Prescribed Pedagogical Outcomes Versus Real-World Challenges: A Content Analysis of Kansas AFNR Course Competency Profiles

Zachary Callaghan
Kansas State University
315 Umberger Hall
Manhattan, KS 66506
785-532-1166
zcallaghan@ksu.edu

Dr. Gaea Hock
Kansas State University
315 Umberger Hall
Manhattan, KS 66506
785-532-1166
ghock@ksu.edu

Prescribed Pedagogical Outcomes Versus Real-World Challenges: A Content Analysis of Kansas AFNR Course Competency Profiles

Introduction

To meet the nutritional demands of a growing human population, agriculture, which is responsible for approximately 70 percent of all worldwide water withdrawals annually, will need to adapt to offset the current and future issues of global water scarcity (Mancosu, Snyder, Kyriakakis, & Spano, 2015). Evidence suggests that secondary agriculture, food, and natural resource (AFNR) educators can incorporate water scarcity into their pedagogical practices to combat these issues (McKim, Fornbush, & McKendree, 2018). In Kansas, the principle issues surrounding water scarcity are the rapid depletion of the Ogallala aquifer and sedimentation of state reservoirs (Kansas Water Office, 2015). To identify what is currently being taught on these issues, this study examined two resources. One is the *Long-Term Vision of the Future of Water Supply in Kansas* (Kansas Water Office, 2015), which lays out water-related problems in the state and provides strategic themes that attempt to identify solutions to those challenges. The other resource is the Kansas AFNR Course Competency Profiles. These course profiles identify learning outcomes that students should obtain as a result of taking a specific AFNR course.

Conceptual Framework

Krippendorff (2013) provides a prescriptive framework to "guide the conceptualization and design of practical content analytic research" (Krippendorff, 2013, p.35). There are six conceptual components content analysis studies should include: a body of text to be analyzed, a research question where an answer is sought out by examining the body of text, a researcher-determined context to make sense of the text, operational understanding of the context, inferences related to the research questions, and validating evidence to justify the analysis.

Methodology

This study utilized quantitative content analysis methods, as identified by Krippendorff (2013). To study the relationships between the *Kansas Water Vision* and the state's course competencies, we downloaded the most recent version of all 36 Kansas AFNR Course Competency Profiles from the AFNR page of the Kansas Department of Education's website (Kansas State Department of Education, 2019). Researchers then developed a codebook adapted from a previous water-related study (Dobelbower, 2018). The codebook provided proper protocols and pertinent information for coders to designate categories to each sample. To determine the level of connection to the *Kansas Water Vision*, category classifications were added to the codebook and include descriptions of the four strategic themes of the *Vision*: *Water Conservation, Water Management, Technologies and Crop Varieties,* and *Additional Sources of Supply* (Kansas Water Office, 2015, p.14). The following objectives guided this study: RO1. Determine which Kansas AFNR courses and pathways prescribe water-related outcomes; RO2. Identify the specific Kansas AFNR course competencies connected to the *Kansas Water Vision*; RO3. Determine the extent to which course competencies are related to the *Kansas Water Vision* themes.

Findings/Results

Research objective one sought to determine which AFNR courses and pathways prescribe water-related outcomes. Of the three courses in the Agribusiness Systems pathway, two in the Food Products & Processing Systems pathway, and eight in the Power, Structural & Technical

