given constraints

4. **Setting realistic deadlines**

- accommodating the availability of all team members
- having equal opportunities to participate and contribute

5. **Regular feedback from stakeholders (Client, SME, ISD Experts, Users)**

What was the effect of having multiple cohorts?

Cohort X: “Interactions in ISD class include senior students, postdocs and the instructor. Their contributions to the discussions are always enriching. Discussions with classmates are of course fruitful but such cross-cohort discussion leads to more learning.”

Cohort Y: “It brings specific dialogues or conversations from different places and time (courses that were attended in different years or projects where I did not participate).”

Cohort Z: “For me interacting with juniors has always been useful, they ask questions that make me reflect on my prior knowledge more deeply.”

Was there sustained interest?

Challenge:

Sustaining students' interest in a semester-long project becomes a key challenge for course facilitators. (Blumenfeld, 1991).

Broad finding:

Students expressed that the social value of the PwD website project and its potential impact has helped them to maintain an interest and moral responsibility at a high level.

*S17: The motivation for taking this course was to contribute to the project as the **project outcome had huge implications on someone's academic life.***

*S4: "In every class, **the engagement is different.** We will **not just sit and look at the slides prepared by the instructor.**"*

*S5: "I will **get to learn more about designing various training materials for PwD cell** which is **aligning with my interest to join this course**."*

*S13: "PwD project has a **non-academic context.** We can **relate the theories** which we are learning, being applied to this project as well. This broadening of the horizon of application of what we are **learning beyond the typical academics-related projects** gives us a **new perspective.**"*

Interest - semi-structured interviews

Questions in Student interview:

- What are the **differences between learning** with the **traditional lecturing** way and learning in ISD ?
- **Apart from the class**, you also spent a **lot of time on curating and creating** the resources outside the class. Can you elaborate on the **experience**?
- Can you please tell us about your **interest** in the ISD course for these three points of time: **start, mid and end** ?

etc

Questions in Instructor interview:

- What were your **initial objectives** and plans about **ISD** ? Did you **achieve** those objectives using that plan?
- What is the **reason behind selecting PwD website** (real life) project in ISD class
- **Reason behind using IDC** approach in ISD class ? What was the primary motive ?
- What were the **challenges** How did you try overcoming those challenges?

Interest - Survey (6 open-ended and 5 Likert scale questions)

Questions in student's interest survey:

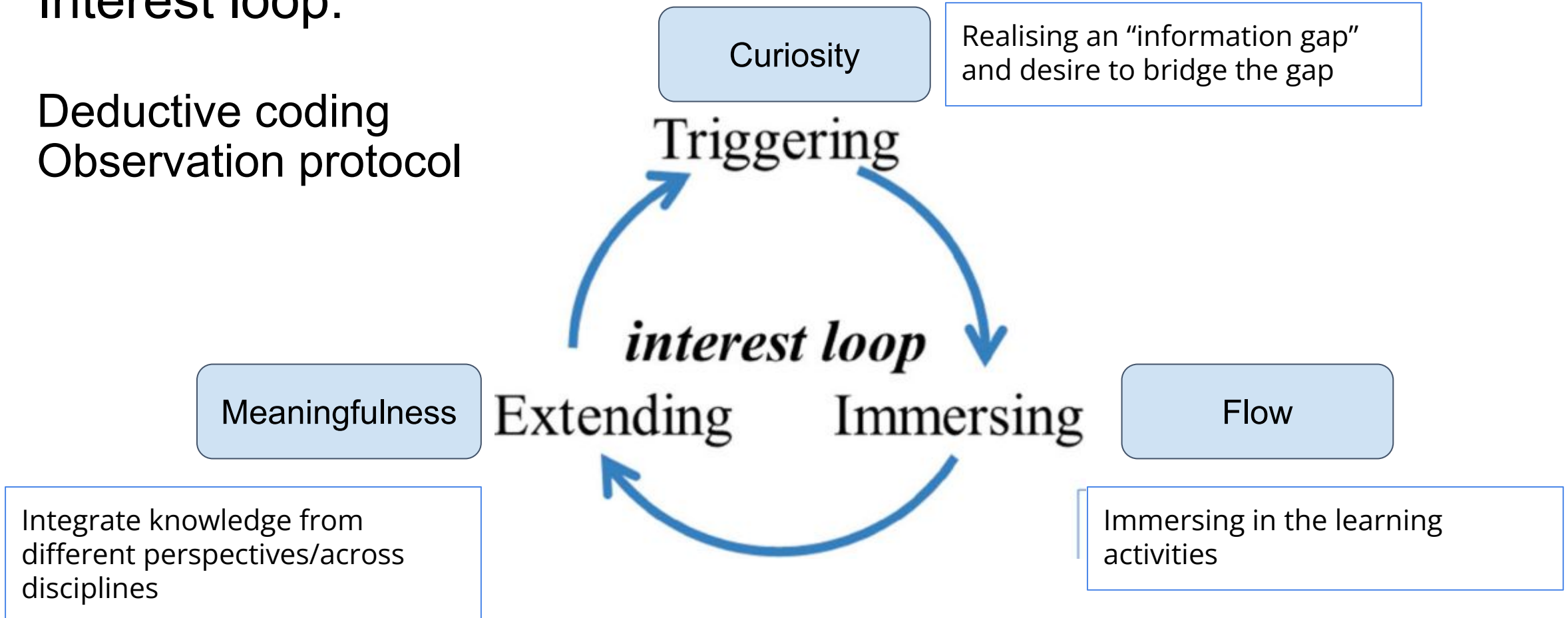
- **What was triggering the interest** for you when you heard of the ISD course before you **joining** it?
- **I look forward** to attend every ISD class **because** _____

