



How is ecology being taught to undergraduates in the US?

Early results from the ESA's Teaching of Undergraduate Ecology Survey

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Why did we do the study?

Purposes of the Teaching Undergraduate Ecology Survey (TUES) study addressed in this paper:

1. To determine how ecology is being taught across a diversity of undergraduate courses and institutions in the US.
2. To identify factors supporting and constraining emphasis on different dimensions of ecology teaching.
3. To provide a baseline for determining change as people learn about and adopt the 4DEE framework.

Additional purpose to be addressed in a subsequent paper

4. To assess ecologists' familiarity with the 4DEE Framework, and the factors supporting and limiting its adoption.

What did we ask about in the survey?

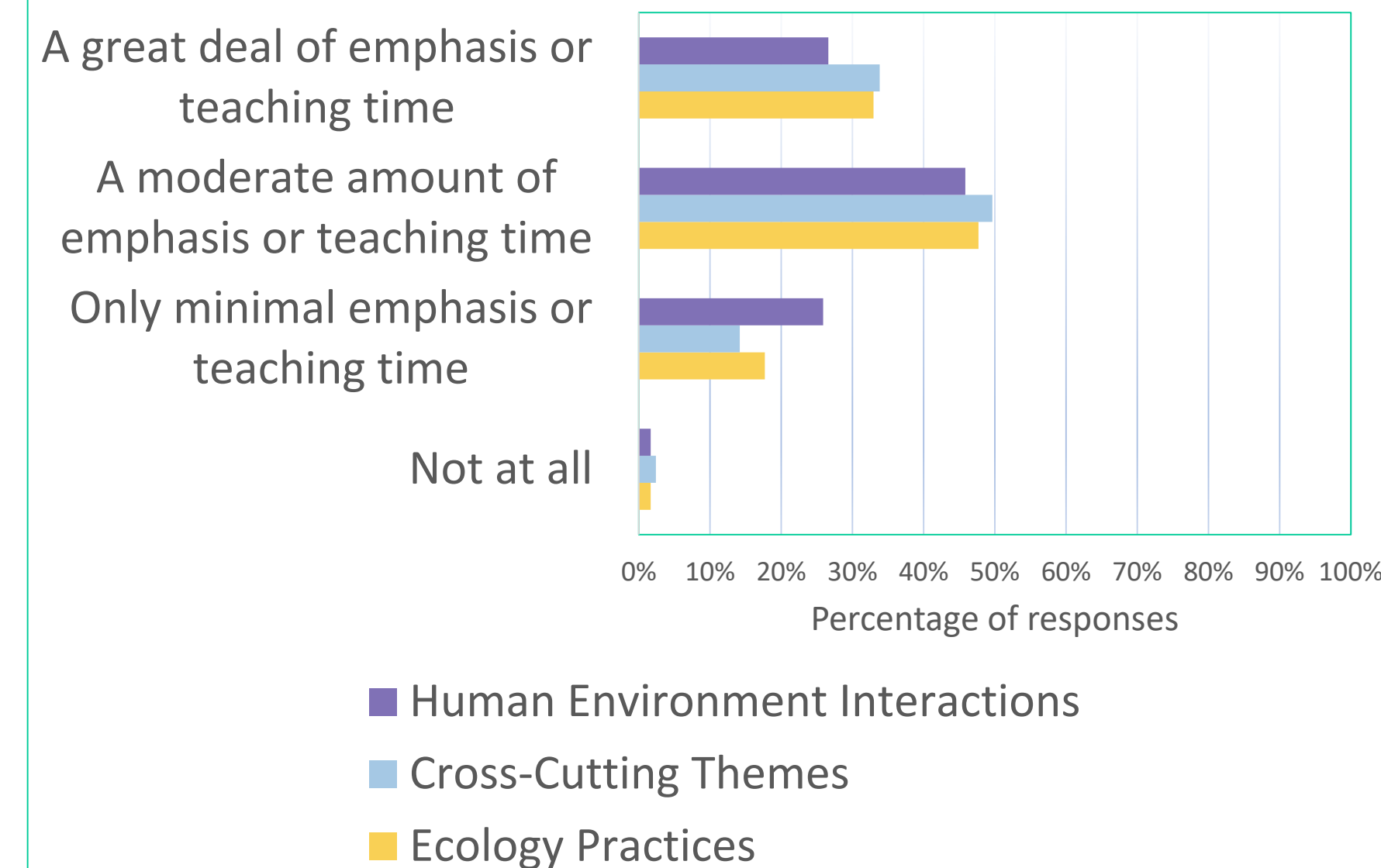
- Part I - Ecology teaching: describe your teaching in a recent course where you teach the most ecology
- Part II - Awareness and use of 4DEE Framework
- Respondent profile – demographics, professional status & experience
- Institutional and instructional context – Institution type, MSI status
- Profile of the course reported on in the survey

How is ecology being taught?

