

[00:00:00] Bonni Stachowiak: Today on episode number 458 of the Teaching in Higher Ed Podcast, How To Develop Ourselves and Others Through Classroom Observations With Rebecca Price.

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[00:00:17] Bonni Stachowiak: Welcome to this episode of Teaching in Higher Ed. I'm Bonni Stachowiak, and this is the space where we explore the art and science of being more effective at facilitating learning. We also share ways to improve our productivity approaches so we can have more peace in our lives and be even more present for our students. Dr. Becca Price fulfilled the dream of her four-year-old self to become a paleontologist. Once she began her faculty career, however, she realized how little her students understood of how evolution actually works.

That inspired her to switch research directions to focus on how students learn science and how early career scientists learn how to teach with evidence-based practices. Since 2011, Becca has run the Science Teaching Education Program, otherwise known as STEP, which has the mission to engage a diverse pool of early career scholars at the University of Washington and affiliate institutions. This is a closely mentored apprenticeship to learn how to teach scientifically with inclusive, demonstrably effective student-centered pedagogies.

To date, Becca has mentored 131 postdocs through STEP wise as a professor in the School of Interdisciplinary Arts and Sciences at the University of Washington Bothell. Dr. Price teaches students to conduct scientific research and encourages them to think about how they'll use their college and other life experiences in a way that is gratifying to them after graduation. Becca still dreams about fossils. Becca Price, welcome back to Teaching in Higher Ed.

[00:02:19] Rebecca Price: Thanks so much, Bonni. It's great to see you again.

[00:02:21] Bonni Stachowiak: I don't like to admit stuff like this very much, the behind-the-scenes, inside baseball stuff, but I'm going to admit that we ran out of time last time we were talking, and I'm so glad we could come back and talk

about a topic that is so near and dear to both your heart and your mind. Tell us what happened in your life and your career in 2011.

[00:02:43] Rebecca Price: Oh, goodness. In 2011, I was an assistant professor, and I was just starting to redirect my research program from paleontology to the scholarship of teaching and learning, and there was an opportunity to STEP into a leadership role in a teaching apprenticeship.

[00:03:05] Bonni Stachowiak: In terms of this big shift in your career, what does that look like? What does STEP look like? What does a day in your life look like? [chuckles]

[00:03:15] Rebecca Price: Yes, STEP is the name of the teaching apprenticeship that I started directing in 2011, and it's short for the Science Teaching Experience Program. I'll start with how did I make the transition to scholarship of teaching and learning myself? I was lucky enough to be in a postdoc that supported scholarship of teaching and learning. I was in a postdoctoral program instead of a one-off postdoc, and so that was my exposure to the field.

Then when I got into the classroom, I realized how dogmatic my students were thinking about evolution. Whether they accepted the science or not, they were thinking about it dogmatically instead of thinking critically, and that really, really intrigued me, and so I started wanting students to develop an understanding of the science to develop that critical thinking to encourage the questions that they were asking if something didn't make sense about evolution. That's a part of learning, that's metacognition, recognizing that something doesn't make sense to you.

I wanted that kind of questioning to be a start of their process rather than an end, and so my early forays in scholarship of teaching and learning were around evolution education. Then when I inherited STEP, I started getting really interested in professional development as well. That's another one of the branches of research within scholarship of teaching and learning that I'm pursuing.

In terms of what it looks like to run STEP, there's this wonderful group of mentors that I have the pleasure of working with and we each have one or two teams of three postdoctoral fellows that are working together. We group the postdocs together by their research interests and that's actually a really fun interest because, after all of their training, they've gotten more and more narrow, more and more specialized.

As instructors, some of whom are teaching intro biology courses, we have a pretty broad sense of when two people have similar interests. It can be shocking

for the trainees to, "Wait, what do we have in common?" Then there's this wonderfully enriching process that they go through to find the areas where they start connecting and they learn a bit about backward design and design two credit seminar for undergraduates. The seminar can be either for second-year students or for seniors, depending on what course they're slated to teach, and we go through a couple of trainings in the fall with the whole group.

Then we narrow in where the mentor is working with each group of trainees to develop a syllabus to think about a final project that gets scaffolded throughout the whole term, and then the real learning is occurring when the mentees are actually teaching because the mentor is there in every single class meeting taking notes. We have a structured observation form that makes it easy to take notes as we're watching class, and then there's an hour-long debrief after class. The class lasts for two hours. Then we have the hour-long debrief in our evaluation of the program.