- **I enjoy the activities** of the class, being unaware of the **passage of the time**?
- In class interactions, I am getting a **chance to communicate/express** my thoughts
- I find Pwd project an **interesting extension as an application** of the learning

Interest - Analytical framework - IDC theory

Interest loop:

Deductive coding
Observation protocol



Was there sustained engagement?

Challenge:

Instructors must continually develop new strategies to capture learner engagement and ensure effective learning in the classroom [Xie 2021].

Broad findings:

Students expressed that PBL with real-life project and cross-cohort approach was useful for sustaining engagement.

Evidence:

88.9% of learners: Class activities associated with the project were rewarding for overall learning experience.

77.8% of learners: learnt significantly from others during their cross-cohort interactions.

Homework 0:

- 26 learners, 125 reflections.
- Considerable word count of 26,999.
- Express thoughtful reflections, emphasizing their engagement with the course.

Engagement - data collection and analysis

FACTORS EXAMINED

Cross-cohort
learning benefits

Participant
Perspective &
Involvement

Project Outcome



Data Sources

Data Analysis

Classroom observation

Survey questionnaire: 5 MCQ and 6 OEQ (general interest in the class, class activities, project work and cross-cohort interactions)

Homework 0

Final Project Analysis: Range of stakeholders

Quantitative data: Frequency analysis of data from the Likert scale to yield percentages.

Qualitative data: Inductive thematic analysis to understand perceptions, involving open coding and subsequent frequency analysis.

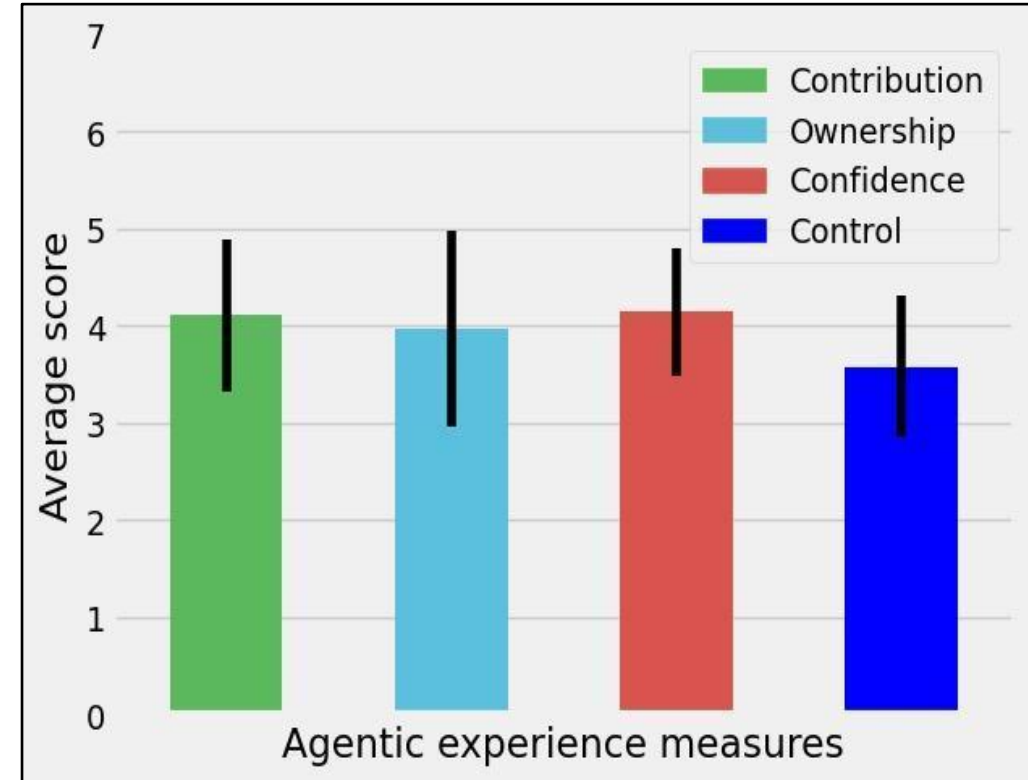
What about Agency in a multi-cohort class?

