Pegasus Innovation Lab
DIVISION OF DIGITAL LEARNING
UCF
UNIVERSITY OF CENTRAL FLORIDA

Project Details – Team 7

Project Team

Project Title: Developing Reduced Seat (RS) Mode Algebra-Based College Physics I Course Using Personalized Adaptive Learning to Promote Independent Learning and Accommodate Scheduling Conflicts

	Team Lead	**Team Member**	**Team Member**
Name	Dr. Archana Dubey	Dr. Alfons Schulte	Dr. William Kaden
College	College of Sciences	College of Sciences	College of Sciences
Department	Physics	Physics	Physics
Department Chair	Dr. Joshua Colwell	Dr. Joshua Colwell	Dr. Joshua Colwell

Additional team members who are non-teaching faculty or CDL staff members:

- Dr. Baiyun Chen
- Dr. Rohan Jowallah

Project Details

The updated version of Personalized Adaptive Learning (PAL) will be utilized for

PHY 2053 RS mode – Fall 2024 and future semesters.

PHY 2053 Studio mode – Fall 2024 and future semesters.

PHY 2053 Lecture mode – Fall 2024 and future semesters.

Course Prefix	**Course Title**	**Modality (see reference above)**	**Instructor of Record**	**Semester & Year to be Taught**
PHY2053	College Physics I	RS	Dr. Archana Dubey	Fall 2024
PHY2053	College Physics I	RS	Dr. William Kaden	Fall 2025
PHY2053	College Physics I Studio	P	Dr. Alfons Schulte	Fall 2024

Technology implemented:

- Personalized Adaptive Learning (PAL)
- Artificial Intelligence (AI BOTs)

PAL and Artificial Intelligence avatars will be implemented in PHY 2053 course taught in RS, lecture, and studio-mode formats.

Additional Comments

Key Deliverables:

PAL content has been developed and modified for optimized learning outcomes associated with our implementation of the newly designed RS mode course for College Physics I (PHY 2053). The work has considered student difficulty and Physics Education Research (PER) literature about student learning.

The following work has been done for PAL using the Realizeit platform:

(1) Question banks were significantly modified to add concept questions, as well as problems including the ones that were divided into several parts to guide students use a certain path to achieve the answer.
(2) Questions were embedded in the reading content to promote academic reading habits among students.
(3) Interactive example problems were included in the reading content to reinforce and promote problem-solving strategies.
(4) Several topics from the previous chapters were revisited in later chapters to reinforce the learning of associated concepts and problem-solving skills, and to enable student understanding of the connections between topics across chapters.
(5) The topic of simple harmonic motion was introduced and incorporated in an earlier chapter.
(6) Several short videos were produced with closed captioning and integrated within the content to provide real-world demonstrations used to supplement course materials.
(7) AI avatars are being included to read chapter objectives and summaries (with closed captioning). This is the first of many steps we plan to incorporate to accommodate student accessibility.

For RS mode instruction, meetings were conducted with several UCF faculty members to learn from their collective experiences to teach in this mode of instruction.

In-person class meetings for students (20% classroom attendance) at fixed intervals were planned considering flexibility to the students. During these meetings, we plan to have live physics demonstrations in addition to hands-on problem solving via a classic “flipped classroom” approach to strengthen student problem-solving skills that are incorporated with conceptual understanding.

The course redesign has been completed in parallel with a separate synergistic activity focusing on the development of a department-wide common assessment tool specific to this course, in addition to reviewing PER literature, student performance on PER-based assessments from previous semesters, and the development of assessments based on collected data. Learning gains measured by these assessments will be combined with the Student Perception of Instruction (SPI) feedback to assess learning outcomes and student perceptions to further revise the course to achieve greater optimal outcomes in successive iterations, thereby maximizing the impact of our unique modalities’ potential for a significant scaleup.

The updated version of PAL will also be utilized for lecture- and studio-mode classes.