

Open Education Rising Podcast (www.openeducationrising.net)

Hosted by Deepak Shenoy

Transcript of Episode 4: What's Next for LibreTexts?

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Deepak: Hello, and welcome to Open Education Rising, a podcast about growing and improving open education. I'm your host, Deepak Shenoy.

Today's guest is Dr. Delmar Larsen, Associate Professor of Chemistry at UC Davis and Executive Director of the LibreTexts project. You may have seen LibreTexts in the news recently because they won a five million dollar grant from the United States Department of Education for open educational resources or OER.

This conversation could be of interest to a couple different audiences. If you're an instructor or you work with instructors, you'll find the discussion I had with Delmar about the content and technology interesting. He talks about where content comes from, quality control, maintenance, and how you can adopt it for your own teaching needs. If you're interested in how a large scale OER project comes together, you'll find the second half of our discussion particularly compelling. Delmar takes us under the hood describing the different teams that are implementing an ambitious and complex expansion of their platform.

You can find out more information about LibreTexts at LibreTexts.org, which is L-I-B-R-E-T-E-X-T-S dot O-R-G. And now here's my conversation with Delmar.

Delmar, welcome to the podcast. Thanks for joining us.

Delmar: Thank you very much. I'm glad to be here.

Deepak: I think we would start out by just telling the listeners. What is LibreTexts?

Delmar: LibreTexts is an open educational resource, an OER project, that's designed in order to provide, construct, disseminate open educational resource textbooks to students, faculty, scholars. It's a platform of it instead of just a simple construction or dissemination effort, which then provides a lot of complexity associated with that. But its central goal is to try to reduce the burdens of textbook costs to our students and society.

Deepak: Great. How long has LibreTexts been running?

Delmar: It started about 11 years ago as a chemistry project called the Chem Wiki, and then expanded in several different stages up until the current existence.

Deepak: It started out with chemistry. What kinds of things are in LibreTexts now? What kind of subjects do you guys cover?

Delmar: We currently have 12 libraries in our project. Chemistry is the most developed of those libraries. It initially expanded into the other physical sciences including engineering, geophysics, geosciences, humanities, mathematics. We have a medicine library, expanded into biology, photo sciences, and physics. Then more recently we expanded to social sciences and statistics and we have a goal in order to expand in a couple new libraries in the near future.

Deepak: That's a very broad set of subjects. Who's the intended audience for LibreTexts?

Delmar: Basically anyone who desires to learn, which is somewhat a simple answer, but it's the basic answer that we have here. The gist in terms of trying to generate and alleviate ... generate resources and alleviate the unreasonable textbook costs is largely post-secondary students, but we do have an interest in order to address K-12 in the near future.

Deepak: I see.

There's a lot of material on the web now for open educational resources, a different way that people aggregate it. I think faculty are sometimes overwhelmed at understanding the differences between all these choices they could make. What's different about LibreTexts? Maybe you could explain a little bit, kind of how it fits in the ecosystem of what's available.

Delmar: Our goal is essentially to become the Facebook of OER. That is a large goal, but it's essentially focused around the point of making a centralized spot in order to identify all OER content, which means that we have a very comprehensive no gap left behind approach in order to do things.

What separates us from any other projects is that we are a platform. And that platform is a productive platform, not only for construction of content, typically humanity-based construction efforts, or dissemination, but it also has the ability in order to track how students engage with that activity and use it in a more powerful approach, something akin to a learning management system by students in order to be able to access that.

What makes us different is several different aspects. One is that our libraries are living libraries. So the content that's stored in the libraries can be easily edited, and they correspondingly have the power in order to be easily remixed, which is one of the key points that the OER community likes to support. That's one of the things that are more difficult in order to do with more simple formats like PDFs or even more advanced formats out there that make it harder for faculty to be able to remix for their individual classes.

