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Welcome everyone to today’s ELI Webinar: Carnegie Mellon’s OpenSimon Toolkit: Open Techniques, Tools, Content, and Code for Engineering Learning. This is Malcolm Brown, Director of EDUCAUSE Learning Initiative and I’ll be your moderator for today. EDUCAUSE is pleased to welcome today’s speaker: Norman Bier, Executive Director of the Simon Initiative at Carnegie Mellon University. Before we begin, first let me give a brief orientation on our session’s learning environment. The online room is subdivided into several windows. Our presenter’s slides are now showing in the presentation window, which is the largest portion of the screen. The tall window on the left is the chat window, serving as the open chat area for all of us. Feel free to use the chat space to submit comments, share resources, or to pose questions to our presenters. We will be pausing at several points during the presentation for questions. If you have any audio issues or other technical questions at any time, you can direct a private message to “Technical Help” for support. Click the top right corner of the chat window to open the drop-down menu, select “Start Chat With” and select “Hosts.” You can also click on the link in the lower left-hand corner of the screen for quick technical troubleshooting steps. And now, let’s turn to today’s presentation. I think it’s fair to say that we all enjoy getting presents. A few months ago, Carnegie Mellon University presented higher education with a whopper of a present, a $100M present to be exact. This is the OpenSimon Toolkit, suite of tools, educational resources, and underlying codebase, which includes many of the instruments that Carnegie Mellon’s learning scientists invented for their own research and that are being used to improve the quality of courses taught in CMU classrooms today. Not content with just that, CMU has also launched an initiative called OpenSimon, a learning engineering community working to improve learning outcomes for individual learners while collectively advancing our larger understanding of human learning. So, there’s a lot in this gift box. Fortunately, we are joined today by the expert who can take us on a tour of the box’s content. Joining us is Norman Bier, who has spent his career at the intersection of learning and technology, working to expand access to and improve the quality of education. He is currently the Executive Director of the Simon Initiative and the Director of the Open Learning Initiative at Carnegie Mellon University. Norm has taught courses in philosophy and computer programming, and was director for instructor training and development for the iCarnegie project, which grew from 80 to 1200 participants worldwide. Norm has a pair of BAs, one in English and the other in philosophy and holds a masters from CMU with a thesis on the use of multimedia in ethics case studies. Norm, many thanks for joining us today! Please begin.

>> First thank you so much Malcolm and thank you to your team as well for helping us get set up with this and thank you to the participants. We are incredibly excited here at Simon initiative with the opportunities that we have with the open Simon project. In talking with you today I'm definitely going to be giving you a quick tour of some of the items in the toolkit and I want to be able to frame that with the
context of what the Simon initiative is and the community building and finally how this toolkit fits into these larger efforts. As Malcolm mentioned I’m the director of the Simon initiative and lead a project which sits under Simon and a lot of folks here at Carnegie Mellon I wear a few hats and I’ll be talking about both of those efforts here today. If you need to track me down after the webinar you can find my Twitter handle on the screen. Let’s start off by talking a little bit about what the Simon initiative is and why we need it. One of the things that makes Carnegie Mellon interesting is we don’t have a college of education and that means that projects in learning science and educational technology has been really free to grow up at various corners of our campus without any one central location governing them. We combine that with a history of strong, sometimes weird cross disciplinary work and we see these projects growing up across disciplinary boundaries and we trace this work back fifty years to the work of Simon. Most of you know Simon for his Noble Peace Prize and leading cognitive psychology and across his career he was interested in what drives learning particularly towards the end of his career and he focused on really improving education and the learning process. His own sense of this was that we had done most of what we could do to really improve the act of teaching and get a decent understanding of what could be done there and that learning is going to require deeper research into learning Excels and this couldn’t be the job of a small group of disciplinary faculty and he put a challenge out to his colleagues to convert from this solo sport to a community based research activity. When we move ahead fifty years, we see the results of this challenge in just an enormous body of exciting work and projects. Projects ranging from cognitive tutors that demonstrated effectiveness teaching mathematics to the courseware from the initiative from aspects of learning science and causal relationships and new methods for educational mining and a quick slide and icon set that I’ve got up on the screen now represent a small fraction of the tremendous amount of work out there. This is very exciting for the university. We’ve got great work happening but if you ask around on campus and ask what’s really important which we’ve been paying attention to you’ll hear from faculty, staff and administration that we think about this work as incredibly important but we see challenges with it. Too often when we do this amazing work, we don’t see it to support Carnegie Mellon students and pushed out in a way that is appropriate for the impact that it might have. Too often we see these projects growing up in isolation replicating