

Fostering Student Engagement through Office Hours

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Session objectives:

- Identify and discuss the challenges often faced in running office hours
 - Review research-based strategies for a student-oriented office hours session, focusing on increasing student motivation and guiding students through challenging problems
 - Develop a strategy to employ in your own office hours to encourage positive and effective interaction with students
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Section 1. What is the purpose of office hours, and what are the challenges for students and instructors?

Goals of Office Hours

- Allow students to ask questions that cannot be answered sufficiently within the time available in class
- Provide students with opportunity for assistance on assignments in a small group or one-on-one setting
- Allow students to develop familiarity with the instructor and thus reduce feelings of intimidation or inaccessibility

Challenges in Office Hours

- Lack of student attendance
 - Instructors may feel frustrated that students are not taking the time to seek out opportunities for assistance.
 - Students may feel intimidated by the instructor and therefore do not want to attend. They may also feel that this subject is a “lost cause” for them, and they simply won’t succeed with or without help.
- Teaching in office hours
 - Students may come to office hours struggling to find a method to solve a challenging problem. Instructors and students often work through the problem together, but the students seem to still struggle with similar problems in future assignments.
 - Instructors may not want to reveal the answer to a problem to make sure the course is fair; students may find the advice given instead too vague to be helpful.

Section 2. What does educational research tell us about student learning in the office hours context?

Background on Student Engagement and Motivation¹

- The motivation of students and their resulting level of engagement in a course is crucial to student success.
- Factors determining student motivation include:
 - The value they see in their goals for the course; example goals might be to get a good grade or to be able to apply the course material to their research
 - Their confidence in being able to achieve these goals
 - Whether they perceive the course environment as one that will help or hinder them from meeting their goals

Strategies to Improve Engagement and Motivation through Office Hours

- Actively encourage students to attend office hours
 - Direct interaction with students in a one-on-one or small group environment has been shown to significantly increase student engagement and learning gains.
 - These interactions may be particularly beneficial to students who do not feel confident or at ease in the course.
- Hold your office hours in a location that is welcoming and accessible
 - Locations that might be more accessible to students include coffee shops and library or building study spaces. If meeting in an office, keep the door open to welcome students and maintain transparency.
 - Try to find a time that avoids most schedule conflicts.
 - Some students may feel more comfortable in a group study session environment, where they can work together and ask questions if needed.

Background on How Students Learn²

- The process of learning involves not just the accumulation of information, but more importantly the organization of this content in the brain. To learn effectively, students must be actively engaged in developing their own understanding of material.
- Novices in a field typically organize content much differently than experts; novices tend to focus on superficial features to organize ideas, while experts organize ideas based upon the underlying concepts.
- Students often struggle to comprehend the underlying process used to solve problems and as a result may also find it challenging to apply what they have

¹ Information based on “Chapter 3: What Factors Motivate Students to Learn?” in *How Learning Works: Seven Research-Based Principles for Smart Teaching* by Ambrose, Bridges, and DiPietro. San Francisco: Jossey-Bass, 2010.

² Information based on “Chapter 3: Using Insight about Learning to Inform Teaching” in *Reaching Students: What Research Says about Effective Instruction in Undergraduate Science and Engineering* by Kober. Washington, DC: National Academies Press, 2015.

learned in a new context. Intentionally discussing the method and process that they are using to solve problems can help them improve this skill.

Strategies to Improve Student Learning in Office Hours

- Avoid solving the problem while the student watches
 - Watching someone solve a problem is largely passive; this position makes it challenging for the student to develop their own understanding.
 - Students may know how to solve the problem that you demonstrated, but they will struggle to apply that knowledge in a new context.
- Help students frame the problem
 - There may unfamiliar language or symbols in the problem that are causing confusion, or they may not understand the main question.
 - Have students state what is given and outline their strategy for solving the problem as a starting point.
- Use “think out loud” discussion to clarify where the student is struggling
 - As discussed above, students can often approach problems quite differently from experts.
 - Having a student describe their process to you can illuminate differences in approach and pinpoint the challenging concepts.
- Model the process of problem solving
 - To help students grasp the underlying concepts in a problem, make clear to them the approach of an expert.
 - Once the process is modeled, try to follow up by having the student work through a problem using what they have seen.

Section 3. Examples of common office hours scenarios and possible responses

- Problem Set 1 has been assigned and your first office hours are coming up. What kinds of preparation can you do beforehand so that you’re well equipped to answer students’ questions effectively?
 - Be familiar with the material
 - Attend the lectures (required in some departments, not others) to know the gaps and anticipate questions
 - Work through (or at least think through) each problem and identify edge cases / corner cases / tricky bits
 - Analyze the assignment
 - Identify key concepts – what is the purpose of the problem?
 - Outline key steps in the problem
 - Develop problem-solving strategies
 - For each problem, create a roadmap to present to the student/group, walking them through the general approach to solving the problem
 - Construct problems analogous to those in the homework for students to work through with you

- Time-saving preparation tips
 - Ask previous TAs from the class for their prep notes
 - Share prep notes with other current TAs – e.g. One person constructs an analogous problem for Problem 1, another constructs one for Problem 2, and share between them
- The night before the problem set is due, your inbox is flooded with e-mails from students asking questions about the problem set. How could you respond? What strategies could you use to establish clear boundaries and avoid this situation in the future?
 - May be useful to send a response to the entire class if question is common (omitting the name and e-mail address of the student who asked the question)
 - Decide on an email protocol and communicate it clearly from the beginning of term so they know what to expect in email communications
 - Will you use email to answer questions about problem sets or course material, or do you prefer to answer these questions in person?
 - It is useful to let students know when they can reasonably expect an answer to an e-mail message – e.g. at what hour of the evening will you stop checking your email.
- Very few students are attending office hours and/or students who attend are not asking questions. List some possible reasons for these issues and identify strategies you could use to address them.

