For the faculty:

I use this to introduce the students to Applied Learning Activities (ALAs). In this first review lesson the ALA’s are more about assessment than learning. After review lessons, the ALA’s become learning activities rather than assessment activities.

Administration. This activity can be administered as an in-class assignment or as a homework assignment. It can be assigned to groups or individuals depending upon the purposes. The students can turn in written reports in MS Word or PowerPoint. The latter are very good for motivating in-class discussions as long as the faculty ask only clarifying questions and provide positive suggestions. Remember it is important to demonstrate how you would develop such a report. I do this in *ALA report writing video.mp4*.

Motivation. Graduate students have a tendency to write much more than is necessary, hoping that the instructor will find the requested information somewhere in the report. They must learn early to write informative executive summaries.

For all of the ALA’s it is important to demonstrate how to accomplish the task with a related example.

For the first ALA, I demonstrate how I read and highlight information that is needed to meet the

assignment using a .pdf document about Alan Robertson written by Trudy Mackay. I

demonstrate how I use GOOGLE scholar to search the web for documents that are needed in the

briefing. I then demonstrate how I read, highlight and extract information needed in the briefing

document. I then demonstrate how I organize the briefing document into two paragraphs; one

for each aspect requested in the briefing.

**Purposes:**

**Keywords:**

**References:**

*Sweetpotato Breeding for CI CM*

Applied Learning Activity:

**Identifying genotypes with high yield and stable performance in different environments**

A cultivar with high yield and stable performance in multiple environments is desirable. Understanding how a cultivar will perform in different agro-ecological zones is important when releasing it to the public. An ANOVA test (restricted maximum likelihood REML) is useful for identifying the presence of significant GXE interactions (i.e., genotype x location, genotype x season x location, genotype x season x location x soil type), but it does not define the stability of the different genotypes. Knowing which genotypes perform well in a wide range of environments is especially important when developing cultivars of sweetpotato that are well adapted for different locations, seasons, and cultivation regimes (e.g., subsistence or commercial farming). Regression analysis (e.g., joint regression analysis, partial least-squares regression, factorial regression), the methods of means (i.e., plots of mean vs. coefficient of variation), scatterplots of Shukla’s stability variance vs. genotypic main effect, genotype x location biplots, and nonparametric multivariate methods (e.g., PCA, factor analysis, and Additive Main Effects Multiplicative Interaction/AMMI) are all techniques for measuring the stability of genotypes.

The AMMI model combines the analysis of variance for the genotype and environment main effects with principal components analysis of the GXE interaction. This method is helpful for understanding complex GXE interactions. The results of this analysis can be graphed in a simple biplot that includes both the main genotype effect and the interaction effects for both the genotypes and environments.

A plot of the genotype mean and the coefficient of variation (i.e., standard deviation X 100/genotype mean) visually displays which genotypes are desirable (i.e., have a high mean performance but low CV).