work rather than building upon one another. Simon was launched with the goal of casting an umbrella over this broad diverse work and providing essential home for it and finding better ways to accelerate the work. Now, one of our challenges in having such diverse collection of work is defining it. How do we approach this? What is it that makes this work common and for that we head back to Simon who really wants us to stop and think about how it is we can think about learning? He comes at this from a cognitive approach. Because learning is something that is happening inside of the brain, if we want to study it we need to be able to build models of what’s happening and further we need to place those models in ways that we’re able to study them. We argue then that if we’re going to make learning something we can observe we need to take the models we develop, associate them with observable practice and use those observations to further refine, validate and improve our models and on the whole we talk about this as a learning engineering approach and see that active modeling as a way to connect research and science with new innovations and we’re using that science to design our models and observable practice and we want to make sure these new innovations are instrumented and we can use data to improve our model and innovation but push this data back into the learning science to drive fresh insights into how human beings learn. Over the past year, we’ve seen a lot of conversation, really
an increase and interest in this notion of learning engineering. I think it's still a term that's got a lot of baggage attached to it and a term that doesn't have a really nailed down meaning. From our perspective at CNU this is what we mean by learning engineering. Not focused on really machine driven approach to learning but rather in seeing an engineering approach is complimentary to design approach that serves as a gateway between what's happening in sciences to what we're doing down on the ground and can help facilitate new insights by taking what's happening on the ground and moving that back into the science. So, from this then we start to think more about the Simon mission. What is our goal? We want to see it happening on the ground for our students and see this approach get out into the world and fundamentally advance our understanding had how humans work. This is our initiative at Simon initiative and we can think about this work as taking on Simons challenge directly. If we don't have a college of education here at CNU what we want to do is challenge all of our colleagues to treat the entire campus as a college of education, treat every classroom as a learning laboratory and make it our work to transform that solo sport into a larger community research activity. Why do we want to do this? Why are we focused on learning engineering? Our own perspective is we've got lots of examples that learning engineering works. We've been using this approach in a number of different ways and environments to improve learning. Quick examples, we've had recent successes in global learning, what could have been decades of work in research side to help support students in Africa who were using tablets to better learn literacy and moving into secondary education we've been fairly proud of our work in cognitive computers in algebra and we've done studies over the words that these tutors can support better learning for students and this more recent brand study looking at roughly ten million students making use of this technology in concert. You see from this our students making use of the cognitive tutor approach. Near and dear to my heart the OLI statistics course is one that we've gotten the most attention for. We were comparing use of OLIs statistics courses with more traditional face-to-face approach and what we were seeing is students showing better results from pre to posttest and retaining that information in a better way and maintaining better skills transfer and learning gain in about half the time with results we've been seeing replicated in other kinds of in institutions. Our own sense is that in fact learning engineering works and we think it's an approach that's going to be useful. We recognize as we look across the landscape an array of challenges facing us in education. Some are new and the nature of work is changing and the way our society funds education, some of these are things we've been trying to cope with postsecondary since the World War II era. How do we deal with a diverse population and think about the variability that we see in this practice and what can be effective with different learners? We believe that the learning engineering approach can help address these challenges but in the end these challenges are too big, too diverse so Carnegie Mellon alone is not going to solve these issues and we need to think about a different approach for finding ways to use learning engineering and science to try to address these challenges. When we asked ourselves how can we expand the successful application of this approach and improving the approach itself? We don't want to suggest that learning engineering has been set in stone and how can we do it in a way that IT successes will be broadly shared? Our own sense is that to address these questions it requires us to think about a more community-based approach, one that can take the approach, learning engineering and make it more useable by everyone and one that supports that research. We think that supporting means are going to require better infrastructure and changing structure and we need to take new approaches in education and I'm not limiting ourselves to just the experiment but we need to better understand the
barriers to and the facilitators to this work and on the whole we think that this is a process that's going
to require lots and lots of help. And in the end, it's going to require us to think about the work of an
ecosystem and we need to be thinking about a broader community and tool set that's going to support
them. All of this is to say that a lot of the attention we've been getting on the effort has focused on the