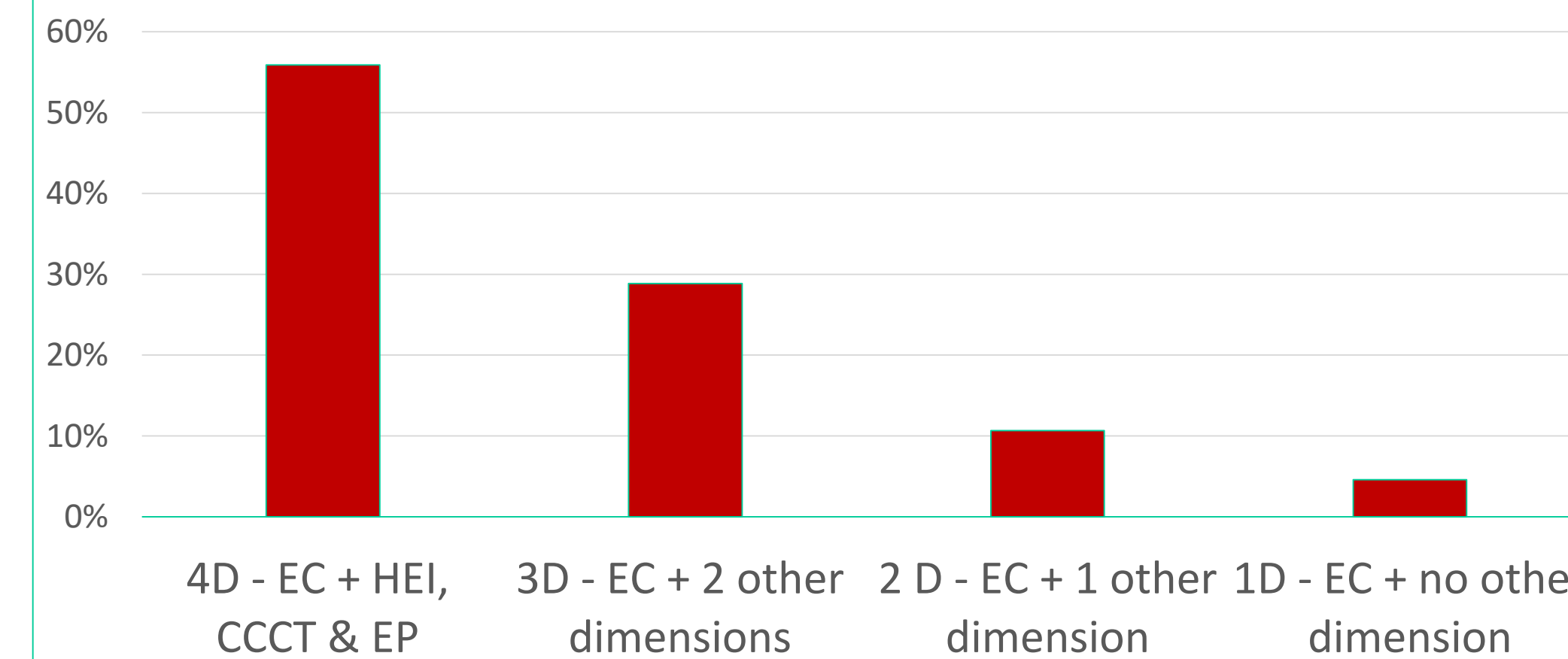
Which Core Ecology Concepts do you teach?