Reason	Potential Strategies
Students aren't aware of office hours (that they exist, or why they are useful)	<ul style="list-style-type: none"> • Publicize on syllabus and by regular in-class reminders • De-mystify the office hours experience (which many students have never encountered before college) by explaining the purpose and how it can help them • Encourage students to attend office hours via notes on graded exams and essays • Make a requirement that students must attend the first office hour and get their homework signed
Timing of office hours	<ul style="list-style-type: none"> • Try to schedule office hours for a time that works for the majority of students • Take into consideration the homework deadlines when scheduling • Make it clear that students can make

	appointments with you if they aren't able to attend office hours
Students are intimidated or worried about looking stupid when asking questions	<ul style="list-style-type: none"> • Have a friendly and positive attitude • Talk slowly! If you talk very fast and go through material really quickly, students might perceive you as so smart and might be intimidated • Be very wary of using words like “clearly”, “obviously”, “trivial”, etc. • Mention things that you struggled with when you were a student taking the class • When students arrive to meet with you, especially the first time, make them feel more comfortable with a brief chat about their background and interests • Connect with students by chatting before or after class

- In office hours, a student says to you: “I have no idea what to do for Problem 3. Where do I start?” What are some possible ways you could respond to help the student?
 - Assess student knowledge
 - Start with what the student knows – have them explain their understanding of the problem, how it relates to concepts from class, what is needed to solve it
 - Ask student to identify key concepts in the problem – make clear what the question is asking
 - Ask them what ideas they can come up with for what to do next (not worrying if they're correct, just generating options to consider)
 - Identify barriers to accomplishing the task
 - Be aware that sometimes a student's difficulty is not a lack of understanding, but that they are afraid to fail so they don't try to solve the problem – need a supportive environment
 - Try to pinpoint the nature of their difficulty – Is there some information not specified and they need to make an assumption? Do the next steps relate to a concept that they are struggling with?
 - Try re-framing the problem (asking the same question in a different way)

- Have the student work through the problem while “thinking out loud”
 - Example prompts for discussing problems
 - What are some possible ways you might go about solving this problem?
 - Tell me what you know about the problem.
 - How might you break the problem into small steps?
 - Please tell me how you got from step one to step two?
 - What are you thinking right now?
 - I don't understand your reasoning behind that step. Will you please explain?
- A student is struggling to understand your explanation of a concept or having trouble following the steps involved in solving a particular problem. You in turn are having difficulty understanding the source of their confusion. What are some strategies you could use to better understand the student's challenges and provide effective explanations?
 - Possible disconnect between instructor and student
 - Be aware that some concepts have become so familiar to you that you take them for granted and don't consciously think about the underlying ideas or intermediate steps anymore – walk through each step
 - Be open to other approaches – a student may do something differently than what you expected
 - Identify additional references students can read for another perspective or different approach
 - Relating the material to student's knowledge
 - Take some time to get to know where each student is coming from (e.g., their major, other relevant courses they've taken, other related experience) – connect to prior knowledge
 - Start with what students know and are comfortable with, and build from there
 - Missing knowledge of underlying concepts
 - Take note of common misconceptions from lecture or assignments
 - Start with the most fundamental concepts to pinpoint sources of confusion
 - Ask the student questions to see if there is some gap or misconception in their understanding of prerequisite concepts which is causing their difficulty
- A student is failing the course. What are some things you can do to help them to get back on track?

- Be aware that there are various different possible reasons for their struggles, both academic and non-academic
- Identify any missing knowledge that is needed
 - Is there some prerequisite material that they were not comfortable with going into the course and need to brush up on?
 - Are there some additional math skills that they needed to complete the assignment?
 - The undergraduate dean's office has a tutoring service that is available for students
- Challenges outside of the class
 - Too heavy a courseload? Do they need to drop this course or another course to make their workload more manageable?
 - Some personal or health issues that they are dealing with? Refer them to other resources (health center, counselling center, their RA, etc.)
- Seeking help from many available resources at Caltech
 - Be careful not to over-extend yourself – help with what you can, and refer them to their RA or other resources for more support
 - Let them know about the safety nets and resources available to them (including for non-academic issues)
 - When you have a comfortable, friendly atmosphere, you might hear things from students that are non-academic issues - should be aware of resources for students

Section 4. References and Resources for Further Reading

Further Reading on Office Hours

- Caltech TA Handbook, <http://teachlearn.caltech.edu/TAs>
- University of Michigan "Learning and Teaching During Office Hours" guide: http://www.crlt.umich.edu/gsis/p4_5
- Vanderbilt University: <http://cft.vanderbilt.edu/teaching-guides/interactions/office-hours/>
- University of Washington: <http://www.washington.edu/teaching/face-to-face-office-hours/>

Further Reading on How Students Learn

- *How Learning Works: Seven Research-Based Principles for Smart Teaching* by Ambrose, Bridges, and DiPietro. San Francisco: Jossey-Bass, 2010. Available as an ebook from the Caltech library.
- *Reaching Students: What Research Says about Effective Instruction in Undergraduate Science and Engineering* by Kober. Washington, DC: National Academies Press, 2015. Available for free at: <http://www.nap.edu/catalog/18687/reaching-students-what-research-says-about-effective-instruction-in-undergraduate>