The evaluator told me, "You really need to stick to an hour." They get tired after an hour of debriefing, so really honor that hour. At the end of that observation and debrief period, the postdocs have an eight-page observation written of that class meeting with at least three things that they really rocked during class and a few things that are areas of growth to try to implement in the next class session. It's that part of the apprenticeship that really leads to the deep learning. That's what our evaluation data is saying.

[00:07:24] Bonni Stachowiak: One of our children recently auditioned for a part in the school musical, and I hadn't had a chance to talk very much with this child about their experience and so inadvertently hurt their feelings talking about that they really, really, really wanted a part, and then they told me about the experience of being in the rehearsal. The reason I'm bringing it up is I was so proud that this child was able to take themselves out of the doing, and almost I explained it's like you were watching a video of yourself.

They didn't think that they got the part that they wanted, and they didn't. We had a conversation about what is it like to be able to say that didn't go the way that I wanted. The director had said to them they should-- to the children who were auditioning, they should move their bodies as they were rehearsing this part, and this child did not move their body and knew that. Was able to see that that hadn't happened the way they envisioned, and the reason I'm bringing it up is I just think that's such an important part of our existence is to be able to take ourselves out of what we're doing and to watch ourselves.

Then you're describing this process, which I think for so many of us, Becca, will not be something we've experienced, where every time I've ever been evaluated, it is for my review, and then every time I've ever been evaluated, it is

we don't really have a shared appreciation of what goals I have in my own teaching. We talk about a structured observation. I'd like to hear more about that because I just don't think that most of us are able to have a shared sense of what our aims are and our teaching philosophy, so we're getting like a thing.

For me, Becca, when it's happened, I can't get myself out and watch myself like I was watching a video. I'm just in that other person's head, and I'm watching what they're writing down, and by the way, I've had really positive evaluations. So many people don't, and it's so much more traumatic, but it's not really helpful if you can't get yourself just back into teaching into the way that you mostly normally would. I've never had that experience where someone's sitting in my class and I'm actually feeling like myself, like how I normally am, because I'm so conscious of the person being there.

Again, people who have reviewed me, I'm so privileged just to have had such a lovely time and such lovely words are shared, but it's not a useful thing. It feels artificial. I'd love to just to hear your response. I know I've been sharing a lot here, but just this idea of getting outside of ourselves and being able to watch ourselves, and then what is it like to do that with a structured observation form? I think a lot of people probably aren't accustomed to these different kinds of instruments and how they can be helpful.

[00:10:31] Rebecca Price: Yes. I'll say that I've never had a formative observation done of myself. Sometimes I have had mentees want to watch my teaching and I always get nervous. I always fumble over something. Well, I always fumble over something anytime I'm teaching, [chuckles] but there are more obvious fumbles when somebody's in the classroom, especially when there's a mentee just the nervousness of being present in the classroom as the expert on teaching. It just changes how things are.

This is actually one way in which recording classes has been a really big change for me. Some of the collegial observations that my faculty colleagues and I will do now are actually based on Zoom recordings or even visiting the course site in the learning management system and seeing just how the course is structured. That changes the kind of conversation we can have because it takes the performative element out of it and really allows us to focus on the pedagogy.

I know what it's like to be giving formative observations of my mentees, but I don't really know what it's like to receive them. I think that's a really important difference. You mentioned how it is challenging sometimes to sit and think what are your teaching goals, not the learning goals for the students, but your pedagogical goals in the classroom. One of the things that we do in our structured observation is we have the trainee complete the first part of the observation form on their own.

That includes the course learning goals. We ask them to identify the-- sorry, not the course learning goals, the learning goals for that particular class meeting, and to identify the level in Bloom's taxonomy that those learning goals are at, to ensure that there's a mix of high and low orders of cognition. Then also to list how much time they took to prepare for class because I want to challenge them to get down to two hours of prep by their third class meeting. Each postdoc is in charge of teaching three class meetings.

