



## Assessment for Rapid Pedagogical Improvement (ARPI) Showcase



# Justin Hoshaw

Waubonsee Community College  
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as part of the ARPI Case Studies Interview Project

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## Context

Justin Hoshaw is a professor of biology at Waubensee Community College. The college is a public comprehensive 2-year college in Illinois, enrolling more than 14,000 students a year. One of the courses Prof. Hoshaw teaches is a microbiology course for students who are preparing to start their nursing program. The course aims to establish a foundation of science, microbiology, aseptic techniques, and disease transmission. Students are eager to learn but are also pulled in multiple directions as they complete this nursing program pre-requisite.

In this course, Prof. Hoshaw aims for students to gain a wide range of foundation knowledge such as cell structure and function, infectious disease, epidemiology, pathogenesis and so on. He also trains students to apply lab techniques and procedures for questions and situations that resemble professional and real-life situations.

## Assessment Strategies for Rapid Improvement

Prof. Hoshaw implements frequent and regular quizzes and exams as the key formative and summative assessment tools in this course. He implements daily homework assignments, frequent quizzes, and study guides, all preparing students for the chapter exams that assess students' learning upon the completion of each chapter or module.

Guided by the backward design principle, Prof. Hoshaw **uses the learning objectives to guide the development of the exam and quiz questions**, which in turn, guides him to carefully select instructional materials and classroom activities for students' successful achievement on the exam questions. After years of iterative revision processes, each exam item is now clearly aligned with a particular learning objective, a learning point, and a specific content area in the course.

**Designing quality assessment tools allowed Prof. Hoshaw to** easily rework the class lecture and activities that he had in the classroom and **prioritize the content**, *"So instead of just trying to evenly space out the time and cover all the topics, it was like, these are what students are struggling with. This is what we need to spend time on."*

He also uses rubrics to assess students' discussion and written works and align each evaluation criterion with a course learning objective.

**Prof. Hoshaw leverages technology to efficiently administer assessments, receiving immediate results, and using results to guide rapid pedagogical changes.** In the Canvas Learning Management system, for each quiz or exam question that he creates, he indicates its alignment with a particular course learning objective and the evaluation criterion. The set up allows him to view assessment results as soon as students finish taking an exam or completing a task, through the display of Canvas' Learning Mastery Gradebook.

The results visually display the achievement results of each learning objective, exam question, and each student.

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When the results reveal an area of concern, Prof. Hoshaw first examines whether there is an issue with the quality of the exam question. He checks the wording to make sure it is clear. He also conducts item analysis and uses indices such as item difficulty and item discrimination to understand how an exam question behaves, then uses that information to improve the exam questions.

Once Prof. Hoshaw has examined and improved the quality of assessment tools, he would examine the patterns in the results to identify learning gaps on a particular learning objective, a content area, and for a particular student: *“So once I knew what topics students were struggling with because of those questions, I was well positioned to prioritize our time addressing those more challenging topics.”*

Prof. Hoshaw would reflect on teaching and ask himself the following questions:

- *Do students need more help with their homework or quiz questions?*
- *Did I not explain the topic in a way that resonated with students?*
- *Would this particular topic benefit from a hands-on activity or a video?*
- *Should I focus the discussion topic on this particular area?*

It has been a continuous process for Prof. Hoshaw to learn how to design good exam questions and best lead students to be successful on those exam questions. Through the iterative alignment-improvement process, “I know the course is better aligned now and that the lectures and activities do a better job of supporting that student learning on the exams.” Prof. Hoshaw has observed positive impact of his assessment effort, “I did see increases in student scores and I saw students feeling less overwhelmed because there was more focus as we were going through the chapters.”

## Pedagogical Interventions

Prof. Hoshaw teaches his course hybrid with online lectures and in-person lab components. The improvement that he made in teaching and assessment can be categorized into two types: rapid and sustained changes.