Our goal is, in order to make this as effective as possible, is to essentially integrate existing OER resources, in fact the entire universe of OER into our site, format them with

the same standard that we have, and then essentially act as a candy store or a Lego store where faculty can come in and optimize the remixing capabilities by [inaudible 00:05:30] things together in order to work as well together as possible. But because it's a living library, also enables the faculty to cut into it and start to remix at the module level or the [inaudible 00:05:43] level.

Deepak: Where do all the materials come from? How have you guys built the library over time? Is that a automated process? Are there editors? How does new content get into LibreTexts?

Delmar: Via a variety of different sources, so basically anyway that we can, that we're able to get resources, we do so.

I mentioned that we're trying to build a central spot for OER, and that involves essentially rating, for lack of a better term, existing OER depositories out there. One of the guiding principles behind doing that is that OER content is, at least in our opinion, far too decentralized and extends across the net. We brought it together into a central system that would be far more productive, at least in order to enable the remixing capabilities that we want them to do.

But we also have our own development team. That involves faculty across multiple campuses in order to build content. We facilitate the construction of content involving students, often times as part of extra credit or homework issues in classes. Sometimes we will get content from faculty in terms of notes that they have both online and offline. And a lot of the effort that we did when we were just the Chem Wiki was to find existing content that existed on the net that wasn't necessarily intended to be OER when constructed, but had a small little part that might be a small repository that's useful, that we get permission to then integrate into our system. So in other words, we take content that was not intended to be OER, and then we request permission in order to make it OER for a greater consumption of things.

Deepak: Gotcha.

How are people typically receptive to that? When you approach them and say, "We'd like to make this OER," how does that conversation go?

Delmar: It's changed as we've grown. When we initially did it, it was somewhere in the order of one third said yes once they asked what OER was. One third said no, even after we told them what OER was. And then one third just never responded to our emails. That's changed a lot. Nowadays it's somewhere on the order of maybe two thirds says yes and one third says no on the process there.

Deepak: That's super. The movement's growing.

Delmar: Yes, definitely.

Deepak: One of the things that comes up with OER is questions about keeping OER up to date, quality, things like that. How do you approach those questions at LibreTexts?

Delmar: I mentioned that we're a living library, so that allows content to be edited directly and instantaneously. Anyone who's ever had any experience of trying to get a textbook in order to change the content in the textbook knows well of the long timelines necessary before they will change a textbook, if they do it at all in the process there. So that means there's a significant ease or lack of a barrier in order to edit and curate our content.

Our existing development team has a subset of curators that are designed in order to curate each of the libraries and move it forward. But our system also has a direct feedback mechanism. So at the bottom of every page for everyone who has a user account, which is freely available, there's a feedback option. So anyone can come in there and write the feedback on the very simple few buttons, and then that provides an email that goes directly to the development team, and then it gets corrected, often times near instantaneously.

There are other mechanisms that we've identified in order to curate content. For example, we've gone through the hypothesis annotation infrastructure where users will ask question on the side of their ... any page on the internet, and we're able to find which pages are obviously of importance to us and adapt it in that way. We've corrected changes that have come up on social media, both Facebook and Twitter.

So it's any way that we get feedback in order to be able to respond. When you have a large system that has so many different eyes that are on to it, and it's so easy for students and faculty in order to provide feedback onto it, it will aid in order to be able to identify at least incorrect aspects or confusing aspects that we have on the pages. Then we rely on the faculty in order to do larger scale, up to date efforts.

Deepak: One of the things I want to talk to you about is you guys recently won a grant from the Department of Education, a five million dollar grant. Congratulations. That's pretty exciting.

Delmar: Thank you.

Deepak: What are some of the things you guys plan to do now that you've got that additional funding? What's going to change, or what comes next for LibreTexts?

Delmar: Well, everything has changed. So the amount of support that we're receiving from the Department of Education is essentially an order of magnitude greater than the total amount of funds that we received to date, which has been from two National Science Foundation [inaudible 00:10:41], which we were quite excited about then too.

