XMILE Panel Discussion
Questions not answered during the presentation

How to avoid duplication of model building? Reusability of models by having a library of sub-models? One can then search in the Web and pick and choose what is relevant to a particular problem. Integration can come later.

> That is the general idea. We are hoping that such a library of XMILE models will be built. Both the System Dynamics Society and isee systems are putting systems together to facilitate this. We anticipate others will also create XMILE model libraries.

Sometimes in Vensim I build simulatable models that look exactly like CLDs, that is, the graphics don't differentiate among stocks, flows, and auxiliaries. This is useful with audiences who are familiar with CLDs but not with flow diagrams. Will XMILE support this?

> XMILE has the ability to represent CLDs. It also allows the ability to select the symbol (or just a name) for entities. The specification, however, does not include the ability to represent a flow as a causal – vs. flow – link. Vendors can extend the specification to include this.

In a recent XMILE video, someone brought up the idea of moving a Vensim or other model to STELLA to do storytelling with the model. This would be very useful because storytelling is so great for presentation. Assuming vendors adopt XMILE ASAP, how soon could this functionality be available?

> This functionality is inherent in XMILE. Providing each vendor has a compliant implementation of XMILE, this should work as soon as the implementation is available. There are some caveats. For example, STELLA does not have multiple views and instead uses modules to divide the model into separate pieces and storytelling to show separate slices of the model. If the imported model does have separate views, your ability to do this would be affected by how STELLA maps those imported views onto its diagramming model (they could, for example, end up in different modules).

Do Diana's most recent comments [regarding the ability for people across disciplines being able to understand stock and flow models] *have something to do with the different ways students (people in general) learn? Visually, for example, as opposed to equations?*

> Diana answers: In the book "How People Learn" from the National Research Council there is a discussion of the difference between expert and novice problem solvers. One principle mentioned is that 'experts notice features and meaningful patterns of information that are not noticed by novices,' In my specific area of interest, mathematics, ability to see patterns of information is fundamental to capturing the essence of a dynamic problem we want to analyze. It also focuses effort on 'big ideas' rather than details, especially as a first pass. I believe (but have not researched, at this point), that stock/flow maps allow a visualization of 'big picture' patterns of dynamic problems. This is the quality of building a stock/flow map that I believe is cross-discipline. By 'laying out the plumbing,' as this is sometimes called, types of variables are identified, the relationship of these variables to each other is identified, their specific dependencies are specified, and misconceptions are made visible. A big part of what we, as teachers, are tasked with is surfacing misconceptions and helping students

understand where the misconceptions lie, and how to adjust their thinking to a more scientifically accepted perspective. Is this because the stock/flow representation is visual – I think so – but cannot cite appropriate research at this moment. It has been apparent in my work with students when I present a problem and we start to draw a stock/flow map on the board. More students become involved in the activity, more (less traditionally adept math) students become part of the conversation. I have seen this with the teacher I have trained as well. Those teachers in the social sciences, some of whom are not comfortable with equations, become part of the stock/flow map-building process with little difficulty.

In my dissertation experiments, I will be focusing on the advantages of SD in helping students understand function dynamics better (I hope). A big part of that will be trying to identify the features of SD (some of which are the software interface) capabilities that help the learning process.

Will XMILE be a modelling medium designed for the Internet - or will the platform be corporate?

XMILE describes the representation of any System Dynamics model, whether it is deployed on the desktop, on the web, or on mobile, or it is for education, government, research, or business.

As I understand the XMILE concept, it will contribute enormously in the agriculture industry in South Africa, where I have been actively applying SD for 15 years. Let's get it going!

Thank you for your support!

How can modeling systems be used in marketing strategy?

This is, unfortunately, beyond the scope of today's webinar. A good place to start looking for a detailed answer would be the System Dynamics Society bibliography: http://www.systemdynamics.org/bibliography/.

As a complete novice to modelling systems dynamics and living in France, which is the online course that could be recommended for initiation? I am not a teacher but work with teachers and would like to promote ST tools in schools.

If you would like to learn the fundamentals of System Dynamics, the best online course program is at Worcester Polytechnic Institute (http://cpe.wpi.edu/online/sys-dyn.html). isee systems also offers online training to get you started in System Thinking (see the "From Systems Thinking to Dynamic Modeling" series http://www.iseesystems.com/store/Training/OnlineCourses.aspx). If you are specifically interested in how to use Systems Thinking in math and science education, Diana Fisher's new course series (http://www.ccmodelingsystems.com/news-overview-intro.html) is designed specifically for that.

How will the STELLA, Vensim, and other platforms change (e.g., user interfaces) once XMILE becomes part of these platforms?

It is unclear that the user interfaces will change. The capabilities, however, are likely to migrate closer towards each other, especially as more users demand higher degrees of compatibility.

I teach mathematics at the community college level and Diana's comments are the very reason why I hope to learn to do more with SD in the near future. Finding colleagues who want to join me will be the challenge.

You may consider looking over a wider geographic region and perhaps post on the System Dynamics forum to find others who could support you.

Diana answers: Are you connected with the Creative Learning Exchange (CLE) organization and/or the Education Special Interest Group in the System Dynamic Society? I think there will be colleagues out there – you just need to find a way to become connected. The CLE addresses K-12 issues, but many teachers (including community college and university teachers) are on their listserv. It would be a place to start. These people may have some suggestions for you.

This is the CC math teacher again. I do work with NOAA Climate Stewards and the AMS DataStreme Project. I'd also love to bring aspects of SD to the K-12 teachers that I mentor via DataStreme.

Please keep us apprised of your work in this area.

Again, am I correct in understanding that XMILE will help improve the presentation of models on the web and interaction with them? By giving developers the capacity to develop context specific modes of presentation?

This is not a specific goal of XMILE. However, since XMILE provides a common way to describe both stock-flow diagrams and the interfaces on top of them, some improvement is likely.

Note regarding NOAA - US Corps of Engineers is using SD for coastal flood modeling, through Michael Deegan.

Thanks for the reference!

Given the ability to build sub-models via XMILE and the resultant integration of models, does the panel worry about inconsistencies of the data formats when outbound data of one submodel becomes inbound data for another submodel?

If you mean the specific data format, e.g., JSON or CSV, XMILE does not dictate the connections in this way. The specific data connections between one model and another are far more problematic. If one model expects three specific variables and another model outputs two very different variables, it will not be possible to connect them without changes to one or the other – or the development of an intermediary that properly converts one set of data to another (in a very application-specific fashion).