Core Ecology Concepts	%
Organisms	69%
Population	74%
Community	75%
Ecosystem	77%
Landscape	45%
Biomes	44%
Biosphere	41%
Other (please specify)	6%

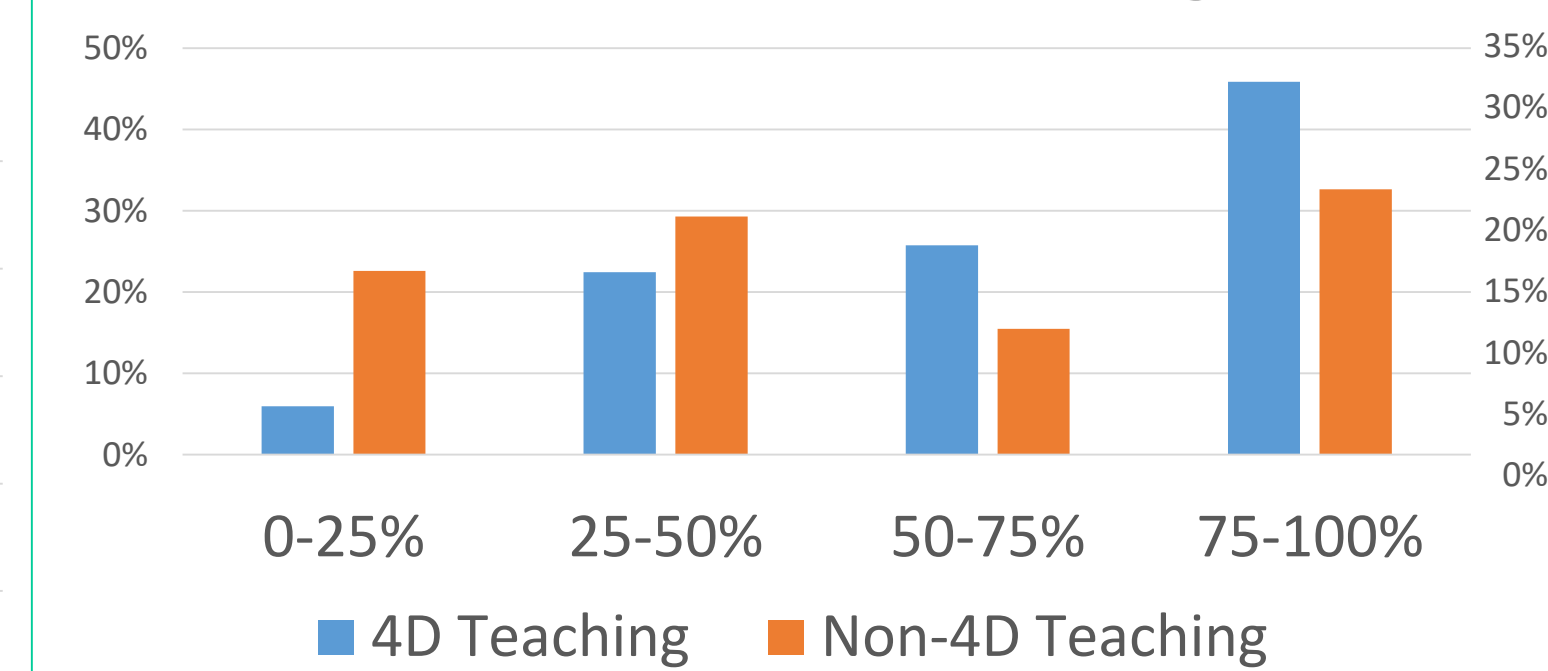
To what degree do you teach or engage students in each dimension?