I'm thinking about when they're going to be assistant professors or assistant teaching professors, they're going to be swamped. [laughs] They aren't going to have 10 hours to prepare for each class meeting. I want them to really think about how to structure really sophisticated learning and minimize prep time. What does it look like to have them minimize class prep? We have the advantage that these are courses that the postdocs are designing. There isn't a set amount of content for them to get through. I think that's pretty critical for this kind of prep time.

What I encourage them to do is to use primary literature in the senior seminars, but only pick one article for each postdoc to cover in a 10-week quarter. We're spending three weeks on one article. Now coming from journal clubs as postdocs, this seems incredibly slow and it is, but what it allows is instead of focusing on comprehension level work of the article, they're really focusing on experimental design and critique. The last class that the postdocs teach, their third class, can be, what is the experiment that you design? What's the next experiment look like? That sets up a great jigsaw where students design their own experiments, then share them with others.

Within that group of experts, they choose one and then elaborate on that one experiment, predict some results. Then they reshuffle and each member, each individual from a different group presents the experiment that their group elaborated on, and then they can learn from each other. Then there's a whole class discussion about all of the experiments. That way, the instructor can be focusing on the science thinking skills and the science practice skills that are emerging from each group's experiment. It doesn't take long to structure a jigsaw.

[00:15:17] Bonni Stachowiak: Tell us a little bit more about jigsaw. I know you just defined it for us above, but connect that word jigsaw with the activity for those who may not be familiar with it.

[00:15:26] Rebecca Price: Okay. The jigsaw starts out with a learning that's divided into groups. Say you have three groups, each student is going to be assigned to one of those three groups, and they begin by answering the questions just for their groups, working independently. Then the students actually

get up and move so that they're with a group of say, 3, 4, 5 other students who've answered the same set of questions, and they can share their answers with each other. This gives some ownership to the learning because students need to be prepared to teach others about the content in their expert group.

There's motivation to make sure that they understand. It's also lower stakes because they're only going to be talking in a small group. It doesn't involve the same kind of anxiety that talking to a whole class might involve. Students who are feeling some anxiety could go into their new teaching groups with somebody else from their old group. You can make sure that people have buddies if they need buddies. It's harder to manage in a larger class. I usually teach smaller classes, so I know pretty well which students are comfortable talking and who are not.

You have your individual think, you have your expert group discussion, and then class reshuffles so that in the new groups, you have at least one representative from each of the subgroups. That way, the person from group one can teach the people from groups two and three their content. The worksheet that guides the activity needs to be structured so that the people in groups two and three are taking notes based on what group one said. That helps groups two and three start asking questions of group one.

Now, honestly, at this stage, students are just writing down the content. They're not necessarily thinking critically about it. When I see the jigsaw used most effectively, there's another step that asks synthetic questions that require knowledge from all three groups to answer. Then students are in these jigsaw groups, the shuffled groups, they're answering the synthetic questions, and then the last step is a whole class discussion that reaffirms the answers that students have been constructing.

Throughout this process, the instructor is circulating through the classroom, checking in on what folks understand, making announcements to clarify as needed, giving an impromptu mini-lecture if you see students are consistently making the same kind of mistake. There's still a ton of instruction going on, even though there isn't a formal lecture. All of the content that the instructor is sharing is emerging from student interest. It's very student-centered.

I think a jigsaw can also be written in a way that's very, very flexible. You can reuse the same questions in multiple class sessions. I used to teach a course called The Visual Art of Biology. It stretched me so much. It was a lovely course. Then I realized that I don't know enough about the practice of making art to do justice to the course. I really knew the biology part and not the art-making part. Anyway, one of the components of the course was that, at every class, we had four different questions that we used to analyze different pieces of art.

We would have each group look at one piece of art and think about the theory behind the art, the historical tradition that it was working from, whether there was a message, and if there was a message, what it was, and I'm now blanking on what the fourth question was. It changed my prep from what questions am I going to have students ask to really thinking more about the themes that I wanted to address in each class and making sure that I was choosing artwork that allowed me to make different arguments about the intersections between art and biology in a way that modeled for them a paper that they were writing in the class.

That changes class prep. I think a big part of preparing for class is actually grading homework. When mentees are asking me, how do you stay on top of grading time and I say, "I build my assignments so that my next class has to respond to what students did in homework. Otherwise, I do fall behind." This is what makes the homework meaningful for them and a way for me to collect data about student performance.