tools and in particular on the content. Reality is that we think about this first and foremost as an act of
community building and support. On that community side then some of the things that we're trying to
understand is how we can provide support across multiple roles, the various types of institutions that
we're trying to support and that diversity of learners. We think that the best approach for gaining
traction is a problem oriented one. We need to identify challenges that are going to be common across
multiple institutions and find ways that some of these tools and approaches can directly approach and
direct those problems. If we can bring smaller subgroups around problems this is useful and gives the
community a project that can be worked upon that's immediately useful. We're looking to go to
collaborations around research projects, share infrastructure and shared funding and findings but those
initial collaborations are going to drive problems and we're looking to leverage partnership with a
project volunteering to serve as a test bed for the effort and technology. And so that brings us to the
toolkit, our first effort and focus is going to be how do we develop a community and for that community
how can we take this hundred million dollars of research effort and get it out to be useful today in
talking about the tools in the end we're taking a careful designed based approach and from that design
influence both by the challenges we're trying to solve and by the best practices that we have from
current learning science and teaching and learning research, use those efforts to develop new kinds of
innovations and learning experiences, delivering those experiences to students whether that means
delivering a new course model or inside of the classroom so we can answer questions and drive us to
continue to rethink our design. The toolkit is a set of techniques of tools and content and code that's
intended to support this application across the entirety of this lifecycle and you'll see again that I leave
the code for last. I think that as folks try to understand what it is that we're making available there's a
tendency to emphasize the software side and the code that sits underneath that but in reality it's
interesting to think about that code as supporting techniques that can help us design, deliver and
discover, tools that make that faster and more robust and content that's been built out and certainly
sitting under that code and code is certainly important and we think that making this openly available
we're in a good position to both solicit more community contributions back into the code base where
other will be able to trust that it is useable and this takes on a common challenge in educational
technology. Too often these kinds of tool sets disappear. Open Simon tool set, it's an exception list of
these things and far more than I'm going to be able to cover in an individual webinar. So what I want to
do is give you highlights from that toolkit and initially it will include tools to design kinds of learning
experiences and new online collaborative learning experiences, dance is an entire set of technologies for
better understanding what kind of collaboration and discourse forces new technology might bring us,
the tutoring toolkit a way that make intelligent tutors easier and new tools from the open learning
initiative that make improving ELI courseware easier and the open environment used to integrate and
capture data and feedback data in and that will include tools like learn sphere which is the name that fits
on wear housing tools, analysis methods and approaches for sharing those data methods and light side a
natural language processing and modeling and a whole host of others. We have a set of tools that
supports the entirety of this lifecycle and more tools that are constantly being added on to the toolkit.
Beyond making the tools available, far too often what we see in open source projects is tossing this out over the fence and hope it's used. If we want to make this useable we need to think about as an ecosystem, these tools need to be able to integrate with one another and from our perspective we need to focus and double down on attention for integration and operate ability and leveraging standards and finding places where those standards aren't around and being able to develop them in the larger community with the assumption that if we're able to be more thoughtful and provide libraries that make it easier to integrate this new ecosystem then folks will want to develop those in a way to plug into this ecosystem while contributing back into it. So, just as a quick set of things, when we think about tools and techniques we're thinking about things cognitive task analysis and skill mapping and tools to support that, to better data collection to better activities to outcomes and a whole host of analytic approaches around discovery that can improve discovery and support you in online learning science research. So, from here I wanted to spotlight a few tools to give you an example of how this work plays out and what kind of opportunities it can afford you. I wanted to take a quick pause for questions. I know I've been talking at you here for a while already. I do see that we've got one question, do we have plans for open Simon workshops and the answer is definitely yes. In fact, one of the questions that I'll be asking you towards the end of the presentation is what kinds of workshops and events are most interesting to you? We have an entire set of webinars that we have planned out from now until the end of the year that we'll publish on the website over the next day or two and we've got a couple of longer face-to-face workshops planned, one which is summer school, hoping to put on an additional winter school but we need to provide better learning support from groups and we want to understand from all of you what are the workshops that you would find most useful or most anxious to join in with.

>> I'm going to throw a question in here. In your earlier slide, there were applications in the secondary or even primary education.

