

## Appendices

**Table S1** – Initial codebook

Indicated perspective	Description of reasoning
Breadth	Particular course restraint with mixture of students – wanting to provide a proper foundation for students who will work in the field
It Depends	Context dependent (course level undergraduate or graduate)
Depth	<p>Concern for students' future</p> <ul style="list-style-type: none"> <li>-Focus on foundations for students to apply in future</li> <li>-Breadth focus sets students up for failure</li> </ul> <p>Student learning is instructor responsibility</p> <p>Concern for students' learning</p> <ul style="list-style-type: none"> <li>-Need to balance student level of understanding "poor" vs. "strong"</li> <li>-Don't want to overwhelm students, leaving them feeling lost/didn't learn anything</li> </ul> <p>Constraints on content coverage (Culture of department/institution)</p> <p>Feeling uneasy about leaving students behind</p> <p>No clear explanation</p>

**Table S2** – Chemistry assistant professors' perspectives on content coverage

Perspective on content coverage	Participants, <i>n</i>	Subject and course level taught
Depth is more important than breadth	4	Bioanalytical - Graduate Inorganic – Lower Undergraduate Analytical – Lower Undergraduate Biochemistry - Upper Undergraduate
Theoretically depth, but in practice breadth	3	Biochemistry - Upper Undergraduate Organic – Lower Undergraduate Analytical - Upper Undergraduate
Breadth is more important than depth	1	General Chemistry – Lower Undergraduate
It depends	1	Biochemistry - Upper Undergraduate

**Table S3** – Final codebook section on factors and reasoning behind faculty’s perspectives on the depth-breadth spectrum

Type of factor	Source of reasoning	Description of reasoning
Individual	Conception of Breadth	Students will get bored if covering a minority of topics therefore need to cover topics quickly
	Conception of Depth	Focus on core/foundational topics
		Students get lost in breadth coverage without depth, therefore there is no point to it
		Application of core/foundation material
		Adjusted pace based on students not the syllabus/schedule
		Emphasis on application of material
Personal considerations	Focus on why content is important	
	Reflected on their own learning, how they were taught, or observation of others teaching of the subject	
	Felt need to add introductions to additional content to prepare students for research in graduate school/their career	
Contextual	External Pressure	Expressed tension in what the instructor wants students to understand versus the content the instructor anticipated to cover
		Syllabus dictates the content that has to be covered
		Felt expectation of content coverage based on course series (ex. Gen Chem 1 & 2)
	Department	Expectation of content coverage in course based on textbook chapters and/or instructor relies on textbook for pace of content
		Have to cover what is on the ACS exam
		Felt pressure from senior colleagues to cover topics
Course Level	Perspective varied between course level taught (i.e. undergraduate vs. graduate)	
Structure of Course	Aimed for alignment of content between lecture and lab	
		Shared schedule and exams for all sections of course

**Table S4** – Representative quotes for chemistry assistant professors’ reasoning that supports their perspective on content coverage

Source of reasoning	Description of reasoning	Quote
Conception of Breadth	Students will get bored if covering a minority of topics therefore need to cover topics quickly	“I think also that instructors tend to think that they are very useful when lecturing, but I don't think that that's true. I think that students tend to learn what they need to from the books and from each other. And so covering the topics quickly is better because most of the students will get bored if you are covering a minority of topics I guess.” 16208
	Focus on core/foundational topics	“Well, so particularly for this class, a lot of the topics we cover is, as I already mentioned, some of them are an extension of Gen chem, but a lot of the other topics are things that they will need to move into their future classes and be successful. Um, and so even if we cover less, making sure that they have a very firm understanding of those topics should assist them as they move into their more, um, like their higher level chemistry courses.” 16205
Conception of Depth	Students get lost in breadth coverage without depth, therefore there is no point to it	“The first one would be worse [ <i>scenario</i> ]. if we're just throwing, you know, flying through the material, but nobody's getting it, we're not teaching.” 16209
	Application of core/foundation material	“These ideas like equilibrium activity, acid base chemistry because they are so prominent in the rest of the curriculum as well that I think it's extremely important that they have a good foundation in them. So they may have gotten a brief intro in gen chem, but they really need to be able to utilize these concepts, these ideas both in my class and as they take things like biochem, organic chemistry, et cetera.” 16205
	Adjusted pace based on students not the syllabus/schedule	“I will say my schedule was pretty broad. It was like week one slash two this topic, week three slash four this topic ... I probably kept to it reasonably well though I did get behind at the end of the semester again, because I saw that there was challenges, understanding certain equilibrium topics that I wanted to make sure we're clear.”16205
	Emphasis on application of material	“We still think the learning, especially for a graduate level course, for learning it should be have a function or application. If you just learn the knowledge but without using it, I think it's useless.” 16201
	Focus on why content is important	“I'm trying to fit in with what we decided the core curriculum should be, but then also to connect not only to, like I said, organic chemistry, but also other, um, I think topics to help students understand why metabolism is important to learn about or why it might be interesting to their day to day life, things like that.” 16204
Personal considerations	Reflected on their own learning, how they were taught, or observation of others teaching of the subject	“So I think I reflect on probably how I was taught those subjects or classes that I've observed, how they were taught there. And I'm trying to reflect on that. And then since this class is the third time I've taught it, I also have taken, you know, notes every semester and try to reflect on things that worked, things that didn't work and trying to continually update and refine things. Um, so that, I think that we're continuing to hopefully improve the course for the students.” 16204