[00:20:35] Bonni Stachowiak: Oh, it's so good. We talked earlier about both you and I. It sounds like we share in common, not necessarily having the most-- I don't know what word to use, productive of summative evaluations in our experiences. We may share that together. I'd like you to talk about now just who benefits from the more formative kinds of observations.

[00:21:01] Rebecca Price: There are so many ways that as a mentor I benefit from making observations, and the intent is for my mentees to be benefiting as well in a number of different ways. First, there's just immediate feedback, what didn't work or what could have worked better, and then also how to prioritize what to try in the next class. Sometimes we'll make a mistake in a classroom, and then that mistake is just something we're obsessing over. I can say, "You know what? That's not a big deal. Don't worry about that."

What I'm more concerned about is this pattern that you are always calling on students in the front left part of the classroom first. How can you mix that up so that everybody feels like they're part of the conversation? One of the benefits of the observation is to prioritize what really are the issues to work on in a class. For me, I am always amazed at the creativity that new instructors bring. This is one of the reasons I really like working with postdocs as opposed to faculty because they aren't indoctrinated in the techniques yet, and so they bring this creativity to their teaching that is inspiring, that I really learn a ton from.

My mentees this quarter, for example, on the first day of class, they gave students little papers that described all of the group work that they would do. Students who went throughout that class, that two-hour period, they would be in three different groups, and the little papers told them where they would need to

go. Sometimes the logistics of the jigsaw, where do people go when, can be overwhelming and can take up too much time. They had it figured out with these little guides. I love the idea of having basically a map, an individualized map handed to each student. I think for that class meeting, I think that's great. I never would have thought of that. I've been doing this for 11 years, and I've never seen it before.

[00:23:13] Bonni Stachowiak: It must be so inspiring.

[00:23:16] Rebecca Price: Yes, it really is. I think when I've done observations for colleagues from different disciplines, I learn so much too. One of the habits that I've worked into my classes is a moment where students can share their appreciation about what they learned. In classes where students are really struggling with content, I think it's important to end class on a high note. Instead of students leaving class frustrated, students leaving class with, "Oh, I just worked through something hard, and look where I got with it."

Taking that moment to reframe. I learned that from watching a colleague who teaches performance, and at the end of her class, she had the students get together in a circle and everybody shared something that they appreciated. I do it digitally. I use Padlet because it's a great way to have words from a whole group of students. Jamboard would work as well, but the idea comes from a performance artist.

[00:24:23] Bonni Stachowiak: I love that. There will be some people who are listening today who don't have the infrastructure that you have. They don't have an opportunity to join a program or be mentored in the way that you're describing, or maybe just the mentoring happens but it's more informal. What exists out there in the world to help if we don't have effective observation tools that are available at our own institutions? Where would you suggest that we go to look to start to find a tool that would be effective for us?

[00:24:57] Rebecca Price: I think so much of improvement on teaching is self-reflection. I also think that collaborative groups with colleagues at other institutions are incredibly helpful. For me, I learned so much from conversation that it would be hard to rely only on self-reflection. I mentioned that challenge of prioritizing. I am one of those people who I'm going to see all of the mistakes. I do this with reading student evaluations of teaching, too.

I see all of the negative comments and then how do you parse? What are the ones to pay attention to? I think that having that network of support is really important. If you don't have that network, who can you reach out to from graduate school, colleagues on research projects, education parts of

professional societies, teaching and learning centers at institutions, affinity groups, demographic affinity groups, and institutions?

I think there's a way to do that networking to get that support. It's also looking at some of the observation protocols that have been published to see what's important. What is it that you're trying to do? If you're trying to move from strictly lecture class to one that starts involving more active learning, the COPUS instrument by Smith et al that was published in CBE Life Sciences Education, that's a really great way to start.

If you're already doing a ton of active learning and you want to refine your techniques, that's not going to be the best place to go. You're going to need a different observation protocol, so maybe the PORTAAL instrument, which is published in the same journal. PORTAAL is spelled with two A's, so it's P-O-R-T-A-A-L. Maybe the PORTAAL instrument is going to allow you to dive more deeply into different types of active learning and start thinking about the trade-offs that you make by prioritizing some techniques over others.