The rapid changes happen in response to ongoing homework assignments and quiz/exam results that reveal a particular area of learning gap or confusion. Prof. Hoshaw provides different additional

resources for students, for example the animation videos that textbook publishers supplement, Khan Academic, [Crash Course Biology](#), [This Podcast Will Kill You](#), and [Amoeba Sisters](#) videos among others.

The videos allow students to see and listen to accounts of people that have been affected by different diseases. This allows students to *“get that really close communication that they wouldn't have had otherwise with the disease.”*

The videos can be embedded as course content in his lecture video or as a homework assignment. Either way, students will respond to additional quiz questions related to the content of the video to solidify their learning or show a picture of it to indicate the completion of assignments.

The **sustained changes** happen when the course is complete. Prof. Hoshaw would go back and improve homework questions to better align with the quiz and exam questions. He would take additional time to systematically analyze the exam question results, understand better where students struggle, and identify the parts of the lecture and teaching materials that can be improved, and incorporate additional readings or resources into the syllabi or course materials for the next semester, thus sustaining the improvement made in the current semester to the next semester.

Examples that Prof. Hoshaw provided for the sustained changes include:

- Scaffolding learning by assigning multiple assignments throughout the semester so that he can give students prompt feedback on how they are studying and how they are preparing for the exams.
- Using smaller but more frequent exams. Instead of administering big exams, Prof. Hoshaw administers one exam per book chapter to help students form regular studying habits.
- Providing a study guide that includes target learning objectives, topic content, and questions to answer. Going through the study guide helps students focus on what they need to learn and prepare them for the kinds of questions appearing on the quizzes and exams.

Prof. Hoshaw observed markable improvement in student learning through these improvements.

## Equity Considerations

Hoshaw implements weekly homework, quizzes, and chapter exams for each chapter to break up the content which helps students to form the habit of studying regularly. With ample time for completion, his students experience less stress, especially students with learning challenges as well as non-native speakers of English. Students can have one sheet of notes to refer to during the monitored exam to alleviate the concern over memorizing the material.

He also tries to encourage critical thinking by using more application-based questions instead of straight definition style questions. To prepare students for the application-based questions, Prof. Hoshaw brings in a variety of case studies that focused on patients from diverse backgrounds, either via the background description of the patient, or using names from a variety of cultures to be more inclusive.

Prof. Hoshaw uses student demographics and assessment data analysis to understand where students are succeeding or struggling and for which groups of students. Particularly, he paid attention to the first-

generation students and other ethnically minority students. He finds ways to help these groups of students that can then benefit all students.

## Personal and Institutional Factors to Effect Change

At the personal level, Prof. Hoshaw exhibits a strong drive to be the best biology teacher that he can for his students. This motivates Prof. Hoshaw to continuously improve his teaching and systematically track the effectiveness of the improvements that he implemented. He is open to new information and technology to reach his full potential so that students can reach their full potential. He acquired backward curriculum design framework on his own and explored continuously to be a good exam question designer.

Prof. Hoshaw is also equipped with high level data analytics skills. He really embraces the data and investigates *“what the data can tell you.”* He uses multiple data sources and has learned to use tools like Excel to track the data from one exam to another and one semester to the next. He has learned and practiced conducting item analysis and using data to guide his teaching improvement.

The one challenge that Prof. Hoshaw pointed out is how to best use the technology tools: *“learn how to use the technology in the most efficient way for instruction and learn how to understand and use those statistics and numbers graphs and whatever Canvas can provide us to help students.”*

Prof. Hoshaw desires more faculty development support and training on understanding the technology, especially on the Canvas Outcomes tool and the quiz analysis reports. He felt that he needed more support to conduct data analysis and disaggregation of student data.

## Takeaways

- Clear alignment between assessment, learning objectives, and teaching content make rapid and sustained change logical and streamlined.
- Technology offered in the learning management system, such as Canvas, can greatly facilitate using assessment results for rapid improvement.