College Readiness and Success in Beginning-Level Science Courses at the University of Hawaii

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Who the heck am I?

Dr. “P”
When we try to pick out anything by itself, we find it hitched to everything else in the Universe.

~ John Muir
What Does “College Readiness” Mean to You?

- Select an object from your purse, bag, or person that reflects “college readiness” to you
- Find a partner and explain
What Does “College Readiness” Mean to You?

- Share out
“College Readiness...?”

- The latest education reform movement for improving student achievement, teacher effectiveness, and overall school performance?

- What we educators need to consider as we plan our instruction, assessment, and evaluation?

- What the state standards are designed to address and prepare our students to be and how our schools’ effectiveness will be evaluated based upon the results of assessment protocols developed to test achievement of state standards?
"College Readiness"

- "... the acquisition of the knowledge and skills a student needs to enroll and succeed in credit-bearing first-year courses at a postsecondary institution (such as a 2- or 4-year college, trade school, or technical school) without the need for remediation" - ACT, Inc.

- But what exactly does college and career readiness mean in Hawai`i, and how should we educators be preparing our students to be college and career ready?
Clear National Challenges Exist in College Readiness (and Success)

Only 1/2 of all undergraduates complete a college degree in six years.

38% of all U.S. students take a remedial course in their first or second year.

More than 60% of jobs will require a postsecondary education.

Students with a bachelor’s degree will earn 40% more in their lifetime (29% more with a community college degree) than students with only high school diplomas.

The U.S. is 9th in the world in college attainment for the 25-34 year old population.

Source: Profile of Undergraduate Students 2011-12, US Department of Education, October 2014, p. 140

Go to college they said, it'll be fun they said.

They didn't say anything about having to pass
Let’s see what we know about...

- UH College Student Statistics
- https://play.kahoot.it/#/k/5719a4e1-3fdb-417e-a7ac-a3ef8c421623
In 2017, 13,581 students graduated high school in Hawai`i.

10,901 from Hawai`i public schools (78.6%)
4,295 graduating Hawai`i high school students become first-time, incoming UH freshmen

3,659 from DOE schools
• 31.6% of all graduating Hawai`i high school students become first-time, incoming UH freshmen

13,581 students graduate

31.6%

4,295 enter Hawai`i colleges
Most of these students enter UHCCs.
UH College Student Statistics
Fall 2017

- 19.1% UHCCs vs. 12.5% 4-yr UH institutions
- (22.5% vs. 11.8% DOE students)
- Most of the 4-year students go to Manoa

Source: Institutional Research and Analysis Office, University of Hawai‘i, January 2018; from Department of Education, State of Hawai‘i; Administrative offices of private high schools.
How many students enroll vs. graduate?

Approximately 19.0 million students are enrolled in higher education institutions.

Enrollments have declined over the last five years.

Degree completion within six years by institution, first-time college students:
- 2-Year Public: 38%
- 2-Year Private Non-Profit: 45%
- 2-Year Private For-Profit: 61%
- 4-Year Public: 61%
- 4-Year Private Non-Profit: 72%
- 4-Year Private For-Profit: 33%

Data sources:
- National Student Clearinghouse - Signature Report #10, Completing College: A National View of Student Attainment Rates Fall 2009 Cohort, Figure 12, pg. 3 and 24 (Nov 2015)
### How many enroll vs. graduate?

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Sources: Banner Operational Data Store (ODS) IRO_TRACKING_COHORT_ID, IRO_TRACKING_COHORT_RET, IRO_TRACKING_OUTCOME [data are derived from IRO_BASE & IRO_DEGREE]
How do we help students achieve their goals?

- College readiness refers to the set of **knowledge, skills, and behaviors** a high school student should have upon graduation and entering their freshmen year of college. It’s about the ability to find success while studying at an institute of higher learning.

- What skills are required to be college ready? What do you have to know? What behaviors should you embody?

0.0 GPA
7 years to finish
Activity: Trading Places

- Each group will be assigned either public school teacher (DOE), college faculty member, or beginning college student.

- Spend 3-5 minutes answering the following question from your assigned perspective:

  - **What are the skills and behaviors needed by students to survive in college?**
Activity Results:

Beginning College Students
- Time management
- Study Skills
- Note taking
- Test taking Skills
- Basic Math & English
- Meeting deadlines
- Financial/Fiscal responsibility
- Health: physical & mental
- Stay focused/goal-oriented
- Beer pong (milk)
- Not being afraid to talk in class

DOE Teachers
- Organizational skills
- Study Skills
- Time management
- Computer/Software Skills
- Library skills
- Research skills (incl. literature)
- Hā
- Respect
- Community
- Financial literacy
- Communicate w/ professors/adults (not just appropriate emails)
- Technical Writing (essay etc.)
- Graduates not needing remediation in Math or Eng

UH Faculty
- Critical Thinking
- Questioning/Synthesizing
- Time Management
- Organization
- Understand Personal Strengths/Weakness
- Motivation/Perseverance
- Ask for Help
- Focus (put down phone)
- Writing/Reading (Literacy)
- Math Skills
- Are proficiency levels appropriate?
UH Faculty Teaching Beginning 100-Level Science Courses were Surveyed

Responses (%)

HawCC  HonCC  KapCC  KauaiCC  LCC  WCC  UHMC  UHH  UHM  UHWO

N = 16
Courses Taught by UH Faculty Who Responded

**NON-MAJORS COURSES (GE)**
- BIOL100/100L Intro to Human Biology
- BIOL101/101L Biology and Society
- BOT101/101L Intro to Botany
- CHEM100 Chemistry and Society
- SCI 121/121L Intro to Biological Science
- SCI124 Environmental Science
- MICRO130/130L Microbiology
- ZOO100 Intro Zoology

**MAJORS/NURSING COURSES (NON-GE)**
- Ansc141, Introduction to Animal Science
- BIOL141/141L/PHYL 141/141L Human Anatomy and Physiology I
- BIOL142/142L/PHYL142/142L Human Anatomy and Physiology II
- BIOL171/171L Introductory Biology for Majors I
- BIOL172/172L Introductory Biology for Majors II
- MICRO130/130L Microbiology
College-ready subjects/topics UH faculty felt were necessary for DOE students to enter their class with firm knowledge and retention of from their high school courses.

