stelar
STEM LEARNING AND RESEARCH CENTER

Puffins!

Once hunted to local extinction, puffins have made a dramatic comeback and been re-established to historic nesting islands in Maine. This project combines a scientific adventure story about puffin restoration with data investigation on the relationships between puffin health and environmental factors. Students examine trends in several decades of curated National Audubon Society data about puffins, using an accessible open-source data tool to examine relationships among variables such as sea surface temperature and puffin weight. They also use data from puffin webcams and train an AI system to identify puffins. We are researching how to make these tools accessible to English language learners and how the technology enhances student engagement and understanding of what ecologists do. Students also learn about the careers of people from diverse backgrounds who have worked on Maine's puffin islands to learn how data are being used to study ornithology and climate change.

Pillar 1: Innovative Use of Technologies in Learning and Teaching

The project uses CODAP (Common Online Data Analysis Platform) to engage students in examining data about the return of puffins and factors that affect their well-being. Relationships between variables are identified. Teachable Machine is used to differentiate puffin images from those of other birds and to identify puffin calls, using video/sound from puffin webcams. AI birdfeeders are used in students' schoolyards to provide experience with the affordances and challenges of AI.

Pillar 2: Partnerships for Career and Workforce Preparation.

The work is anchored in a scientific adventure story about ornithologist Stephen Kress, who brought puffins back to Maine over a 50-year period. Young interns working with puffins are featured in the book and in a card game "Guess My Puffineer," which uses photos and data about the careers of former interns. We use myriad data from the National Audubon Society concerning the work of seabird restoration experts.

Pillar 3: Strategies for Equity in STEM Education

The project takes place in Maine and works with new immigrant multilingual students from cities and low-income students from rural areas. We scaffold reading and writing for a range of students, using strategies designed and tested by partner teachers. We emphasize multiple and active learning strategies (e.g., growling like a puffin, designing a burrow) to engage a range of learners. The "Guess My Puffineer" game showcases careers of people of color and those from diverse backgrounds.

RELATED LINK(S):

NSF Award Abstract for Puffins (DRL-2241777)
Puffins summary and activity handout ITEST PI meeting May 2024

DISCIPLINE(S):

Data Science
Environmental sciences
Emerging Tech (Artificial Intelligence, Quantum Computing, and Blockchain)

TARGET GRADESPAN(S):

Middle school (6-8)

TARGET PARTICIPANT(S):

Youth / students
Educators
English learners
Students eligible for free lunch or reduced-price lunch

PROJECT SETTING(S):

Formal Education

CATEGORY:

Exploring Theory and Design Principles (ETD)

RELATED PROJECT:

Puffins: Exploring how narrative, data science, and artificial intelligence enhance the study of ecology in middle school

AWARD NUMBER:

2241777

PRINCIPAL INVESTIGATOR(S):

Janice Mokros

CO-PRINCIPAL INVESTIGATOR(S):

Penny Noyce
Don Lyons

ORGANIZATION(S):

Tumblehome
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PROJECT WORK STATE:

ME

2024 ONLINE PROGRAM

Visit the 2024 ITEST PI Meeting Online Program

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