

Report on Innovative Teaching Learning method adopted: Extra Experiment for Fast Learners in Digital System Laboratory by Prof. Priya Deshpande, Dr. Amol Deshpande, Dr. Narendra Bhagat, Dr. Anand Mane, Dr. Santoshkumar Sabat

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Sem II, EXTC

Subject: Digital Systems and Microprocessors (EC101),

Academic Year: 2023-24

Introduction

In the SEM II Digital Systems and Microprocessors Lab, an innovative teaching and learning approach was introduced to cater to the needs of fast learners. This initiative involved offering an extra experiment designed to challenge advanced students, allowing them to earn full marks for the respective experiment without the need for a viva. The goal was to engage fast learners in deeper exploration of digital systems and microprocessors, thereby enhancing their practical skills and conceptual understanding.

Method

1. Identification of Fast Learners:

- **Criteria:** Fast learners were identified based on their consistent high performance in lab exercises, assignments, and quizzes.
- **Selection:** Instructors selected students who demonstrated exceptional proficiency in course material and a strong aptitude for problem-solving.

2. Design and Implementation of Extra Experiment:

- **Advanced Problem Statement:** An additional experiment was crafted to be more challenging than regular lab exercises. This problem statement required advanced application of digital systems and microprocessor concepts.
- **Resource Provision:** Students were provided with the necessary resources, including advanced tools, software, and supplementary reading materials to support their experimentation.
- **Self-Directed Approach:** The extra experiment encouraged self-directed learning, allowing students to independently explore advanced topics and techniques.

3. Evaluation and Assessment:

- **Report Submission:** Students were required to submit a comprehensive report detailing their extra experiment, including the problem statement, design methodology, implementation steps, and results.

- **Full Marks Awarded:** Upon successful completion and submission of the extra experiment report, fast learners were awarded full marks for the respective experiment without the need for a viva examination.

Outcomes

1. Enhanced Understanding of Advanced Concepts:

- **Deep Exploration:** Fast learners explored advanced digital systems and microprocessor concepts, gaining a deeper understanding of complex topics.
- **Practical Application:** The extra experiment provided an opportunity to apply theoretical knowledge to practical, real-world problems.

2. Improved Problem-Solving Skills:

- **Tackling Complex Challenges:** Students enhanced their problem-solving abilities by addressing more complex problems.
- **Innovative Thinking:** The initiative encouraged innovative thinking as students devised creative solutions to challenging problems.

3. Promotion of Independent Learning:

- **Self-Motivation:** The extra experiment fostered self-motivation and independent learning among fast learners.
- **Effective Time Management:** Students learned to manage their time effectively, balancing the extra experiment with regular coursework.

4. Recognition and Reward:

- **Acknowledgment of Excellence:** Fast learners received recognition for their advanced capabilities, motivating them to continue excelling academically.
- **Fair Assessment:** Awarding full marks without a viva ensured a fair and unbiased assessment of students' capabilities based on their performance in the extra experiment.

Outcome Measuring Mechanisms

Student Feedback: Collected feedback from fast learners about their experience with the extra experiment, including challenges faced and skills acquired.

Student have recorded videos of the experiment:

<https://drive.google.com/drive/folders/1ZhHDOvovw8hyXWSkcdDvpv-uG0PykEcX?usp=sharing>

Following Student were the fast learners:

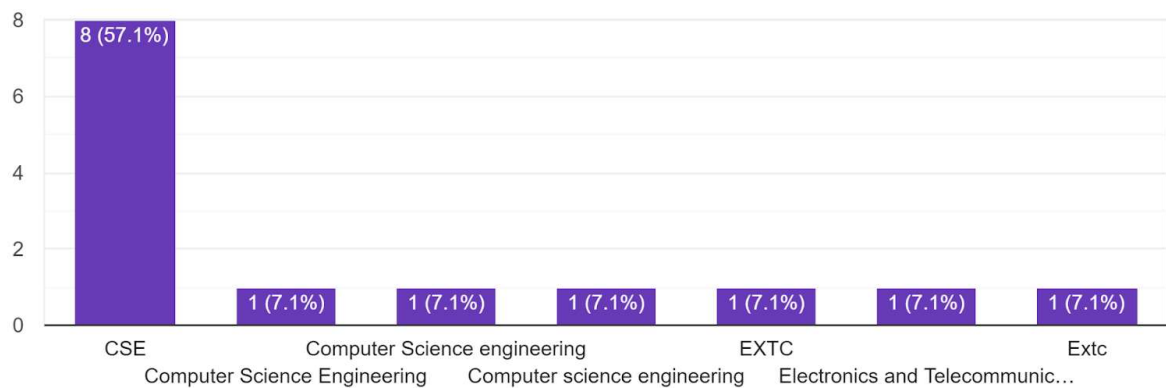
DSM FAST LEARNERS							
SR. NO.	EXPERIMENT NAME	STUDENT NAME	UID NO	BATCH	DATE	TIME	emailid
1	MOD 10 DOWN COUNTER USING 7476	Nitin Sharma	2023800110	F3	18/3/24		nitin.sharma23@spit.ac.in
2		Sarang Patil	202380084	F3	19/3/24		sarang.patil23@spit.ac.in
3		Gargi Dhulekar	2023200037	E2	20/3/24	4.20pm	gargi.dhulekar23@spit.ac.in
4		Chaitali More	2023800062	G2	21/3/24	3.30pm	chaitali.more23@spit.ac.in
5		Ananya Chauhan	2023800009	F1	21/3/24	4.07pm	ananya.chauhan23@spit.ac.in
6		Lekh Nayak	2023800068	G3	20/3/24	4.32pm	lekh.nayak23@spit.ac.in
7		Bhavik Desai	2023200030	E2	21/3/24	4.37pm	bhavik.desai23@spit.ac.in
8		Viraj Salunke	2023800097	F3	21/3/24	4.30pm	viraj.salunke23@spit.ac.in
9		Rahul Chaturvedi	2023200022	E2	21/3/24	5.12pm	rahul.chaturvedi23@spit.ac.in
10		Prinka Devi	2023800090	F3	26/3/24	3.21pm	prinka.devi23@spit.ac.in
1	DECADE COUNTER USING 7490 WITH SEVEN SEGMENT DISPLAY	Lekh Nayak	2023800068	G3	20/3/24	10.48am	lekh.nayak23@spit.ac.in
2		Piyush Chintal	2023800010	F1	20/3/24	10.56am	piyush.chintal23@spit.ac.in
3		Jiya Gudakha	2023800027	F2	20/3/24	10.56am	jiya.gudakha23@spit.ac.in
4		Suyog Nikam	2023800070	G3	20/3/24	11.15am	suyog.nikam23@spit.ac.in
5		Greenal Tambe	2023800124	F4	21/3/24	2.45pm	greenal.tambe23@spit.ac.in
6		Ananya Chauhan	2023800009	F1	20/3/24	5.10pm	ananya.chauhan23@spit.ac.in
7		Menil Dhamelia	2023800017	G1			menil.dhamelia23@spit.ac.in
8		Divit Gupta	2023800029	G1			divit.gupta23@spit.ac.in
9		Atharva Pandit	2023800073	G3	26/3/24	2.10pm	atharva.pandit23@spit.ac.in
10		Suraj Nair	2023800066	G3	26/3/24	2.10pm	suraj.nair23@spit.ac.in
11		Prinka Devi	2023800090	F3	26/3/24	3.45pm	prinka.devi23@spit.ac.in
1	2 TO 8 COUNTING USING DECADE COUNTER IC 7490 WITH SEVEN SEGMENT DISPLAY	Sumit Rathod	2023800094	G3	20/3/24	10.50am	sumit.rathod23@spit.ac.in
		Nishant Jadhav	2023800033	G1	20/3/24	10.51am	nishant.jadhav23@spit.ac.in



Feedback from Students:

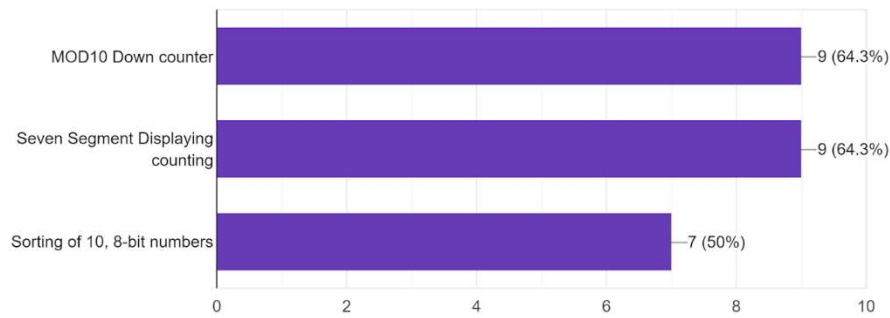
Department

14 responses



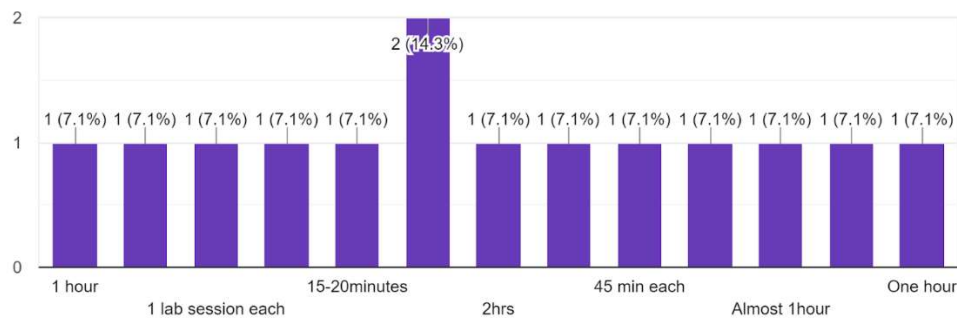
Which experiment(s) did you complete?

14 responses



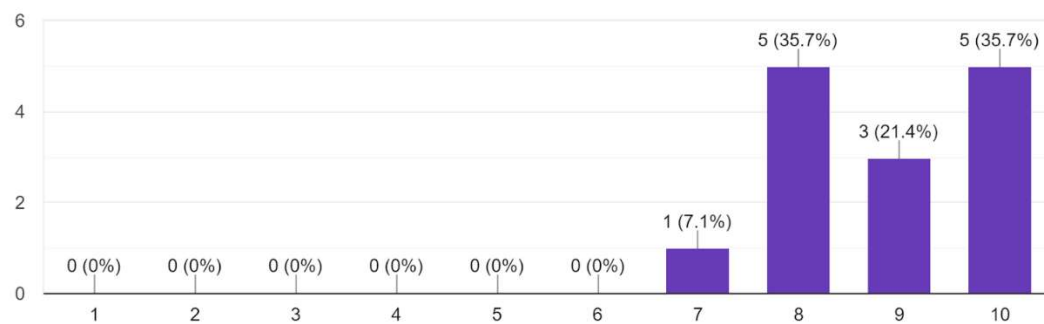
How long did you work on each experiment?

14 responses



On a scale of 1-10, how would you rate the effectiveness of the experiments in helping you understand DSM?

14 responses



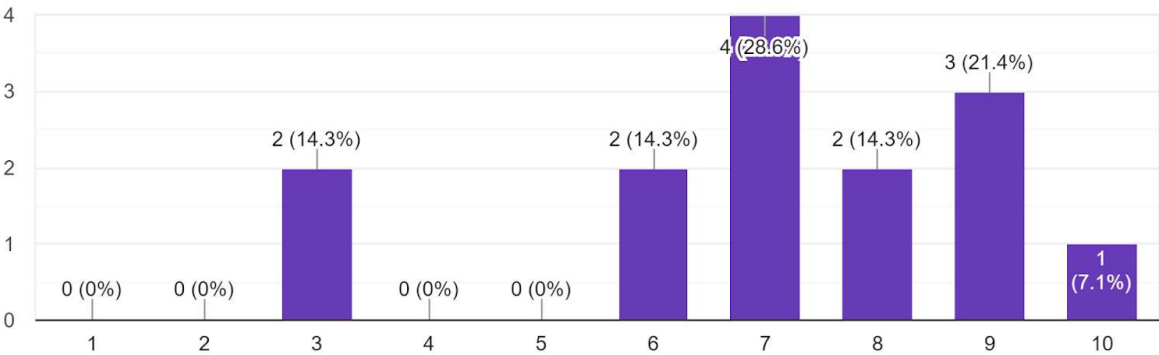
What specific skills or knowledge did you gain from these experiments?