College-ready knowledge of topics includes things like:

- **MATH**
  - Following through with mathematical formulas,
  - Basic statistical understanding – mode, median, range, mean
  - Being able to read graphs and charts
  - Checking their answers and being able to tell if they make sense or not
  - Calculating ratios and percentages
  - Use of a ruler
  - Basic math skills
Knowledge

College-ready subjects/topics UH faculty felt were necessary for DOE students to enter their class with firm knowledge and retention of from their high school courses.

College-ready knowledge of topics includes things like:

- **SCIENCE**
  - Good observational skills
  - Inquiry-based learning
  - Being able to use the scientific method – knowing how to write a proper hypothesis
  - Fact checking

- **ENGLISH**
  - Writing well-structured essays
  - Differences in scientific writing vs. essays
  - Reading textbooks and annotating them
  - Writing complete sentences
College-ready “hard” skills include things like:

- Ability to make a table and/or graph in excel or google sheets
- Ability to open MS word documents
- Printing documents
- Making .pdfs and powerpoints
- Being able to do a presentation

Other:

- Basic note-taking skills
- How to look up resources other than Wikipedia and what a reliable source is
- How to use a library
- Study skills and how to identify how they learn best
- Email and classroom etiquette
“Soft” Skills

College-ready soft skills or abilities that UH faculty felt were necessary for DOE students to enter their class with

Additional skills that are not necessarily taught directly in the classroom, but help in both college- and career-readiness (and life!):

- Critical thinking
- Problem solving
- Communication (verbal and online)
- Organization
- Collaboration – ability to work with others
- Ability to seek help from instructors and others
- Curiosity
- Honesty
- Understand multiple points of view and discuss differing opinions logically, rationally, and with a kind demeanor
- Participation
- Show up on time
- Be respectful
- Don’t make excuses
- Take responsibility
Behaviors

College-ready behaviors faculty felt were necessary for DOE students to enter their class with.

College is a challenge, and students must have certain mindsets to meet that challenge—and thrive! These behaviors and habits can include things like:

- Self discipline and self-motivation
- WORK ETHIC: some students think coming to class is enough, they need to do assignments and do them on time. Or some think they can skip class and hand in a few assignments and still pass.
Majors Courses:

- Basic physics and chemistry of how/why energy is important for all biochemical reactions (molecules move in water at a faster rate when hotter, etc.).
- Basic biology of what is a cell.
- Basic taxonomy that different animals have different scientific names.
- Students who take anatomy and physiology are interested in a future career in the health fields. They will need the following sets of soft skills: social skills, communication skills, attention to details, and etc.

Faculty have higher expectations of students who want to go into a specific major or field

College-ready subjects/topics UH faculty felt were necessary for DOE students to enter their class with firm knowledge and retention of from their high school courses.
As educators, we know we need to make sure they acquire and develop the knowledge, skills, and behaviors that will not only strengthen our workforce and economy but also strengthen their chances at succeeding and surviving in their personal and professional lives.

However, we do need **practical strategies** that will help us educators provide teaching and learning experiences that support postsecondary readiness.
Teacher readiness

- Openness to embrace multiple perspectives.
- Intrinsic motivation to learn and share the joy of learning by passing it on to others via teaching.
- An mind ready to engage with the learning material in new ways and a thirst for self-discovery.
- Willingness to go the extra mile to maximize learning.
- Ability to transcend obstacles and barriers in the pursuit of excellence.
- Preparedness to move out of the ‘comfort zone’ by taking untrodden paths of teaching to facilitate learning.
We need to look at science as it relates to everything in our world, but also how it is used practically to explore and understand the world.

We need students become engaged listeners, to reason, to meaningfully externalize their thinking, and become productive members of society.

As teachers, we have a huge responsibility to help guide and develop the next generation of scientists, engineers, mathematicians, computer scientists, nurses, doctors, and more....
Central to understanding how to improve achievement for all students is to understand how to build bridges between the prior knowledge students bring to the classroom and the conventionally framed mathematics and scientific knowledge and processes they encounter in formal education.
Ethnomathematics = 
*EthnoS.T.E.M*

- Integrating **cultural and place-based knowledge, prior experiences, and diverse teaching styles** makes learning more appropriate and effective, and **empowers students intellectually, socially, emotionally, and politically**
Learning is a two-way street...

- College faculty are primarily taught to become content experts
- D.O.E. teachers are primarily taught to become teaching experts
- We can only build bridges for our students to cross if we work together
- Please leave a note with ideas for how college faculty can better work with DOE teachers! What is needed?
“We are providing our students with the skills to be independent thinkers, so that they can analyze data and make judgments that are data-driven, with the ability to re-think and incorporate new findings. We want them to have empathy for their fellow students and for nature. We want them to be grand arbiters of future decisions. We want them to be engaged contributors to their communities.”

- Brian Yamamoto, KauaiCC
Thank you!

Questions?

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