>> So, the Simon initiative covers the full range. I have a tendency to focus on postsecondary because that's where my work and expertise has been but we've been fortunate to bring on board an associate K-12 and she has been able to highlight work and there's a huge array of projects happening here at CNU and in collaboration with our colleagues over at the university of Pittsburgh. CNU and Pittsburgh are simply a bridge away, so we talk a lot about collaborating across the hollow. There's a tremendous body of work happening at both places. Much of what we've been showing off has been postsecondary. That's where my bias is and there's a decent chunk into the Simon initiative has been coming from the university. We have been using this to help address educational challenges.

>> Okay. Thank you. I think you can proceed.

>> Fantastic. So, let me highlight one tool for you. So, the open learning initiative is a project that's been going on at Carnegie Mellon for roughly sixteen years. One of the early open projects and one of the things that's interesting about OLI is almost from the beginning it was integrated with the local larger learning science ecosystem and the tools we're talking about in particular are our new course offering tool and OLI development in improvement during the past year, the core opening learning initiative platform and we're talking about building out online and learning experiences but it's been our goal to
be able to apply what we know from the learning sciences and opening a space to talk about new research and we think about this project of the learning approach and what makes this available within the open Simon toolkit are open designed sets of materials and we started off this project with thirty-five full courses and in the past year we've seen new modules and courses being developed but this project allows for immediate instrumented delivery and larger integration with the open Simon project, tools for skills mapping and improved tools and analytics and what this gets us from a technique perspective and we talked about modeling and too often we think that a model needs to be sophisticated analysis but we can do a nice mapping from the skills we're trying to achieve to the activities we intend to teach them and the assessments we use to evaluate our outcomes and learning design is hypothesis and just this approach of modeling can reveal that we have additional skills that we haven't thought carefully enough about. OLI provides an additional layer of tools around design auditing to help us think about are there places we have been trying to think about skills but not with adequate time and ask I able to test this hypothesis? Can I look at this model and talk about whether it's helping students gain new skills and in this model in particular we missed a few things so our audit can help us tie activities back to appropriate skill set. The new altering platform is usable by most faculty and designers, helping them to answer this question, is my hypothesis ready for testing and then make changes and improvements as they move on. Once we capture data we have a new set of tools, highlighted here, learning curve analysis and if you haven't seen this in the past it's a tool and a method coming out of integration with data shop and the notion here is we are looking at a specific skill and student opportunities to practice that skill. Vertical axis is showing how much assistance students need at their first attempt to practice this skill whether this means asking for help or getting the question wrong and asking for targeted feedback and with each subsequent attempt this student receives we see how much assistance changes and over time they need less and less help until they are practicing this skill on their own without assistance. It's a perfect learning curve, fantastic learning model. Ideally, we'd see every learning experience ever designed to look just like this but in practice just as often we see learning experiences that look like this. Fortunately, because we do emphasize this ongoing approach to developing these types of learning experiences, we're able to take the time out to investigate and say that for this first skill it looks like students already know this. We're not making a good use of their time. The upper right and lower left looks like we're combining skills and we need to unpack those in how we're supporting student learning for them and for the skill on the right, we've got strange behavior there we need to dig into it. In this case we need to think about what kinds of learners are needing that extra assistance towards the end and whether this is the entire class and this gives us a set of tools to improve the learning models that we've been building. We also want to better understand from do these practice activities support the kinds of assessments? We have a skill, express list and it looks like our practice has a decent learning curve and this yellow dot, despite the learning practice students are not doing well on their high stakes assessments and we need to pay a little more tension because it looks like our assessments are misaligned. We see reasonable alignment at the end but the offering tool as it's currently built leverages OLI's underlying learning architecture. We've got a series that spell out what we think our features of learning and codes to that is able to publish to the OLI platform and OLI in turn is able to integrate LTI compliant learning management system, answering Andreas health question, as we think longer term about what the role is of the offering platform and what the role is of OLI our hope is opening up this code as able to see this offering space and the ability to take the tools