14 responses

It helped me to understand logic in circuit and it also helped me to improve my theoretical knowledge.
More DSM equipment and microprocessor knowledge
The application part of these experiments were highly explored with question rooting to the way we can think in digital systems .
Learned how to control the flow of the counters and create better programs in 8085 Microprocessor Kit
I learned the skill of using seven segment display for displaying counting
Made my concepts strong of making different counters and coding in 8085 microprocessor
From the mod 10 down counter i learned how to effectively use jumper wires and why proper connection is needed for the ic's to work. From the 8085 mpu to sort array i learned how to use the microprocessor unit and to code on the unit and to modify the code if anything is wrong inside the hex codes.

How would you rate the difficulty level of the experiments? (Scale of 1-10)

14 responses



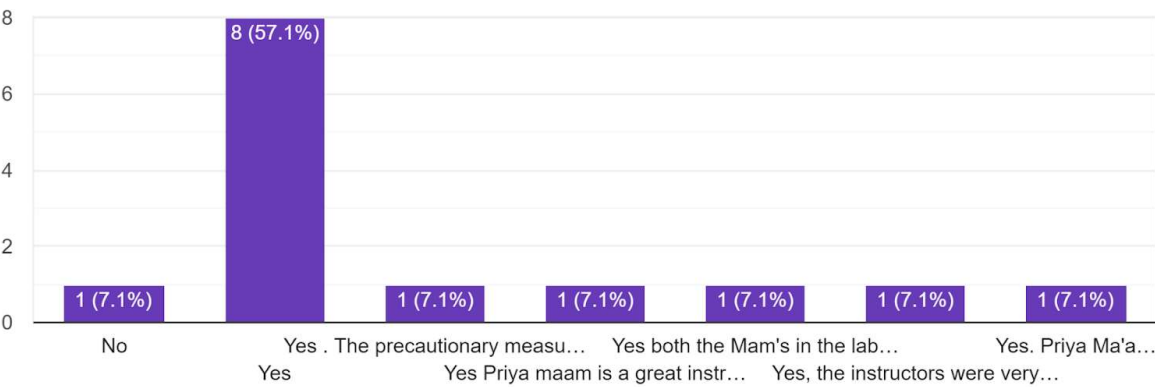
Did you encounter any technical issues during the experiments? If so, please describe.

14 responses

- Yes ,however upon changing the wires and clocks were able to implement .
- The Digital Electronics Kits were very problematic as the kits sometimes didnt work and other times when they did the wires had to be held down manually in a particular angle for them to work
- No issue
- In mod 10 counter the jumper not connecting well is a big issue.even if the circuit is correct a faulty jumper leads to reattempt the circuit as it's not possible to detect the issue easily.
For the microprocessor experiment sometimes the keyboard or the unit starts malfunctioning leading to write the code again.
- The 2 bottom sockets of one of the Digital Trainers Kit were not working. Whereas the same connection and configuration worked in the upper sockets of the kit
- Yes, the kit doesn't work in some cases even after proper connections are made. Some pins in the CC or CA are shorted.
- Wires were loose. and kept coming off

Did you receive adequate support from instructors or teaching assistants? (Yes/No, with space for comments)

14 responses



What changes would you suggest to improve the experiments in the future?

14 responses

Nil

Sometimes it happens that connections are proper then also circuit is not working or have any issues regarding internal circuit board. So pls Check the circuit board as well as wires before lab.

None

Varied application side and usage of software as well in the given ,example the proteus software.

Regular maintenance of the Digital Electronics Kits

No Changes

Replace the old jumpers with new one. I was making circuits multiple time because of wrong output but at the end it was jumpers fault behind it 🤖

Replacing the old jumpers in certain time durations so that the problem with jumpers not being working will be resolved to certain limit.

Do you have any other feedback or comments?

14 responses

No.

Nil

None

None.it was a great experience learning and enjoying the process.

none

Everything is good

Not any

Learning DSM was fun in the lab and lectures.

Learnt the most jn dsm lab