The project involved expanding into five independent operating teams. So these teams are the construction team, the harvesting team, the dissemination and recruitment team, the technology team, and the assessment and valuation teams. They are five

pseudo-independently operating teams, and they have the corresponding goals that reflect the magnitude of the resources that we were just given.

For example, on the construction team, we have three primary efforts that are involved in there. What is the general construction of all our existing libraries? I mentioned that we have 12 libraries spanning most of the academic field out there, and we have several different approaches in order to be able to expand in those libraries involving existing faculty constructors.

Then we have more specific goals. We have the development of the trades library, which is to address career technical education, CTE based education, and that's going to be pushed primarily by the community colleges that are in our consortium. And then we have a goal that goes back to the original point of the project, which was chemistry, in that we're building the textbook set to support the full curriculum for the American Chemical Society's certified bachelors of science degree. That's essentially going to be an example of a ZTC, a zero-textbook cost curriculum, for a four year science degree, which doesn't exist right now. We want to use that as a mechanism in order to disseminate, what you can do when you have full control over a curriculum, which is one of the key benefits that OER in general provides departments and faculty.

The harvesting team has actually two teams or two sub teams operating. One is the pre-harvesting team, and that team goes through a lot of effort in order to implement different levels of gap analysis, finding out what is missing and then what needs to be developed obviously in order to fill those gaps. And the second one is the harvesting team, and that involves somewhere in the order of 100 student developers that will effectively be [inaudible 00:12:54] the OER universe. Basically, as I mentioned before, we want to take and identify all the OER content that we can find out there, and bring it into our system, and put it in the same format. And that is a task that undergraduate students are actually well capable of doing and gives us a high return on investment in order to proceed that way, plus it's pedagogical in the students getting exposed to a lot of different aspects in their education.

The dissemination recruitment team is relatively straightforward. They're going to be showing up at a variety of different meetings. They're going to be doing outreach activities to individual campuses in order to emphasize what the project is able to do for faculties and for campuses. They'll be running workshops at various campuses and a wide range of other activities that fall into dissemination.

The technology team is really quite cool. Because this is a computer based project, now while the textbooks that we generate online can be printed up as a PDF or they can be printed up as a print on demand physical copy, intrinsically students when given the opportunity in order to have a paper-based book that they pay for or an online resource like this, they choose the online resource on a case [inaudible 00:14:13]. That means that we have the ability of taking advantage of the computers that are behind the scenes in order to be able to do calculations and other things that are important.

So the technology team has several key aspects involved in them. One is interactive figure development. For example, having the opportunity of students to be able to

move molecules, proteins, vector calculus based systems using java script or other HTML5 compliant technologies. So basically realizing that the textbook of the future is very different from the textbook of the past. We want to embrace that activity.

Also included in that would be introduction of interactive simulations and visualizations. For example, the PhET Simulations that come out of Colorado, [Concourse, Collective 00:15:02], and a range of other contributors. If it's able to run on a website, it's able to run on our system without any conflicts with the overall infrastructure, and that gives us a lot of freedom in order to really take advantage of existing technologies as they come out or individuals that make new approaches.

We can embed videos. We have an annotation system I mentioned before. We actually have two of them. Hypothesis is integrated into all our pages, and nota bene out of MIT, a precursor to Hypothesis is also integrated, at least in our biology library, and can be introduced to all the other libraries as needed. The annotation system provides two key benefits for faculty and students.

For faculty, it allows the faculty to come in and highlight the sections that they want the students to particularly pay attention to, that's if they decided they don't want to edit the page themselves. So you can highlight and say, "This one specific area is important for the exam on Friday," and just put the annotation there and students can then see that and have an emphasis.