and materials that are being developed and push them out into a broader assortment of environments. So, Dan, to answer your question, this is data being captured from OLI, our experience with most MLS’s is we don’t currently have a data stored associating learner interactions with the context we need to be able to make these kinds of analysis. The integration is via LTI but there’s limited data coming back to us from the MLS at this point. Obviously at times we want to dive in and understand learning activity performance and in this context, we’re looking at student use, how much help students need on average for these questions and are they eventually getting an answer that’s correct. We’ve got a host of tools available via OLI and there are course materials that might be interesting for you and might help to address learning challenges and we’re hoping that you’ll have the chance to head to OLI and take a look at the courses now. The delivery platform we’re still doing a final code review and we’re trying to be cautious and make sure we cover all of our basis but we intend to make it fully available in October but if you are interested in using this approach to create your own materials or taking any of our open licensing courses, testing, the offering platform is already to use at this point and you can jump on and begin using ours or if you want to stand up your own or make a contribution that is available. All of the tools I’m highlighting you are able to get access to the production space via the website and I’ll give you a link later in the webinar. Alright. So I just looked at one piece of our design and development infrastructure, OLI tends to play nicely with other elements and we’ve got the ability embed other tutors and we’ve got collaborative activities we can plug in but as I mentioned we have the other exciting pieces that were integrated on the data later. I’d like to talk about a series of projects. That really constitute our larger institutional data mining, wear housing and analysis space. Learning sphere is a new NSF project that builds on top of the successes of Pittsburgh learning and these constitute one of the largest shared data and it’s a tool intended to share those data sets so that information can be used not just for primary but also for secondary analysis in accordance with the circumstances under which the data was collected so learning sphere and data shop are careful and cognizant of requirements. This gives us a way to investigate learner activities and understand it in different ways that don’t require us to build out a full RTC. And so, when I talk about learning sphere one of the goals is to really take analyses that have been built out and make them able to be used in different context. I think most of us in this space have had the challenge of needing to take a collection of data and a new format that will plug into an analysis that has been written into a code base that we don’t understand, they’ve written it in a code that they expect to come from a P.S. V file and it requires an awful lot of work to actually replicate that particularly if we’re getting our data from different sources. Learn spheres goal in part is to be able to abstract that workout into a series of work flows that can be plugged in. One of the studies we’ve been seeing lately is a psychology nook taking advance of OLI as a set of readings and activities while still creating their own lecture videos and high-stake assessments and created a natural experiment to try to understand which of these student choices associates with learning. What we were able to do in this case is apply an analysis to start to look at what’s the relationship between doing these activities and performance on the quiz. What’s the impact of simply watching? What’s the impact of reading? There’s certainly impact from reading and additional impact that seems to happen from reading but the relationship from impact and learning by doing is six times better than learning by reading or watching. We’ve got an interesting analysis here and we’re hoping we’ll have an impact on how we think about designing online learning experiences in the future and we’d like to know if it generalizes and by taking this analysis and abstracting it out as a workflow we’re now able to quickly
plug in other data sets and in this case we have a whole host ranging from biology and statistics to computing that have been used at other institutions that we can plug into this learned be doing analysis and then into a framework. Let’s take a look roughly twelve and a half thousand students to understand whether this doer effect is consistent across courses. We see in fact that it is. That compared to reading this is two times as effective up to sixteen times as effective. The analysis itself and the learning science contributions represents is interesting but what's more interesting is that by applying this and plugging it into the -- awesome questions there. I apologize. By plugging this into a workflow framework this means that if you are interested in investigating for yourself what the impact is of your learning activities you are able to jump into learn sphere, import your data and then apply the workflow without an understanding of underlying code or technologies. We'll talk about the rise framework. Rise is an analysis approach developed by colleagues. We highlight this. The idea behind rise loom builds out open course wear and I'd like to provide some mechanism for identifying what are the components of course wear that most need some additional attention and how can they engage with the community to try to get that course wear corrected? Rise then is going to compare student performance with engagement. Page views in this case to try to locate what are the resources most used and that students seem to be having the most performance is. That's our upper quadrant. Students in the lower quadrant students are using them but not doing quite well. What's most interesting is the lower right quadrant, we've got high use, we do not have great performance, these are places where we know that something is wrong. Our resources might be poorly designed. Outcomes aren't aligned. Fantastic analysis. It was written specifically to be able to use arc to process the course work. We took this analysis and plugged it in as a component and OLI courses were plugged into this same framework and we're using practice course and performed the same analysis without writing any additional code. What we think about our data framework, some of the things that you might be interested in in this case if you've got differences in data use and learning outcomes then there's a great opportunity for you to dive in and take advantage of these existing