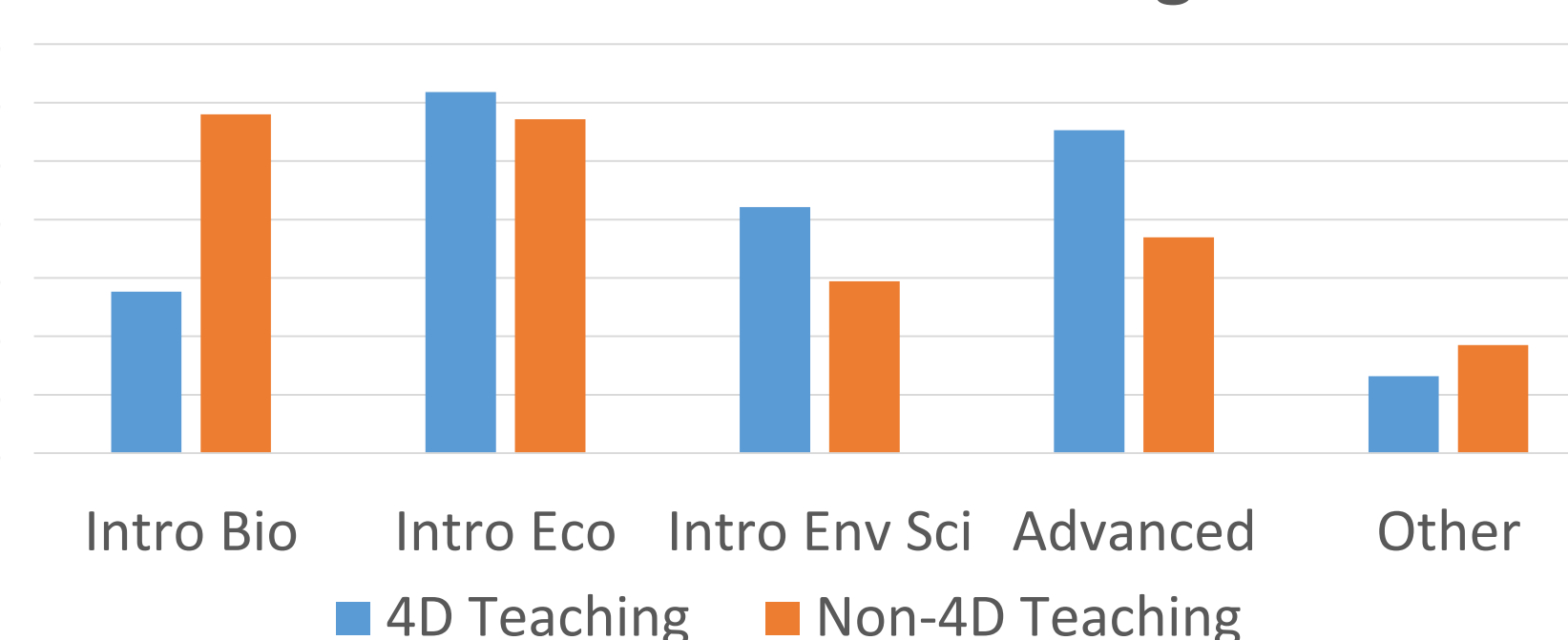
How many dimensions are taught a great deal or moderate amount?



