Viewing Local Flora Digitally

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Introduction

Society's increasing 'plant blindness' (Wandersee & Schussler, 1999) threatens efforts to protect the flowering species that dominate the plant diversity found in most terrestrial ecosystems. Few people, after all, can be expected to protect species that they fail to see, let alone identify as distinct (Knapp, 2019). Yet, learning to identify flowering plants is difficult: the phylum Anthophyta is diverse (approx. 300,000 species, Christenhusz & Bing, 2016) and many characters that distinguish species are easily overlooked.

Most botanists organize flowering plant diversity along the taxonomic rank of families; few outside academia, however, have easy access to educational resources that explain how one flowering plant family differs from another (e.g., how is a rose (family Rosaceae) different from a sunflower (family Asteraceae)?). Although, as a discipline 'field botany' has been traditionally learned experientially, the availability of open-source content collaboration frameworks such as H5P (H5P.org) creates an opportunity to make this information more readily available. Currently H5P activities can be integrated into four different platforms including Moodle and WordPress. Thus, the goal of this project is to create an online resource (built from H5P interactive modules in Moodle) and then share this learning by transferring these H5P activities into WordPress. We believe that the creation of this open education resource will help facilitate future understanding of twenty angiosperm families commonly found in the South Thompson Region.

Objectives

1. To collaboratively develop teaching modules for 20 of the most common angiosperm families found in the South Thompson Region. Each module will contain information regarding
   a) Family-level recognition characters
   b) Example species for each family found locally
   c) Interactive activities highlight family characteristics
   d) Summative quizzes to test users' understanding.

2. To, through the creation (and field-testing) of these modules, develop our own understanding of angiosperm plant families and how best to teach this material in a virtual environment.

3. To share the H5P modules as an open education resource through the transfer of H5P activities from Moodle into WordPress.

Process of Developing Family Modules

1. Reseach current taxonomy and any nomenclature changes.
2. Summarize family level recognition characters and/or unique features.
3. Source or create digital resources that illustrate family characters.
4. Assemble (edit and format) images into a combined figure using GIMP (image editing software) to highlight family features (Fig. 1).

Fig. 1. Example of combined (phtotos and illustrations) image illustrating the fruits of Liliaceae family

5. Attribute copyright based on image license (examples below).

"Lycium barbarum" by Andreas Rockstein is licensed under CC BY-SA 2.0 / A derivative from the original work
"Atropa belladonna" by Michael Mueller is licensed under CC BY 2.0

6. Follow established format (Fig.2) to present family level information within a series of H5P modules.

Fig. 2. The generalized format followed for each family (A) and finished H5P activities (B).
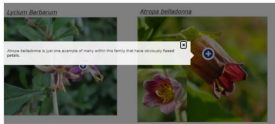
7. Within the H5P modules, use a combination of text, and interactive activities to illustrate and review key family characters and introduce local species from the family (Fig.3).

Fig.3. Examples of the media forms used to present family characters within each H5P activity: text (A), drag-and-drop (B), hot-spotted images (C), and fill-in the blanks (D)

9. Collabratively review and edit family modules.

Challenges and Opportunities

Developing an online resource both remotely and collaboratively is, as might be expected, challenging. In reflecting upon the process we've identified the following challenges:

1. Format: Each of us had our own approach to describing angiosperm families; yet it quickly became clear that a consistent format would facilitate learning for both ourselves and future users.
2. Digital Resources: Angiosperm family identification requires pattern analysis of flowers (How many petals? Superior or inferior ovary? Stamens fused or separate?); yet images of these characters are difficult to obtain during the winter in the South Thompson Region. In order to acquire the necessary images, we needed to navigate the complexity of copyright licenses, and become proficient in botanical illustration and photo-editing skills.

Of course, each challenge also provided opportunity. Upon reflection we identified four opportunities we accessed through this project:

1. The opportunity to practice science communication.
2. The opportunity to help rescind the 'extinction of experience' (Pyle, 1993).
3. The opportunity to relish not just what is wrong, but what is right with our world.
4. The opportunity to create a lasting resource for our community.

Conclusion

"Viewing local flora digitally" is fundamentally a learning project. We intended the learning embodied in this project to be two-fold: (1) to increase our understanding of angiosperm floral diversity and (2) to increase the understanding of future users of our open educational resource. In a world of increasing "plant blindness" many people, including university students, lack the background knowledge to recognize the native flora of a region. We hope that by creating an open, accessible interactive resource we will leverage public engagement and education as a tool for conservation. This method of community-led conservation has been effective in the past (Kremen & Merenlender, 2018) but how always requires a foundation of basic knowledge of species and their ecosystems. "Viewing local flora digitally" is a work in progress but we hope to pass our learning onto future TRU students and the larger community that surrounds and supports TRU.

Acknowledgments

References

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