tools and discover what's happening on the effectiveness side. Similarly, if you've built out your own analysis there's an opportunity to contribute these as workflow components. Just touching my mistake there. Sorry. With all of these tools one of the things that we'd like to highlight is that on the one hand we have immediate ability to jump in and use these but at the same time but making the code base available we'll hope that you'll investigate and contribute back and that way to engage with the community you need not require standing up your own sphere or recoding it from the ground up but jump in and take advantage of what's already published and for other institutions and other researchers it may be more appropriate to stand up your own instance and hopefully you can share back with the rest us. So, I'm just outlying just a few of our use cases as we've walked around that cycle and what I wanted to do now was quickly walk through a few case studies of this toolkit being used here at CNU. We often lead with the quote emphasizing that our improvement can be thought of as a community-based research activity but we like to emphasize there may be a slightly lesser known quote. Focus must be an understanding and changing what it is our learners think, what it is that our learners do. So, let's talk a little bit about how we tried to think about and engage with what our learners are doing and thinking here at Carnegie Mellon. Institutional case studies, just a few quick notes that as we get started at an institutional level, we think it's important to start off with the need to identify the kinds of challenges that we want to address. Too often in the tech space and I think we've all experienced individuals that want to lead with the technology. We've got a new tool and we want to find a new way
to use it. We understand the underlying pedological challenge and we recognize that we must provide multiple types of support and at this space it's fairly complex. Finally, we really need to have a commitment early on to catch these processes. We’re going to look at three different cases, one trying to address different levels of preparation. We want to be closing the loop and focusing on this in our own context at CNU. We have an early project that we talk about as the discreet and students are struggling and we want faculty to understand where students are succeeding. What are those skills? Develop OLI modules and support both in the learning and engineering and also on the consultation side with our faculty and we started on this about three years ago. By partnering with data scientists and learning engineers we evaluated the impact of building out these models. We are seeing reasonable work on the quiz side although clearly in this last module students are still facing challenges but luckily, we are able to dive into the data to understand what are some of the skills that are not working and we used this data to provide refinements, targeted feedback. As a result, we see some improvements. That was last summer. We end up with open-ended problems that aligns with the kinds of challenges students are facing and we see improvement by integrating tutors and in this case, we are looking at three complete cycles through this design, develop and discovery cycle. The application of a different set of tools across the ecosystem and new customizations focused on your learning context or a deep dive into new research studies. With a different case in English composition trying to highlight not just mathematics but other types of domains. Often students have difficulty improving style and usage and there’s little room to take a new class so we’ve developed supplemental online classes and targeted skills ensuring that the types of feedback students are getting are reflecting back to the challenges they are exhibiting. Again, as we dive in we see that we need attention on skills and recognize that we’ve got common errors on open-ended approaches and as we move into this cycle for the second time we take another tool into the toolkit called light side, a modeling kit that forms the foundation for turn it in and we're using this to help model and provide feedback for students as they continue to try to improve pro style and usage and this is another tool you'll find available. Again, it’s an open source. Finally, we've been looking at developing core competencies. Just as we see at every other institution, we're finding that our students definitely need more practice in skills around collaboration, teamwork, communication, and we’re working to build out modules that can be plugged into different context. In this case, developing out collaboration materials that are then used by students that are undergoing team projects and we used randomized materials and there’s definite improvement around teamwork and better ratings for students from their peers and the product has been better and teamwork across CNU. General positive feedback and positive pre/post games and we take in and saw one specific area we needed to improve and over a summer we were able to target that and improve student performance in that space. Our takeaways, we know that we're able to use this approach in lots of different skills ranging from things that are more traditionally applied to engineering like mathematics to collaboration and we're able to do this in a way that scales and supports different faculty and learner context. From an institutional side we see this study has given us an opportunity to support innovation from our educators and the students see immediate value in ways that are measurable and data and culture for greater appreciation for evidence base and approach. Walking out of this I've given you a rapid tour around what our goals are in launching the open Simon effort and the kinds of problems that we think we can help to address with a community based approach and with a real emphasis on that community based application, we’re providing a set of tools that we’re trying to integrate into a larger
