Kansas MSP: Enhancing Science Education through Inquiry-Based Learning in Ecology

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\textbf{Theory of Action}

This project focuses on ecology, a field that is critical for solving some of the greatest challenges of our century (climate change, land-use change, biodiversity decline). This project serves USD 501 (Topeka, KS), a community that is dedicated to enhancing STEM education for all students. Effective teaching of ecology incorporates both inquiry-based learning approaches and collaborative learning processes. The definition of inquiry-based learning provided by NSF (\textit{Foundations}, volume 2) is most relevant to Kansas MSP: \textit{“Inquiry, as it relates to science education, should mirror as closely as possible the enterprise of doing real science.”} However, ecological studies in the field can be challenging for both teachers and students, and this provides a collaborative role for scientists. Kansas MSP aims to integrate both inquiry-based approaches and collaborative learning among scientists, teachers, and students in Topeka.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{karesite.jpg}
\caption{This is the location of the Kansas Area Research and Education Site (KARES) that was donated by USD 501 for purposes of conducting authentic research in ecology. This is a major resource for Kansas MSP since it is a grassland system that contains a high level of biodiversity and is in close proximity to the majority of schools in the district, ranging from K-12. It provides an excellent location where scientists, teachers, and students can come together to engage in collaborative learning projects.}
\end{figure}

\textbf{Recent Projects: “Summer on the Prairie”}

In the summer of 2011, we conducted a summer workshop at our newly developed ecological field site in Topeka. In addition, teachers, students, and scientists collaborate on a prairie restoration project, involving a number of scientific concepts. These groups work together to catalogue the diverse plant and animal life at the site. One teacher stated: “My students greatly enjoyed the visit to the grassland. They had great fun being outdoors and collecting organisms. They also had to use all of their resources in trying to identify the organisms.”

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{summeractivities.jpg}
\caption{Examples of field activities to be conducted by MSP participants.}
\end{figure}

\textbf{Challenges and the Future}

During 2012, teachers, students, and scientists will continue visiting KARES, and the popular “Summer on the Prairie” will be held again. Students have had a strong voice in conveying to Kansas MSP leaders that they are benefitting from the opportunity to conduct authentic research. We hope to continue stimulating this excitement for ecological science, although we do have challenges ahead. Although KARES is close to the majority of schools in the district, we are trying to determine the best ways to incorporate more distant schools, as transportation can be difficult. Also, determining the best assessment tools to measure student learning (and how students are learning differently at our site) is currently under discussion and will be incorporated into our new targeted MSP proposal.

\textbf{Critical Literature Sources}

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