How does CASE Compare to High School Science and Non-Science Courses?

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Introduction & Need

• A rigorous, science-based high school agriculture curriculum may improve our ability, on the college level, to recruit and retain high achieving agriculture students.

• The Association of Public Land Grant Universities’ *Science & Mathematics Teacher Imperative* calls for an increased emphasis on STEM related middle and high school education.

• The National Research Council 2009 report, *Transforming Agricultural Education for a Changing World*, recommended an increased focus on K-12 education.
Background

• In 2008, the National Council for Agricultural Education was instrumental in the development of the Curriculum for Agricultural Sciences Education (CASE)
• Modeled after Project Lead The Way (PLTW)
• Project-based & Inquiry-based learning

Conceptual Linkages

• Curriculum may allow:
  ◦ for novelty, discovery, and challenge (tenet 3)
  ◦ be collaborative and promote social interaction (tenet 5)
  ◦ focus on a spiraling model of content acquisition (tenet 6)
  ◦ be learner-centered and provide visual and auditory choices (tenet 12)

(Caine and Caine's Brain Based Learning Theory)
Research Objectives

• Determine level of agreement with science comparison statements

• Determine level of agreement with high school comparison statements

Methods

• Descriptive research reporting “what is” (Borg & Gall, 1996)

• Accessible populations:
  ▪ Students participating in CASE at four Oregon high schools ($N = 353$)
  ▪ Results generalizable only to the respondents
Instrumentation

• Researcher developed instrument based on student open-ended responses to “how does your CASE class differ from your other courses”

• Students identified 133 differences

• Researchers analyzed, collapsed and piloted a Likert-type instrument

• Item test/retest reliabilities were calculated and ratings above .50 were considered acceptable

(Ary, Jacobs, & Sorensen, 2010)

Instrumentation

• 18 statements “compared to a high school science class”

• 14 statements, “compared to other high school classes”

• 6 point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree)

• Stability coefficients ranged from .50-.94
Methods

• Data collection occurred in March
• 258 students responded (73% response rate)
• Surveys were anonymous and participant numbers were coded by the teacher

Results

• Compared to an average science class, the following four statements evidenced the highest level of student agreement
  ➢ This class has less homework
  ➢ This class is easier for me
  ➢ This class is more fun
  ➢ This class has more activities
Conclusions

• Less homework, easier for me, more fun & more activities:
  ▫ This may relate to the collaborative nature of the curriculum
  ▫ Science, embedded in real-world context is more accessible to students
  ▫ Learning is affected by attitude, emotions, feelings and social interaction (tenet 5)

Results

• Compared to an average science class, the following four statements evidenced the highest level of student disagreement
  ➢ This class takes more field trips
  ➢ I learn more about science in this class
  ➢ This class is more focused on me
  ➢ This class has less busywork
Conclusions

- **Students**
- More field trips, learn more science, focused on me, & less busywork:
  - Students did not think they learned as much science as a science class
  - Students did disagree that the course focused on them
  - CASE is a paperwork heavy curriculum

Results

- Compared to an average *high school class*, the following four statements evidenced the highest level of student **agreement**
  - I work with my classmates more in this class
  - This class lets me experience what I am learning
  - This class focuses on careers more
  - This class requires more participation
Conclusions

• Work with my classmates more, experience what I am learning, and requires more participation:
  ◦ Support tenet 12 – information should be presented in a visual, auditory, or kinesthetic environment while promoting student investment and autonomy (Caine & Caine, 1994, 1997)

• Focus on careers: allows students to glimpse the parts and the whole at the same time (tenet 6)

Results

• Compared to an average high school class, the following four statements evidenced the highest level of student disagreement
  ➢ This class is more important to me
  ➢ This class is more focused on me
  ➢ This class takes more field trips
  ➢ This class is more relevant
Conclusions

• Compared to a typical high school classroom, students did not feel the class was more important, relevant or focused on them.
  ▫ Contrast to tenet 12 which encourages emotional investment

• Field trips: Students indicated CASE is not focused on field trips

Recommendations

• Further research should consider
  ▫ Within school differences
  ▫ Student learning
  ▫ Levels of student motivation, both intrinsic and extrinsic
  ▫ Student perceptions specific to CASE tenets
Thank You

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