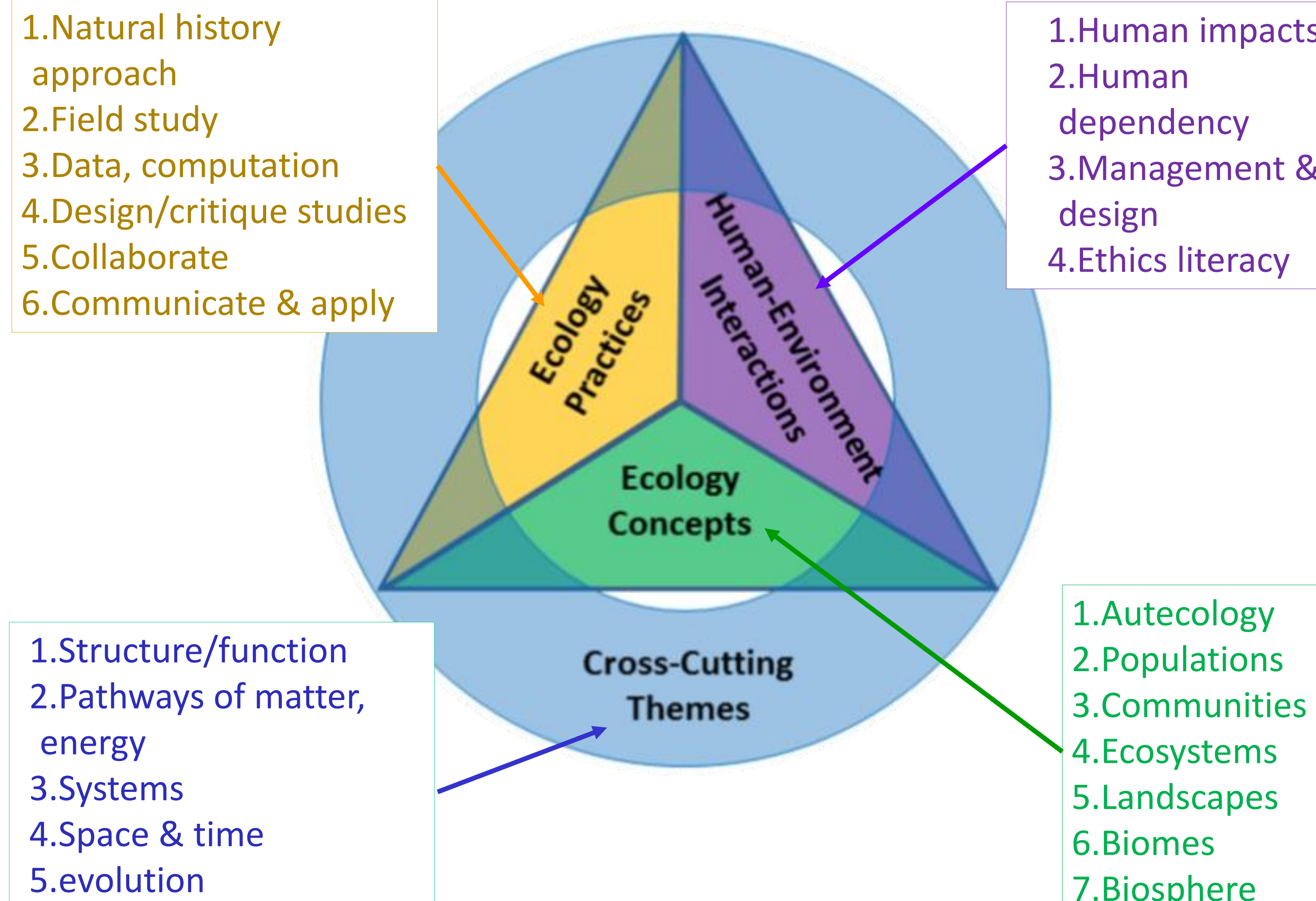
Ecology as % of Course 4D and Non-4D Teaching



Course Title 4D and Non-4D Teaching



Four Dimensional Ecology Education Framework (4DEE)



Who responded? (n=544)