It also provides a substitute for chat rooms, where you can provide a contextual basis for students come in and highlight an equation or highlight a section and say, "I just don't know what this means." And it provides a mechanism for the faculty member to come in and then provide a response to that student that's on the side. So you can have this commentary on the side of the textbook page about the textbook itself. In many situations, that's far more entertaining to read than the actual page itself. Anything that gets the students engaged with the activity I believe is a plus.

We have an effort in order to bring in informatics into our system, both chem informatics and bioinformatics under the argument that we want a more data-driven approach in our education, especially our science educations, and it's useful in order for students to learn how to access these data in today's world.

And then we have a scientific programming that's integrated into our system based off of the Jupiter Notebook system, which gives faculty up to 30 different languages in order to run code and look at the code including R, Python, SageMath, Octave, which is a MATLAB alternative, and a wide range of other systems. And that provides also a very meaningful and powerful approach for interactive figures so students can engage in the code directly.

Then there are two other major efforts of the technology team. One is coupling the learning management systems, and we have two approaches in order to do that. One that's already existing, which is the common cartridge approach. So we can take our textbooks and we can export them into a tiny common cartridge that can be then

embedded into learning management systems at individual campuses. We have tested that in Canvas, and we're looking to test that in the other systems, but we are fully compliant with that. We expect that to be fully operational. That's available already on our site right now to any user.

And then the second one, which is a deeper integration which involves coupling to our own learning management system which we co-opted, the TSUGI learning management system by Chuck Severance, who's a member of our team. And by building infrastructure onto there, we can then use the LTI infrastructure, the Learning Tools Interoperability protocol, in order to be able to bring the whole course into campus learning management systems. And this is related to that in some way, which is the homework system, which is a very significant aspect of what we're dealing with, which currently as we envision it involves a range of different sub-applications like WebWork and other systems that would then interface directly to the TSUGI where TSUGI will provide the student grade book features that can interact with learning management systems on individual campuses or can provide at the end of the class access to the grade book for campuses that have no desire for LTI but want to be able to use system as they want.

Coupled into that is a machine learning infrastructure so it can provide individual student-adapted feedback. That's still in the works, but the idea is that we want to be able to provide the technology behind the scenes in order to fully take advantage of the pedagogical benefits that we have available with the online homework system. Coupled into that is then the ability in order to do studies, which is part of the assessment evaluation, which is essentially asking, "What's the efficacy of studying online?" How much better, presuming it is better and I do believe it is, versus an offline experience? So these are false within the acronym of science of teaching and learning, or SoTL approaches, and we have a range of different studies planned in order to be able to pursue that.

And then within the assessment and valuations is also our accessibility sub-team, which we have the UC Davis Student Disability Center that will be in play in order to ensure that we have full compliance with all appropriate protocols for online accessibility, and we are very enthusiastic with that.

So that's in a very short nutshell what the project that we have planned from the Department of Education grant that we are quite fortunate to have received.

Deepak: It sounds like you guys have a lot to do.

Delmar: We are excited.

Deepak: Delmar, my last question today is if somebody's looking to get involved with your effort either by using the materials or helping out, how can they get involved?

Delmar: Faculty can use our materials however they like. They're all openly licensed, so they don't have to contact us in order to use them. There are benefits in order to contact us

in order to be able to use them. So the first step is to contact us directly. They can email us, and it's not that hard in order to find emails that come into one of the development team member's inbox. That will eventually get to the right spot. Or if you just google my name, Delmar, and LibreTexts. It's not hard to find. There aren't that many Delmars on the internet today.

There are benefits to interact with us in order to use our content. We have the ability in order to make closed off areas dedicated to individual campuses or individual faculties that act as sandboxes or that are custom designed in order to allow the faculty member in order to build whatever they want there without having to hinder anyone else's activities. And that's something we need to obviously know that person wants to do that before we can make it for them. We are working on an online order form in order to have a greater interaction with us, but email works the best.

Deepak: Delmar, thanks for joining us today and giving this overview of LibreTexts. I really appreciate it.

Delmar: Thank you. I very much appreciate it.

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