ecosystem and we realize that it’s just as important as the technical component and we really need to see these tools, techniques and content used by individual institutions. Carnegie Mellon by itself is not going to solve all the problems education faces for all educators and institutions. We’re looking ahead to find ways to better partner around the challenges that y’all are facing and better shift change in our larger paradigm so we can think about this larger community-based research effort. So, moving on to Q&A now and I apologize. I ran a little longer than I’d intended. As you are looking through next steps definitely jump on to the open Simon website and see the tools, techniques and you'll be able to identify future webinar events and I think one of the things that I'm interested in hearing from you is, you know, recognizing this is just scratching the surface, how can we get more information to you to make this community and tool set more actionable and what tool sets would be your priorities and what kinds of support would you be interested in. We've got a poll we'll put up and I see we've got questions coming up. I’m going to talk through some of these questions. Kathryn is asking a great question. Are we best suited and is this approach best suited for structured problem-solving activities where things can be rated as right or wrong? I think that the kind of structure, the right wrong problem set certainly lend themselves better to approaches but in any case a faculty member is actually going through scoring assignment, that's instrumented and for more thoughtful analysis and critical thinking skills so long as we’re able to relate that back to the skill and feed those back into our analysis tools we’re certain liable to take advantage of some of these techniques and I think I glossed over a bit some of the design techniques and these are going to be things that you are already familiar with and we tend to focus on cognitive task analysis which in a lot of ways is as suiting and best known for its work on more analytical style questions and things that are problem solves. The Roger tailor, he knows the bridge I was talking about. So how do we translate these open Simon tools into ways that can help faculty improve their instruction? Are there folks that can work with us on this topic? Definitely yes is the answer to that. I think we see a couple of different paths to that space. On the one hand we have been fortunate to have a Grant from the Carnegie corporation of New York to really investigate deeply what are some of the barriers to this use of technology and enhanced learning and we were fortunate to bring on an anthropologist. I think some of her insights can be really useful and she has been explicitly talking about and thinking about this as a translational activity. Her model has actually been the medical profession where despite an enormous proliferation of evidence-based medicine we weren't seeing those things getting pushed out into practice and so that question of where have they been successful in translating discovery into practice is one that she has been thinking more deeply about. In addition our Eberly Center for teaching here at CNU I will modestly say it’s one of the best in the world, I think and I think that they've really shown themselves to be successful in building the teams that support faculty and Eberly Center is a key partner in this initiative and part of the open Simon leadership team. Peter, I think the understanding of how you get cross buy-in and that cross culture is one that we could be providing more support on and I guess my first instinct, we've been fortunate one of our provost, senior leadership has been involved and we've really seen a commitment from our president and new provost to this work, to seeing this project happen at CNU and it's CORNERSTONE of how they think about the larger task of educating Carnegie Mellon students and as we look at our list of potential webinar and workshop topics would it be interesting for us to get some of those folks on and deliver some webinars on that side? I think that’s a role that definitely needs to be addressed and I'd love to set up some peer-to-peer opportunities there.
>> So, Malcolm coming back in. We have time for one more question and one that I have for you, a key question, data and its format. In the community space API, could you very quickly because you only have a minute here talk about those conventions and the data points that you are working with.

>> When we look at our own internal data infrastructure much of it predates the emergence of API and we talk about capturing data at the learner interaction level, the tutoring format and tutor messaging and the format being consumed by learner sphere and data shop on those learner interactions can be represented as API data or [indiscernible]. In addition, places that I haven't even touched on, part of the learning sphere larger learning space involves a number of different discussion boards and discussion formats and those are the MLS's and two major move providers and that's a place that we haven't pressed. We are hoping within the development of the libraries that I've mentioned to build out better starting points for making that connector between caliper data store and some of our analysis tools. We're not quite there yet. We're all trying to better understand how to really address this challenge of data transfer. Did that help? I know I was all over the map.

>> No, that was good. That was helpful. Thank you. And sadly, we're out of time here. A great topic has been discussed. But we need to put a bookmark here. Thank you, norm, for being with us today and enlightening us with all that's going on.

>> Thanks again for inviting me. Thanks to the participants. I try to approach this work with excitement but also humility and hopefully you are seeing things here you'd like to be involved in.

>> I have no doubt. On behalf of EDUCAUSE, thank you all for joining us today for an engaging session and conversation. Before you sign off today, please click on the session evaluation link, which you will find in the chat window. Your comments are very important to us. The session’s recording and presentation slides will be posted to the website later today. Please feel free to share it with your colleagues. On behalf of EDUCAUSE, this is Malcolm Brown, thanks for joining us today. And have a great week.

[End of Webinar]