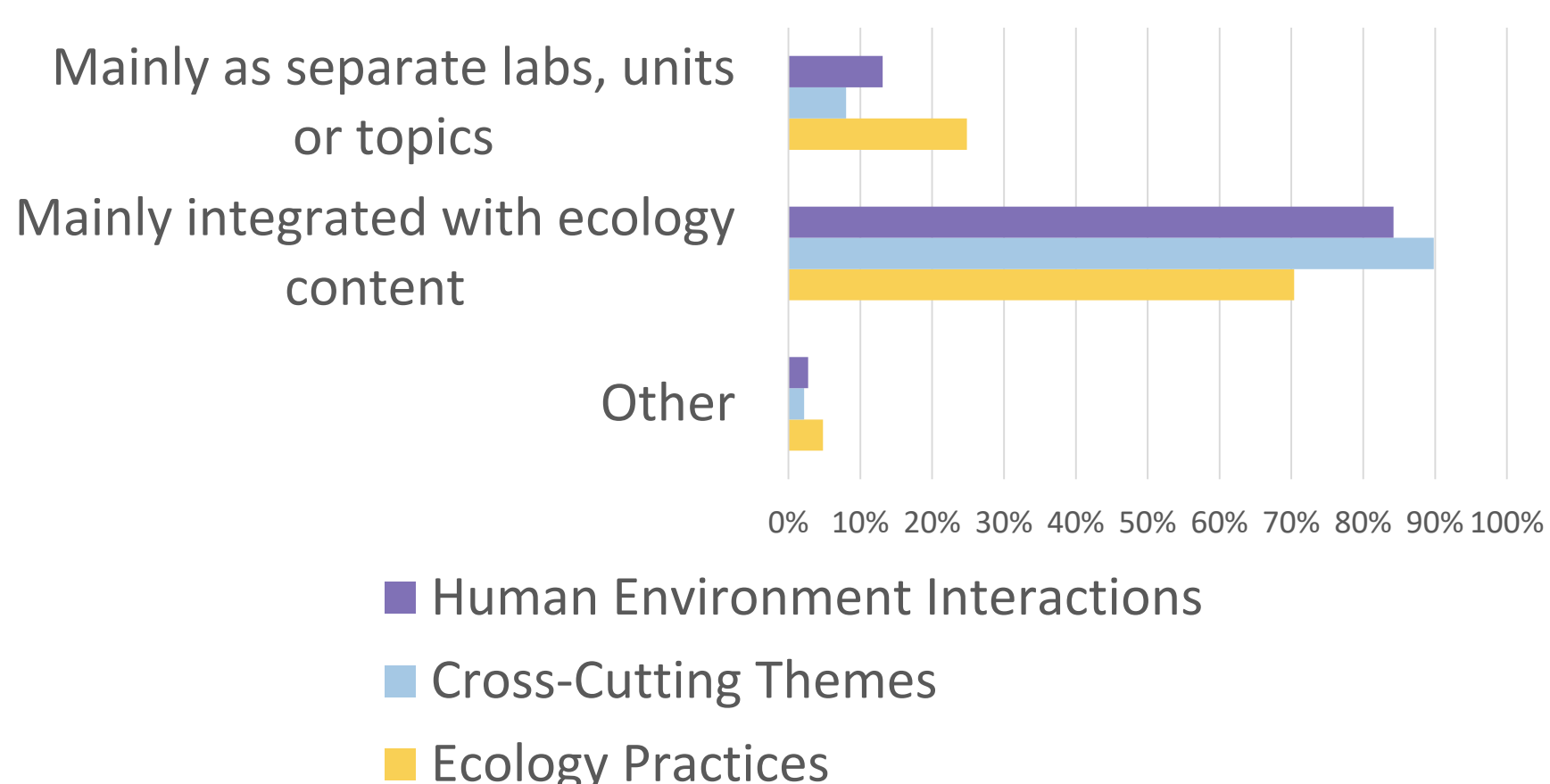
Position	64% tenured + retired	School - type	50% 4 yr w/ grad prgm
Highest degree	66% Ph.D.	School - MSI, etc.	34% MSI
Years teaching	14% < 4, 59% > 7	Gender	44% male, 50% female
ESA member?	44% current, 34% past	Race/Ethnicity	69% white, 22% URM

What courses did they report on?