Systems pathway, none had any water-related learning competencies (N=966, n=0). Coders reported less than 1% of competencies (N=311, *n*=2) in the Animal Science pathway, specifically from the Animal Science and Advanced Animal Science courses, were water related. The Applications in Agricultural Biotechnology course, in the Biotechnology in Agriculture pathway, had one water-related competency and accounted for 1% of the total competencies (N=86, *n*=1) in that pathway. The water competencies of the two courses in the Natural Resources and Environmental Systems pathway, Natural Resource Management and Environmental Resources & Wildlife Science, accounted for 27% (N=86, *n*=23) of the total. The Floriculture and Greenhouse Management, Crop & Range Management, Horticulture, Applications in Horticulture, and Plant & Soil Science courses of the Plant Systems pathway are reported to have 8% (N=358, *n*=28) of their competencies be water-related. The Agriculture Explorations, Plant & Animal Science, Advanced Plant & Animal Science, Research in Agriculture, Ag Leadership/Communications, Introduction to Agriculture, and Agricultural Science courses were included in the Comprehensive Agriculture pathway. In this pathway, 6% (N=539, *n*=35) of competencies were water related.

The second research objective aimed to identify the specific Kansas AFNR course competencies that are connected to the *Kansas Water Vision*. Of the 2,346 total course competencies, 89 had some connection or a strong connection to the *Kansas Water Vision*.

Research on objective three investigated the extent to which course competencies are related to the *Kansas Water Vision* themes. Of the 2,346 total course competencies, 4% (*n*=89) were related to themes of the water vision document. Of those 89 competencies, 27% (*n*=24) had a "strong connection" to the document. This accounted for 1% of the total competencies. Additionally, 73% (*n*=65) of the 89 water-related competencies, or 3% of total competencies, had "some connection" to the document. Examples of a "strong connection" are "Determine the hydraulic conductivity for soil and how the results influence irrigation practices" and "Perform a water quality test." Competencies with "some connection" included "Develop a plan of action to improve the environment," and "Develop a watering schedule for a greenhouse."

Conclusions/Implications

Of the 36 courses included in this content analysis, 17 contained at least one water related competency (47%). Of the eight pathways, three are not incorporating water-related competencies (Agribusiness, Food Products and Processing, and Power, Structural and Technical). Of the pathways that do offer these learning outcomes, they still only account for a small percentage of their total number of competencies. Moreso, the level to which these outcomes are connected to water scarcity issues in Kansas, as outlined by the state's water vision, is miniscule, as only 27% are strongly connected.

The findings of the study indicate a more rigorous review of Kansas AFNR Course Competency Profiles is warranted. Work needs to be done to include key state agencies, industries, and scientists to help teachers know what they should be teaching to prepare their students for future success. Recommendations for future research include identifying teachers' perceived ability to teach the water-related competencies, student achievement and career interest, and impact of changes on water practices in the state.

References

Dobelbower, S. (2018). *Framing the Future of the Ogallala: A Comparative Content Analysis of Agricultural and Mainstream Media Publications*. (Master's thesis). Texas Tech University, Lubbock, TX. Retrieved from https://ttu-ir.tdl.org/handle/2346/82072.

Kansas State Department of Education. (2019). *Agriculture, Food & Natural Resources*. Retrieved from https://www.ksde.org/Agency/Division-of-Learning-Services/Career-Standards-and-Assessment-Services/Content-Area-A-E/Agriculture-Food-Natural-Resources-CTE-Career-Cluster

Kansas Water Office. (2015, January). *A Long-Term Vision for the Future of Water Supply in Kansas*. Retrieved from https://www.kwo.ks.gov/docs/default-source/water-vision-water-plan/vision/rpt-vision-call-to-action-sectiona2d9e11da40b6667970cff000032a16e.pdf?sfvrsn=c6d28714_0

Krippendorff, K. (2013). *Content Analysis: An Introduction to its Methodology* (3rd ed.). Thousand Oaks, CA: Sage. (Original work published 1980)

Mancosu, N., Snyder, R. L., Kyriakakis, G., & Spano, D. (2015). Water scarcity and future challenges for food production. *Water*, 7, 975-992. doi:10.3390/w7030975

McKim, A.J., Fornbush, M., & McKendree, R.B. (2018). Sustainable Water Management Within Agriculture, Food, and Natural Resources Education. *Journal of Agricultural Education*, 59(2), 166-178 https://doi.org/10.5032/jae.2018.02166