FAEIS Food and Agricultural Education Information System

Improving Data Granularity in the Food & Agricultural Education Information System (FAEIS)

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ABSTRACT

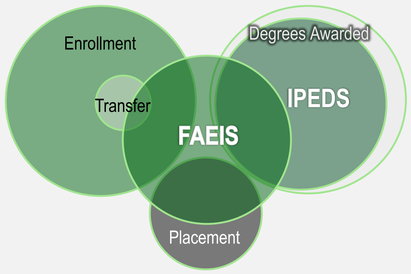
A primary objective of the Food and Agricultural Education Information System (FAEIS) is to provide information for planning and coordinating efforts toward supporting higher education in the food and agricultural sciences. FAEIS currently collects data on student enrollment and degrees awarded disaggregated by Classification of Instructional Programs (CIP) codes, gender and ethnicity from approximately 230 academic institutions. In order to collect meaningful quantitative data it is necessary to identify and track evolving programs in a variety of institutional structures as well as demographics over time which is complicated by this growing interdisciplinary world. We compared the number of programs reported to FAEIS from Non-Land-Grant Agriculture and Renewable Resources Universities (NARRU) institutions in recent years to the way programs are promoted on institutional websites. There were at total of 75 agriculture related CIPS reported to FAIES from participating institutions which differed significantly from the number of agriculture programs promoted on websites. CIP codes give limited granularity and may fail to capture how programs change over time. We explore the potential of tag based models to improve the FAEIS ability to map degree programs and majors. This new approach could provide academic advisors a clearer picture of emerging programs.

BACKGROUND

Funded by the USDA, the Food and Agricultural Education Information System (FAEIS) has been compiling nationwide higher education data for agriculture, natural resources, family and consumer sciences, and related disciplines, for 35 years. A primary objective of the program's legislation is to provide information for use in planning and coordinating efforts directed toward supporting and strengthening higher education in the food and agricultural sciences.

Educational artifacts such as degree programs, majors, or options have vast differences in construction at each institution. In order to support deeper reporting, it is necessary to identify and track evolving programs in a variety of institutional structures.

METHODS



This represents the relationship between the population and the data sampled by FAIES student survey forms with a comparison of coverage to the Integrated Postsecondary Educational Data System (IPEDS). The FAES degrees awarded form is similar to IPEDS completions, however, FAEIS student data is delineated by college or department.
Raw FAEIS survey data are available at survey close while IPEDS completion data is released after a two-year imputation process.

Programs – Extant and Emerging

FAEIS historically identifies programs to collect through one of two strict definitions:
1. Within college/department of Ag/FCS/NR
2. Within CIP range of Ag/FCS/NR

This does a good job of identifying existing programs. Attributes were added in 2016 to capture program emergence:
1. Non-traditional agricultural CIPs in traditional agricultural college/department
2. Majors that appear to deviate from a strict interpretation of parent CIP

Capable Depth of Analysis

FAEIS 2016	FAEIS 2002 2015	IPEDS
Institution	Institution	Institution
College/School	College	
Department/Office/Unit		
CIP	CIP	CIP
Major/Specialization/Track		
Alignment CIP		
Parent program		

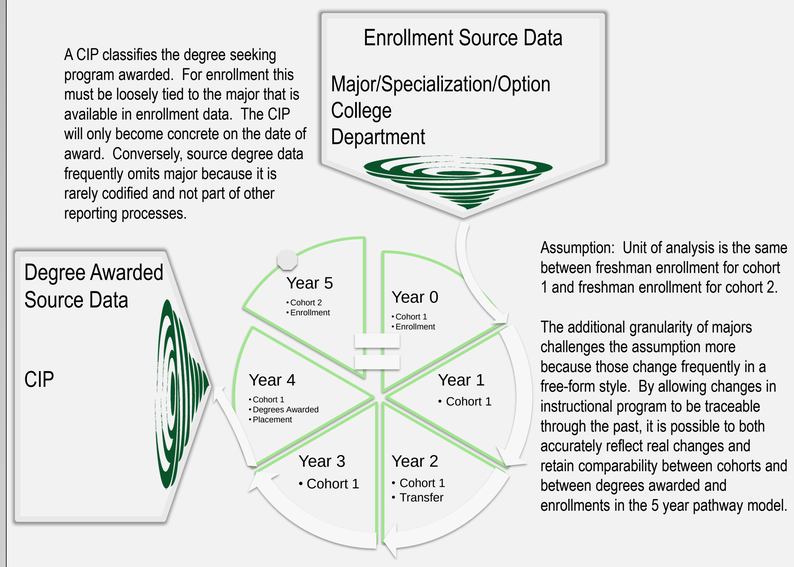
The Classification of Instructional Program (CIP) system is maintained by IPEDS and re-evaluated every ten years to accommodate accredited programs that institutions report (IPEDS[1]). The CIP code remains a common global identifier used for comparability across external datasets.

[1]IPEDS. 2010. National Center for Education Statistics - Introduction to the Classification of Instructional Programs: 2010 Edition (CIP-2010) https://nces.ed.gov/ipeds/cipcode/files/introduction_cip2010.pdf

5 Year Pathway Model

FAIES student data is collected with the objective of supporting a 5 year pathway model. This model is long enough to ensure comparability between cohorts of students and is also useful in forecasting Degrees Awarded based on Enrollment. Accessibility and local differences between the two datasets at each institution challenge our FAEIS data responders.