Challenge:

There's always a risk that low achievers could become *passive* in the presence of high achievers (Mulryan, 1992).

Broad Findings:

- Both the 'X' and 'Y' students displayed a high sense of agency while designing the ISD module.
- The interactions between the 'X' cohort and others included conflicts-disagreements and agreement-support.



1-1.80 = 'very low', 1.81-2.60 = 'low', 2.61-3.40 = 'neutral', 3.41-4.20 = 'high', and 4.21-5.00 = 'very high' measure of experience.

Agency - data collection and analysis

Theoretical framing:

- 'Social Practice Theory' (Holland & Lave, 2019) has a central focus on participants' actions/interactions.
- Lens of 'contested' spaces (Kane, 2015). Contested spaces are formed during the moments of interaction when participants question and challenge each other's ideas and processes in a community.

Data:

- Semi-structured interviews; video and audio recordings

Analysis method:

- The 'constant comparison method' of Grounded Theory which involves continuously analyzing and examining the data collected to explain the emergent themes of interactions that had an impact on the 'X' cohort's learning process (Corbin & Strauss, 1990).

What about Online students in a hybrid setup?

Challenge:

Adapting AL strategies for **student-content** interaction, **student-student** and **student-teacher interaction** in the online mode.

Broad Findings:

Online students were able to participate effectively due to:

- Usage of low tech collaboration platform
- Stakeholders driven open resources
- Continuous shared actionable responsibility

Specific Findings:

Online Student (Audit): *"...it was relatively easier because while we collaborate online, we have the slides in front of us as default. So we began reading the question first and then started with the discussion."*

Shared Google Slides and Homework 0 document promoted synchronous and asynchronous participation, engaging all students with course content, peers, and instructors.

What about social-emotional ethical learning?

Challenge

Broad findings:

Specific Findings:

Quotes:

Other questions - still being investigated

How much social-emotional learning happened and how?

How does learning happen for each cohort? What is the role of the various interactions?

What is the evidence that the model works for instructor goals for Y and Z cohorts?

How does this compare with other PBL approaches?

Some Quotes

Cohort X - Quotes from 7 students

- Felt like a living classroom with this PBL approach, that we are doing something for real, which was the constant motivation.
- opportunity to apply the concepts taught in the class to a real-life project.
- hands-on experience made the learning process more interesting and inspiring
- Implementation of ISD concepts like ADDIE & SAM model in project.
- learned how to create and present scenarios.
- learned new tools to create content.
- Importance of review and proper feedback through bottom and horizontal approach.
- Realised the differences in the perceived and actual complexity, at different stages of the project.
- better team player
- got an insight that working within group can give us a lot of benefits as we can get different points of view
-
- developed new perspective on the different challenges faced by PwD; sensitized me to the different needs of persons with disabilities, fostering greater empathy.
- development of empathy, not only towards PwD, but also to all the people around me.
- Inclusivity is not just about sharing physical space but it's more than that...
- Getting to know Ummeed