Source of reasoning	Description of reasoning	Quote
	Felt need to add introductions to additional content to prepare students for research in graduate school/their career	"I still try to stick to, you know, we have this textbook that we use, um, [inaudible] finish the first 14 chapters because it's the first semester to second semester, right. So it's pretty much determined by, the scope the class that the school defines, but I try to incorporate um, some new stuff in there as well." 16220
	Expressed tension in what the instructor wants students to understand versus the content the instructor anticipated to cover	"I still feel like... I want to cover more, but I want them to understand more. So I feel like sometimes I'm personally challenged by figuring out what, what we should really make sure they understand versus what I had anticipated to get through by the end of this past year." 16205
	Syllabus dictates the content that has to be covered	"I guess I stick to a schedule. I don't stick to students and their need to stay on the topic. I stick to the schedule and what we have to cover. So it's, it's schedule-led not student-led." 16208
	Felt expectation of content coverage based on course series (ex. Gen Chem 1 & 2)	"I won't skip any chapters, um, for this class because I think everything is important. Um, especially when you have a second semester to take, if you miss one chapter it's gonna probably cause some issues in second semester, um, or even down the line, in the class. Um, so what I'll try to do is we have some, uh, I, I would intentionally leave out things and then I will have, we have review sessions, so I'll have my TA cover that in the review session." 16220
External Pressure	Expectation of content coverage in course based on textbook chapters and/or instructor relies on textbook for pace of content	"The syllabus is pretty much standard. Um, so we'll have certain content that we need to teach the class. Right. Um, so it's pretty much determined by that. I've acquired lecture notes from previous instructors just to get a sense of what are things that are important and how much leeway do I have in terms of incorporating new knowledge... Um, but I still try to stick to this textbook that we use, um, finish the first 14 chapters because it's the first semester to second semester, right. So it's pretty much determined by the scope the class that the school defines, but I try to incorporate some new stuff in there as well." 16220
	Have to cover what is on the ACS exam	"So that's just based on the ACS exam, so there are certain topics that they require to teach so we just follow it. And then I talk to other senior faculty in our department all from the same division and then they say, oh yeah, so there are certain topics that um it is a must, so we have to cover all the topics." 16226
Department	Felt pressure from senior colleagues to cover topics	"Based on, uh, the ACS exam so there are certain topics that they require to teach so we just follow it. And then, uh, I talk to other senior faculty in our department all from the same division and then they say, oh yeah, so there are certain topics that um it is a must, so we have to cover all the topics." 16226
Course Level	Perspective varied between course level taught (i.e. undergraduate vs. graduate)	"It should be the latter one, the majority of students should understand, but maybe it depends on the setting. I think in the lecture class, uh, that's what I'd pick, but the undergraduate and graduate and those more specialized topic versus broader topic, it varies." 16203
Structure of Course	Aimed for alignment of content between lecture and lab	"In class I also tried to align some of those lab topics with class, like timing. Um, so I'd say that's another thing I kept thinking about throughout the semester. Like how much time do we spend on each topic. I was trying to align it with what was being covered in the lab simultaneously." 16205

Source of reasoning	Description of reasoning	Quote
	Shared schedule and exams for all sections of course	“Yeah, so I'm kind of in a bind. I can't get through a minority of topics because we have shared exams. And so in the case of shared exams, I have to get through the majority of the topics even if a minority of students understand them.” 16208

**Table S5** – Chemistry assistant professors’ reasoning that supports their perspective on content coverage

Type of factor	Source of reasoning	Description of reasoning	Breadth (n = 1)	Theoretically depth, but in practice breadth (n = 3)	It depends (n = 1)	Depth (n = 4)	
Individual	Conception of Breadth	Students will get bored if covering a minority of topics therefore need to cover topics quickly	16208				
		Focus on core/foundational topics		16226		16202 16204 16205	
		Students get lost in breadth coverage without depth, therefore there is no point to it		16209		16201 16202 16204	
	Conception of Depth	Application of core/foundation material				16203	16202 16204 16205
		Adjusted pace based on students not the syllabus/schedule					16202 16204 16205
		Emphasis on application of material			1626		16201
			Focus on why content is important		16220		16204
	Personal considerations	Reflected on their own learning, how they were taught, or observation of others teaching of the subject				16203	16201 16204
		Felt need to add introductions to additional content to prepare students for research in graduate school/their career			16220 16226		
		Expressed tension in what the instructor wants students to understand versus the content the instructor anticipated to cover					16205
	Contextual	External Pressure	Syllabus dictates the content that has to be covered	16208	16220 16226		
			Felt expectation of content coverage based on course series (ex. Gen Chem 1 & 2)		16209 16220		
Expectation of content coverage in course based on textbook chapters and/or instructor relies on textbook for pace of content				16220		16203	
		Have to cover what is on the ACS exam		16226			
Department		Felt pressure from senior colleagues to cover topics		16226			
Course Level		Perspective varied between course				16203	

Type of factor	Source of reasoning	Description of reasoning	Breadth ( <i>n</i> = 1)	Theoretically depth, but in practice breadth ( <i>n</i> = 3)	It depends ( <i>n</i> = 1)	Depth ( <i>n</i> = 4)
		level taught (i.e., undergraduate vs. graduate)				
	Structure of Course	Aimed for alignment of content between lecture and lab				16202 16205
		Shared schedule and exams for all sections of course	16208			