[00:27:02] Bonni Stachowiak: What you're reminding me of a little bit is the story I told earlier as far as our child who's getting outside of themselves to be able to watch. That's what these observation protocols have done for me. The one that I'm most familiar with is a variation on the COPUS. That one is looking at who is talking, and what questions are being asked. This one is designed to be more culturally responsive. It's not just who's talking in general, but specifically so that I could find out someone who is either doing self-observation or inviting a peer to do so to find out, "Oh, you're only speaking to this particular demographic of people."

You might not know that you're doing that until you were using a protocol that could share that information. I think this is really, really helpful just to make sure that whatever it is that you're using to measure success is actually in alignment with what you think success is, or does your definition of success actually need to be modified in some way? I did want to mention before we get to the recommendations segment that there are going to be times when you're going to experience student resistance.

That's part of the problem is as you start to experiment with different kinds of approaches, then you could feel like you're failing unless you know what happens on the other side because, as human beings, just in general, we don't love being challenged and failing. All of us, it's not anything unique to students that we get to teach, and just know that that's coming. A protocol can help you see, this is measuring for this. Did you use active learning to what extent-- that kind of thing.

Then you're not going to be as poled. It still is emotional experience, like you were talking about, Becca, with looking at your course evaluations. When you've experienced that enough confidence on the other side that more learning is going to transpire because of the teaching, like you were talking about jigsaw. Sometimes jigsaw can, for some students, feel like, "Wait a minute, we're teaching ourselves, and we didn't pay this money for you to have us teach ourselves," and that, of course, is really dependent on how that gets set up.

I'm really intrigued by your synthesis questions because those, of course, can change that dynamic, because then they're getting the challenge and they're starting to realize, "Oh, I can't passively sit here and just take notes and think I'm going to get it. I do need to show up," but it's exciting. Anything you want to leave us with before we get to our recommendation segment?

[00:29:35] Rebecca Price: I just wanted to reaffirm something that you just said, which is that sometimes with instructors, it doesn't work the first time. Sometimes there's this arc of years. I love pre-post assessment. When I was first starting to use active learning techniques, my course evaluations dropped. They've never reached the same height. I'm satisfied with them now, they're fine. There is a difference. It was really, again, emotional for me to see students complain about my teaching and having the pre-post assessments to accompany that student evaluations of teaching. I could see how much more they were learning.

It's that measurement, that increase in the sophistication of their thinking that's really propelled me forward with this. What I've been concentrating on in my teaching over the last-- well, really since 2016 especially, has been the emotional, the affective part of the classroom where I want them to enjoy what they're learning, not just learn it. That's part of retention in STEM as well, is enjoying what they do. If they're learning but turned off, that's not my goal. I want them to be learning and enjoying. There's a whole nother literature that I've been studying about instructor talk and building community that is part of active learning and is part of my trajectory as an instructor.

[00:31:13] Bonni Stachowiak: This is the time in the show where we each get to share our recommendations. Mine comes from an interaction that I had with Deb Van Etten who is the registrar for the Lilly Conferences. I had the privilege of getting to speak at one of the Lilly Conferences, this particular one in San Diego in early 2023, and we're chit-chatting about things. I had/still have, sadly, an injured shoulder. We were talking a little bit about that. She had had a injury that took a long time to heal. We were lamenting but also encouraging one another in that conversation.

She mentioned something called yin yoga, which I had never heard of before. It's Y-I-N yoga, and she said it's also sometimes called restorative yoga. I, of course, go to the great yogi of the world in YouTube and go and search for that and found a wonderful practice from someone whose name is Cassandra or Cassandra, Yoga with Cassandra. That's with a K. There's two things I wanted to share. One is just, I think, she's excellent for someone like me who doesn't have a lot of experience with yoga, but needs to be doing more stretching to heal this shoulder.

It's not the only thing that has shown me good results. This is definitely a lot of different things that are contributing to a ridiculously slow healing process, but I can measure my success, including this very morning was able to see a new milestone that I hadn't been seeing. I find her really wonderful. I find it really doable that it's most of her prac-- well, you can go and just find a practice that's 15 minutes and it just feels, it's hard to explain.