Cohort Y - Quotes from 6 students

- how Project Based Learning contributed in a final and useful product for sensitization of the community towards PwD students.
- A lot learned-Language, empathy(boundary), awareness, perspectives
- Designing course for diverse learners through PBL and solving real life problem
- Involvement of students of every year and all categorising them in the form of rubric was very innovative.
- It helped us to apply our learning from ISD to real life challenge of PwD website is a crucial learning.
- The process of developing a website, from initial discussions to engaging with experts and conducting periodic reviews, has equipped me with a framework for initiating an organization.
- Observing the way classes were conducted,
- these classes were not only productive for learning rather it has formally contributed to a variety of people (many participants are publishing papers from collected data).
- interest driven the course
- create interest, team work, awareness, understand different needs of PwD,promotes empathy and encourages to view challenges from diverse perspectives.
- Having participated in creation process, I believe I personally will be more sensitive and sincere about going through similar trainings, knowing the diligent effort put forward by creators behind it.
- It helped me to sensitise myself and others about different challenges of people who struggle to learn and implications for such people.

Cohort Z - Quotes from 4 students

- I became increasingly aware of the need to let go of preconceived assumptions. What may appear to be a suitable solution at first glance may not necessarily be the best one for the end users.
- The interaction with stakeholders was eye opening and also led to cycles of conversations and thinking resembling the popular design thinking framework.
- Interactions with Cohort X participants during the final stages of project also lead to nuanced understanding of various concepts.
- Got to know the perspective of students on implementation of the different models/theory used in ISD through discussion in class and during project.
- With the exposure from the course and the
- Immensely enriching experience working with such diverse groups on the PwD training module
- It was a great opportunity to critically examine the concept of “Inclusion” and it’s operationalisation in the context of educational institutions and beyond.
- Became aware that most of the disabilities manifests as spectrum and hence needs of the persons will be varied. One solution fits all will not work.
- Overall, this has helped me think in many new ways

Cohort R - Quotes from 4 observers

- **Course Delivery**: The course was delivered in a very unconventional and exceptional way. The dynamic changes and adaptations in the course was impressive.
- **Course Content**: Since, the course dealt with a real life project on sensitization, it not only helped in understanding the principles of ISD but also about PwD in particular learning disabilities - a truly eyeopener for me.
- For me, one of the key learning was observing the perspective shift in ISD learners. From “I think this is the problem and this could be a solution” to “let’s not assume and try to understand what’s the actual problem” we have come a long way in this course.
- **Researcher perspective**: Rich and varied learning dynamics
- **Learner perspective**: Awareness and openness
- Saw Dynamic nature of instruction designing, delivery and it impact on learners
 - Learned new perspectives about ISD (Differentiated language for Diff. Audience, importance of constructive alignment & diff. Active learning methods)
- This entire process in ISD made me more aware about PwD students and their social, emotional & educational needs. It will have deep and long lasting impact on my decisions and behaviour.

Instructors - Reflections

Sridhar Iyer

- Ensuring that appropriate learning happened for all cohorts, while meeting the project goals was the hardest part of an instructor's role.
- I was thrilled to see the commitment of all the students who participated. There was hardly any attrition in the course.
- This shows that if we get students' buy-in, they can learn whatever is required to deliver on real-life projects.

Syaamantak Das

- "As a co-instructor, my primary responsibility was to strike a balance between the course objectives and the project."
- "The students demonstrated exemplary autonomous management skills. This observation is indicative of the fact that when individuals are working towards a greater cause, they may develop additional soft and hard skills throughout the journey of the process."

Diving into Details

A – How was the ISD course structured?

B - How well did the students do the project?

C – How much learning happened?

D – How could this be replicated?

Recommendations - for practice oriented courses

If you want students to learn industry practices in an authentic manner, then one way of getting there is by:

- having a real-life context and stakeholders
- incorporating diverse cohorts of learners
- doing PBL as suggested in this “model”

If you naturally have diverse cohorts in your class, then one way of ensuring meaningful learning for all is by:

- having a real-life context and stakeholders
- doing PBL as suggested in this “model”

This model - Create cohorts and groups

Cohort	Learning Objectives	Role in the project
X Junior students	Same as specified for the course.	Learning technical concepts and exploring new ideas through application of industry practices
Y Senior students	1) Learn to plan larger scale projects. 2) Gain Mentoring skills.	Mentor Cohort X in application of idea using their prior knowledge. Learn larger scale project mgmt.
Z More senior students	1) Gain Teaching skills. 2) Make connections across topics.	Provide directions to others (without thrusting own ideas). Learn PBL course orchestration.