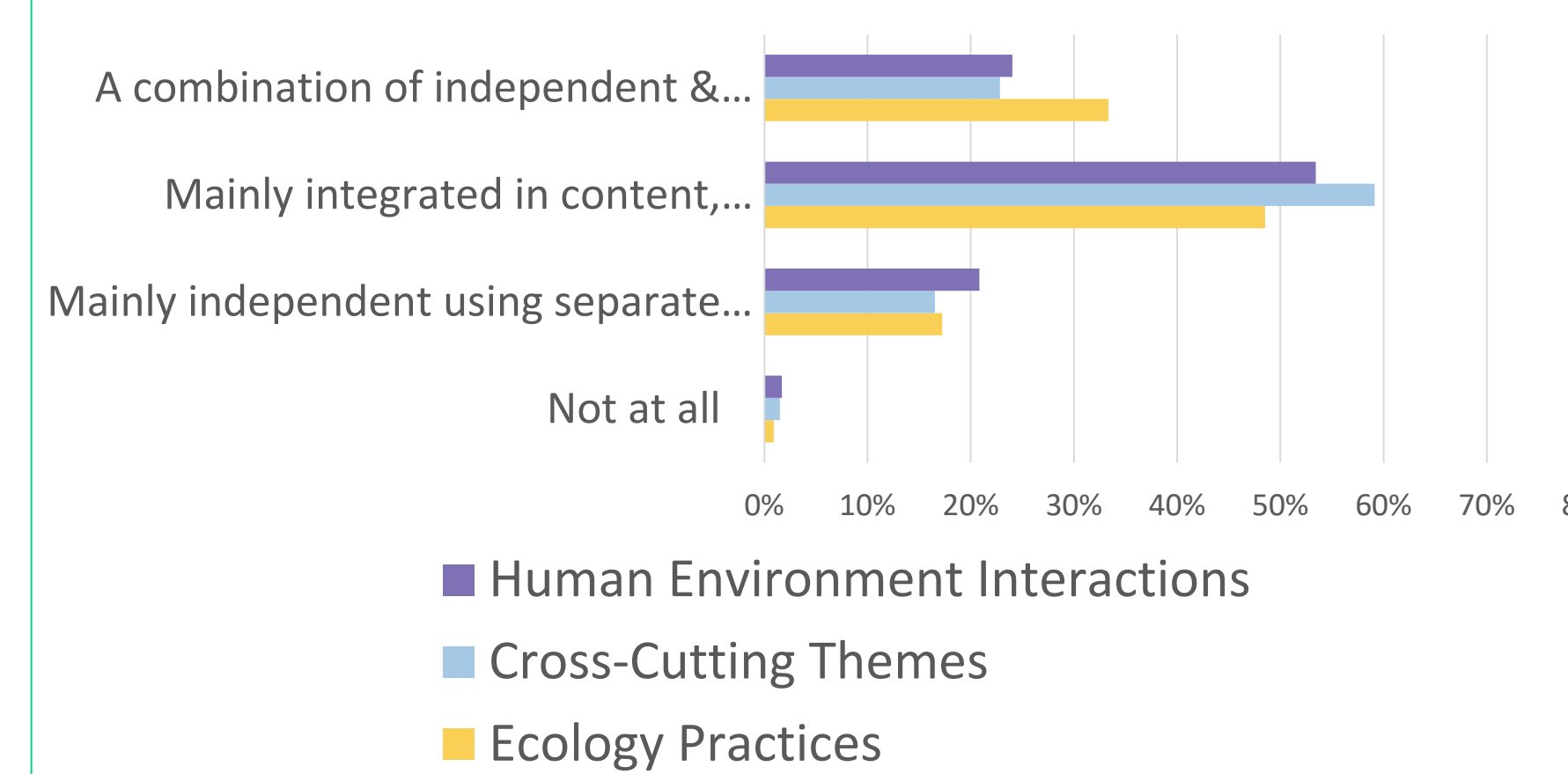
Course Title	%
Intro Bio	20
Intro Ecology	30
Intro Environ. Science	18
Advanced Bio, Eco, Env. Sci	24
Type of Course	
Integrated Lecture/lab	53
Lecture only	24
Lab only	18
Hours/week	
1	3
2	14
3	34
4	19
5	29

Ecology as % of course	
0-25%	13
25-50%	25
50-75%	21
75-100%	40
Student type	
Majors	45
Non-Majors	15
Mixed-Major	20
Mixed Major and Non-Majors	19
Student enrollment	
< 25	33
25-50	37
50-100	18
> 100	12

How do you approach teaching each dimension in your course?



How do you assess understanding of each dimension in your course?



Barriers preventing use of dimensions in courses (darker color indicates more frequent responses)

Barriers	Ecology Practices (n=109)	CC Themes (n=90)	Human-Env Int (n=150)
Not enough time in my course	51.4	42.2	50.0
Don't have the resources or facilities needed	34.9	27.8	14.7
Dimension not supported by the course textbook	24.8	42.2	26.7
Dimension not necessary/ as important for my students to learn	21.1	18.9	14.7
I don't have the expertise	15.6	16.7	16.0
Other	15.6	12.2	22.7
No time to prepare	14.7	13.3	17.3
None of above/prefer not to respond	0.0	0.0	2.7

What have we learned?

- Ecology is being taught in a wide diversity of courses and contexts, by faculty in a diversity of institutions, many not currently ESA members.
- More than half (55%) reported multi-dimensional (4D) teaching: giving all three dimensions beyond Ecology Concepts 'moderate' or 'a great deal of emphasis'
- The Human/Environment Interactions dimension was emphasized slightly less than the Ecology Practices and Cross-Cutting Concepts dimensions.
- The four traditional Core Ecology Concepts – organisms, populations, communities and ecosystems – are taught by 2/3 to over 3/4 of respondents.
- Multi-dimensional (4D) teaching is more common where ecology is a higher percentage of the course, and less common in Introductory Biology courses.
- Those indicating emphasizing a dimension 'not at all' or 'only minimal' reported **course time** as the most significant barrier, followed by **resources** and **textbooks**.

What's next?

- Triangulate the self-reported results with syllabi, student surveys. Repeat study.
- Engage 4D teachers in efforts to broaden and deepen integrated, multi-dimensional ecology teaching. Develop resources.

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