Those of you that know what yin yoga is are going to laugh at me because you were like, "There's a whole thing that could explain this," but it's gentle and just a little bit challenging, and I just haven't found yoga practices that are a little bit challenging. They are all for me. I can't possibly follow you or do even with modifications. This is just right for me and it's really been wonderful. I'm so grateful to Deb for sharing that with me.

Then the second thing I just wanted to say quickly is I think very intentionally about my language and, Becca, you mentioning the instructor talk is-- now you've got me curious about that. I try not to say things like, "I'm not good at stretching." That's not going to be very helpful. I don't stretch enough or whatever. Instead, I try to rephrase my language to, "I am becoming a person who stretches every day." Implied in that, Becca, just so anyone's curious, I am not currently stretching every day, but that's not what I want to focus on. I want to focus on, "I am becoming a person who stretches every day."

Then those days that I do stretch, I celebrate that and those days that I don't, I go, "I am becoming, I'm not there yet, but I am becoming a person who stretches every day." That's been my thing is I'm becoming a person who stretches every day. Thanks to Deb, I have someone who's both gentle and stretching me just a little bit. That's really been both healing on a physical level, but the times when I do it in the mornings is also really healing on another level of just my mind for the day.

It really has been just spectacular. Again, I know so many listeners know a lot about yoga, so I'm feeling like you must be laughing at me right now, thinking like a five-year-old explaining it. It's been delightful. Thank you again to Deb and, Becca, I get to pass it over to you for whatever you'd like to recommend.

[00:34:52] Rebecca Price: Hey, I'm so glad that you're finding yoga. I think that one of the beautiful things about the practice is that really there are ways to approach it from so many different directions. I started my practice after my first kid was born, so it's almost a 14-year practice for me. It's changed so dramatically over time. That's part of the practice, is just welcoming how I can do it when I can do it. It's inspiring to hear you talk about that.

We talked about the jigsaw. I wanted to recommend a video by the Cult of Pedagogy that illustrates the jigsaw. This is a blog for K-12 educators, and they're often leaps and bounds ahead of what we're doing, their education. It's just a particularly clear explanation of the jigsaw. I also would like to recommend The How Scienceworks Flowchart. This is a flowchart by the Understanding Science team at Cal Berkeley, and it's a dynamic chart. Often we're taught that the scientific method is a linear process and it's not. It's a messy, messy process.

I think it captures research more generally. The flowchart allows you to zoom in on what is the exploration and discovery process like? What is it like to be getting community analysis and feedback? What are the benefits and outcomes of doing science, and all of these surround testing ideas. We're usually just taught about the testing ideas part, but I think that it can be so helpful to really think about discovery in these other lenses as well. I think it's especially important to focus on the benefits and outcomes. Why are we doing science? Then my last recommendation is one that I hope will bring laughter to your audience.

There's a wonderful comedian named Diane Morgan, who has a character named Philomena Cunk who does mockumentaries, or maybe they're documentaries, but they're absolutely hilarious. There's a series about Philomena Cunk describing the history of the world. It's just hilarious. One of the things that she does is interviews academics, but the questions that she asks are so ridiculous. You see these academics trying to keep a straight face and having really no way, no idea of how to answer an incredibly absurd question.

I think that for those of us who are in the field, there's a special charm in the humor. She is also delightfully irreverent. The shows that she's in get a little bit edgier with every series and in the humor and just quite a bit of fun.

[00:38:08] Bonni Stachowiak: Becca, I have been taking notes while you've been sharing the recommendations and my brain keeps going, "Don't go, don't go, don't go," because I want to go look at everything just right now. [laughs] I know I have to be patient so I can stay focused on what you're saying. These are so fun. I can't wait to see them and I can't wait to share them with colleagues, too. It sounds like they're just going to be absolutely amazing. Becca, thank you for

coming back on Teaching in Higher Ed and sharing this other slice of your life and expertise. What a joy it's been to talk with you again.

[00:38:37] Rebecca Price: Thank you so much, Bonni. It has been fun.

[00:38:42] Bonni Stachowiak: Thanks once again to Becca Price for joining me on another episode of Teaching in Higher Ed. Today's episode was produced by me, Bonni Stachowiak. It was edited by the ever-talented Andrew Kroeger. Podcast production support was provided by the amazing Sierra Smith. I so appreciate each one of you for listening and being a part of the Teaching in Higher Ed community.

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[00:39:41] [END OF AUDIO]

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