No. of Students	Group A	...	Group N
X	2-3	...	2-3
Y	1-2	...	1-2
Z	1	...	1

This model - Create collaborative learning activities

Instructor actions transforming a traditional instruction-based classroom into a cross-cohort learning space

Cultivating initial enthusiasm for the course	Creation of meaningful learning activities	Supporting cross-cohort collaboration and engagement
<ul style="list-style-type: none"> • <i>Identifying the multiple cohorts who can contribute and gain from the course</i> • <i>Clearly defining the benefits for each cohort and effectively conveying the same via email communication</i> • <i>Respecting learners' autonomy, refraining from excessive follow-ups</i> 	<ul style="list-style-type: none"> • <i>Identifying evolving interests of different cohorts</i> • <i>Creating learning activities, striking a balance between learners' interests and learning goals of the course</i> • <i>Breaking up larger tasks into smaller learning objectives and respective learning activities</i> • <i>Creating activities which were relevant, required critical examination, and were open to diverse & valid perspectives from multiple cohorts</i> 	<ul style="list-style-type: none"> • <i>Including a high-significance real-time class project as a collective goal</i> • <i>Providing clear instructions on what is expected from each cohort</i> • <i>Providing clear roles & responsibilities to each member in group tasks</i> • <i>Appreciating learners' efforts and providing constructive feedback</i> • <i>Providing opportunities for learners to provide feedback to the instructor on his teaching, and learning content</i> • <i>Providing autonomy to be flexible with their physical/online presence, outputs and presentation formats</i> • <i>Enriching perspectives by inviting field experts as guest speakers</i>

This model - Ensure shared action and reflection

- In-class:
 - Individual - writing responses to focus questions in a shared doc
 - Group - presenting ideas and getting feedback from others
- Out-of-class:
 - Individual - writing reflections after each class in a shared doc
 - Group - working on project execution

Why is it important to write class responses publicly?

Student responses:

S1 - Recall of the discussion

The screenshot shows a Google Docs document titled "S1 - Recall of the discussion". On the left is a navigation pane with a table of contents including "Outline", "Homework 0: Post-class Reflec...", "Common Instructions", "Cohort specific instructions", "Group specific instructions", "Class 1 - Warm up", "- Class 2 - ADDIE model", "Class 3 - Project Kick-Off", "Class 4 - Reflect and Revise", "Class 5 - LCM Model", "Class 6 - SME interaction with U...", "Class 7 - TPACK + Stakeholder i...", "Class 8 - Reflection, Content ty...", "Class 9 - Project development (...)", and "Class X - Final reflections". The main content area shows three student responses, each in a blue box:

- Student 1:** "I removed the slides in ADDIE model, and how they are applied in a real scenario through the example discussed in the class on the problem of training new recruits to follow SOP in an organisation. In class discussions the point of 'review and revise' was stressed upon (at some point during the lecture), which an ID person has to (or may) do post every stage during the ADDIE, as method of course correction during the path. One interesting use of the 'speaker note' feature of the Google slide came up, where it can be used as a section to store feedbacks/ corrections from other members in a collaborative learning environment (or when working in teams). The software interface affords different kinds of interactions when compared to 'comments' feature in an online word processor (such as Google docs)"
- Student 2:** "The hospital training context was a very relevant one, easy to interpret and it led to a lot of constructive discussion. It was interesting to see even while planning somewhat similar sequence of steps, each one of us pointed out a unique dimension in their respective plans like Avijit talked about appointing some senior to observe where the hospital staff was lacking so as to plan accordingly and we also got to know that this concept is called shadowing. I like this method of air of getting the answers from us and then introducing the formal term for the same, it is easier to learn and connect with the technical terms this way."
- Student 3:** "ADDIE represents the five phases model. The purpose of the model is to help learners acquire the knowledge and skills needed for effective performance. The stages are analysis (analyzing participants, their previous knowledge and the gap between what they know and what they need to know), design (designing objectives, instruments and lesson planning), development (creating and testing phases in design phase), implementation (redesigning according to feedback to ensure effective outcome) and evaluation (evaluating whether the desired objectives are met)."