A CIP classifies the degree seeking program awarded. For enrollment this must be loosely tied to the major that is available in enrollment data. The CIP will only become concrete on the date of award. Conversely, source degree data frequently omits major because it is rarely codified and not part of other reporting processes.



Assumption: Unit of analysis is the same between freshman enrollment for cohort 1 and freshman enrollment for cohort 2.

The additional granularity of majors challenges the assumption more because those change frequently in a free-form style. By allowing changes in instructional program to be traceable through the past, it is possible to both accurately reflect real changes and retain comparability between cohorts and between degrees awarded and enrollments in the 5 year pathway model.

Instructional Program Archetypes

1 to 1	Hierarchy	Multifactor
One advertised major per accredited program	True hierarchy with multiple advertised majors per accredited program	Advertised major is loosely tied to multiple degree seeking programs and vice versa. Multiple factors determine the actual degree awarded, including organizational structure.
CIP → Major	CIP → Major, Major, Major	Department A, Department B, Department C; CIP, CIP, CIP; Major, Major, Major, Major, Major

Bridging the gap between enrollment majors and CIPs of degrees can be assisted by understanding the usage at individual colleges.

Each college's program organization can be roughly categorized into one of three archetypes, distinguished by its complexity. Historical FAEIS data collection accurately reflected 1-1. FAEIS now supports metadata for describing all three archetypes. As the complexity of the archetype increases, survey disaggregation increases exponentially. Only institutions that can generate an automated data file extract can reasonably respond with a multifactor archetype. Institutions who must report with less depth consequently lose granularity and contribute less to the body of knowledge.

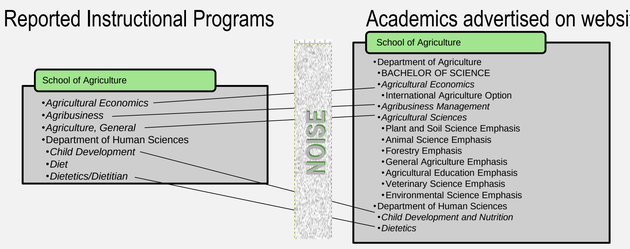
Qualitative Case Narrative

Instructional programs evolve and, intuitively, the labels that identify and describe the instructional program change. This hypothetical series of program changes is drastic and unlikely, but possible, within the five year pathway. What cohort 0 perceives as enrollment in year 0 and actually receives in year 4 change and is different than what cohort 2 perceives in year 5. What is important is that we know these changes affected a particular instructional program which means the enrollments within the program have continuity and meaning between cohorts and label changes. To fully understand the dynamics, a narrative must be constructed using a qualitative analysis of the case, leveraging additional context provided by responders.

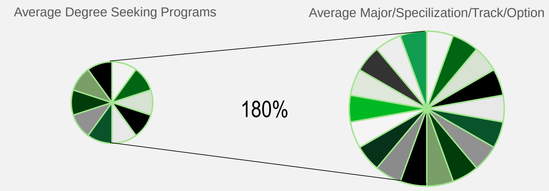
ANALYSIS: 2017 investigative comparison

In the fall of 2017 FAEIS compiled a list of advertised programs from websites across 52 Non-land-grant Agriculture and Renewable Resources Universities (NARRU) institutions. This data was attributed with College, School, Department, Degree Program, and Major. The observed degree programs were compared against the FAEIS record of programs to estimate existing collection success. The relationship of observed majors to observed degree programs was recorded as well. These attributes give insight into the volume of potential additional information that can be gleaned by surveying majors and the complexity that will be associated with pursuing them.

Sample of Organizational Collection Noise

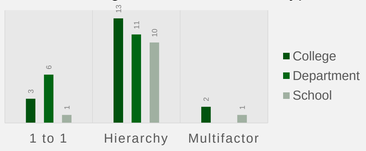


An additional number of degree seeking programs were observed on NARRU websites which had not been self-reported to FAEIS. NARRU institutions participating in FAEIS have on average 1.8 times as many majors as they do degree programs.



Potential for deep reporting of majors based on web survey

NARRU Agricultural Unit Archetypes



Web survey results were interpreted as archetypes based on the presence of the most complex major to degree program relationship in the respective agricultural college, school, or department at that institution. As many as 13 majors are advertised in a single agricultural degree program.

The ten institutions having one major per degree program tend to have Agriculture organized into departments and provide no further depth of information. For the 36 institutions with complex archetypes, reporting by major will result in an increase of meaningful data detail that has never been collected by FAEIS or similar data collection agencies.

CONCLUSION

FAEIS nationally tracks student enrollment in academic programs in part to observe changes and emerging programs relying on the CIP system. An effort to improve FAEIS data towards these ends requires an approach that monitors a deeper level of programs such as options, specializations, tracks, etc..

Students enroll in advertised programs, such as majors, and therefore demonstrate intent. This intent is a valuable detail that may factor into placement choices or future academic pursuit. Transparently relating specific intent can help answer more specific questions about trends in academic programs. Ideally, the advertised program would be reported with all appropriate labels to correlate intent from the body of enrollments.

Increasing this granularity may represent a heavy burden on responders using the manual online data entry system. To permit clear and easy data submission, FAEIS needs to identify easy and consistent ways for institutions to reference their majors from year to year in a consistent data file extract. FAEIS actively seeks to establish new protocol with data responders to achieve this objective.

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