Below the responses is a "Reflection 1: Discussion in class helps to..." section with a blue box labeled "B" containing the text "missing points".

On the right side of the document, there is a comment thread:

- A comment from "Student 1" (Jan 19, 2023) says: "Continuing from above comment - Technology affordances can influence the effectiveness of your pedagogy. So we in ET need to know both well."
- A reply from "Student 1" says: "[from the comment above] @everyone, are there any valuable resources on the concepts? I think it'll be of some help to the first years!"
- A "Feedback by student attending online" comment (11:24 AM Feb 18) says: "I think Bloom's digital taxonomy can be a good resource, with new tech adaptations of the old tech products. One idea is that attending various ET RS's open sessions with other institutes gives us new ideas of how they are utilizing simpler softwares like Google slides or docs even for novel uses, which requires less training for a new audience as compared to a padlet or mentimeter. Trying out and failing/succeeding is also a good strategy to explore this one. :)"

At the bottom of the screenshot, there are three blue circles labeled A, B, and C, corresponding to the student responses, the reflection section, and the feedback comment respectively.

This model - Contracts

What: A contract is an agreement between you (learner) and me (instructor), on what each of us will commit to doing in this course.

Why: The class has high diversity in terms of participants' prior knowledge, academic training, level of interest in ISD, what they want to get out this course, etc. The mode is hybrid which is known to be more complex than fully online.

If we don't have a clearly defined contract for different categories of participants, there may be mismatch of expectations, leading to frustration for you, me, others in the class, chaos in class schedule, etc.

This model - contract for instructor

- **I will ensure that the course runs effectively for cohort X.** This course is meant for them. Their learning needs will not be compromised to cater to other cohorts.
- I will try not to give you more work than the allocated credits for this course.
- I will ensure that **cohort Y gets enough out of the course**, subject to above.
- I will ensure that **cohort Z finds it interesting to participate**, subject to above.
- I will do my best to ensure that **appropriate learning happens for all cohorts**, at a level that is acceptable to most of the cohorts.

This model - contract for cohort X

1. You will attend all classes, in-person, on time.

- a. No over-sleeping and then giving some excuse to bunk or join online. No making the instructor call you after the class has begun.
- b. If you cannot make to a class, or need to switch to online temporarily, you will inform whoever is likely to be impacted by your absence - instructor, your project team - as soon as you can.

2. You will participate in all activities diligently.

- a. You will put in whatever effort is required in-class, and out-of-class.
- b. You will complete assignments on time.

3. You will focus on real learning of the subject.

- a. You will not game the system for assignments.
- b. You will not be a sleeping partner in projects.
- c. You will not pester the instructor regarding marks and grades. :-)

This model - contracts for cohorts Y and Z

Cohort Y -

1. **You will attend most classes** and do the activities given for your cohort / group.
2. **You will participate in the project, at the design level.**
 - a. You will honor your commitments to cohort X.
 - b. You will not take the project team meetings or deadlines casually.
3. **You will not suddenly vanish from the course.** If you need to exit, talk to the instructor.

Cohort Z -

1. You will contribute to whichever classes you attend, in whatever mode.
2. You will participate in the project, at a mentor level.
3. You will not suddenly vanish from the course. If you need to exit, talk to the instructor.

This model - discussion on repeatability

Have two courses - one on learning the subject and other on learning to mentor.

Have different goals and credits for different cohorts.

Have the same instructor and same slot for both courses.

- Example - PG class (elective):

Cohort X = 1st year MTech, learning the subject.

Cohort Y = subset of 2nd year MTech/PhD who are familiar with the subject, now learning to mentor/lead projects.

Cohort Z = 4th year PhD, learning to teach courses.

Anecdotal experience
from a networking course

- Example - UG class (wishful thinking):

Cohort X = 2nd year BTech.

Cohort Y = subset of 4th year BTech or MTech.

Cohort Z = subset of PhD.

School level (more wishful thinking):
Timetable a few classes across grades
with the usual grade-level ones

Experience from a networking course

Timbaktu wireless

Add points from [slides](#)? Show [video](#)?

Thank you

This presentation is available at:



Sridhar Iyer, IIT Bombay

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