Learning styles and personality types of Computer Science students at a South African university

Vashti Galpin, Ian Sanders and Pei-yu Chen
School of Computer Science
University of the Witwatersrand

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Outline

Motivation

Learning Styles

Personality Types

Results

Teaching

Conclusion

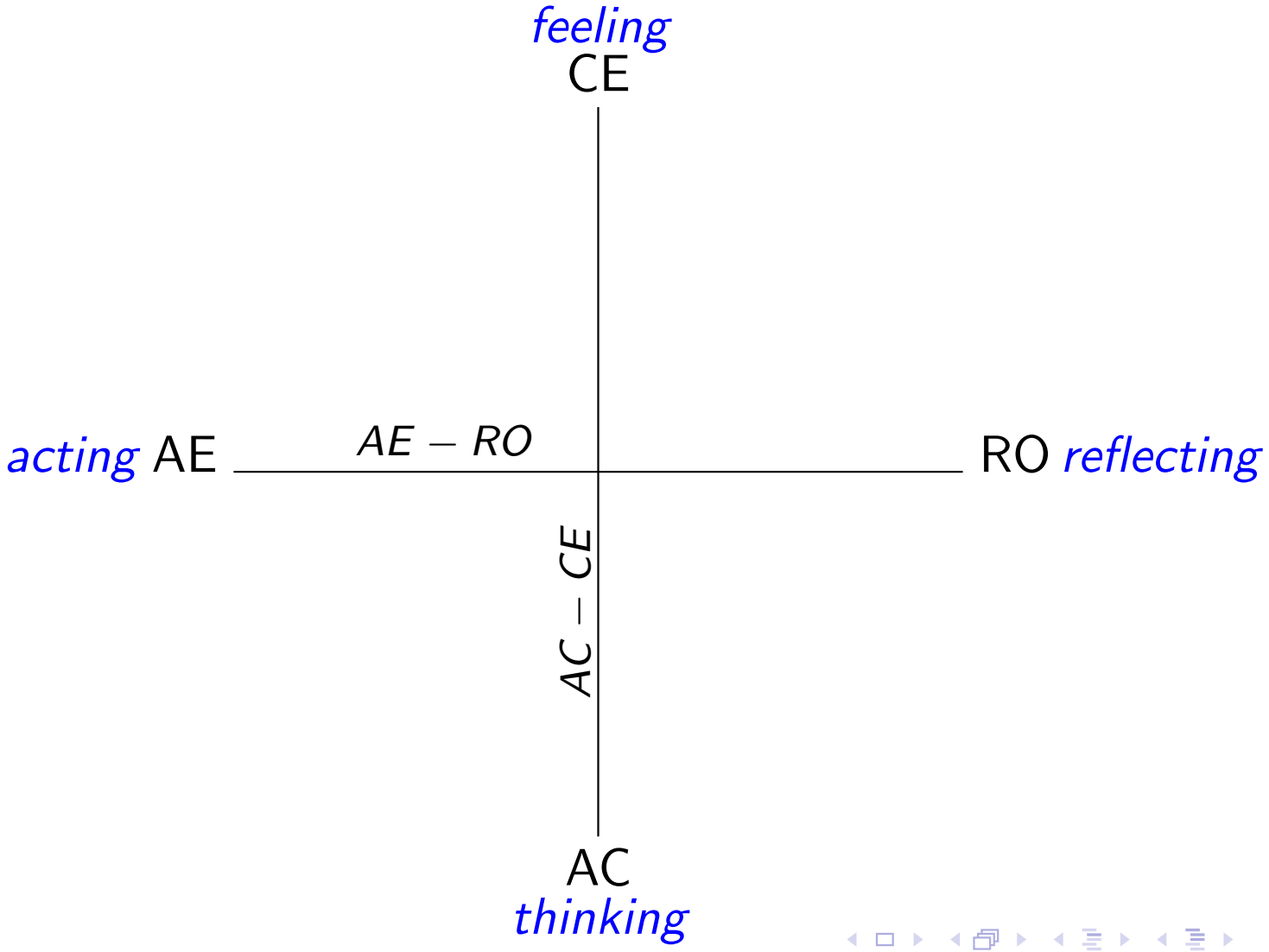
Motivation

- students have different
  - learning styles
  - personality types
- questions
  - how do they learn?
  - how do we teach?
  - which students enter?
  - which students persist?
- research
  - all three years of undergraduate study
  - about 45% response rate

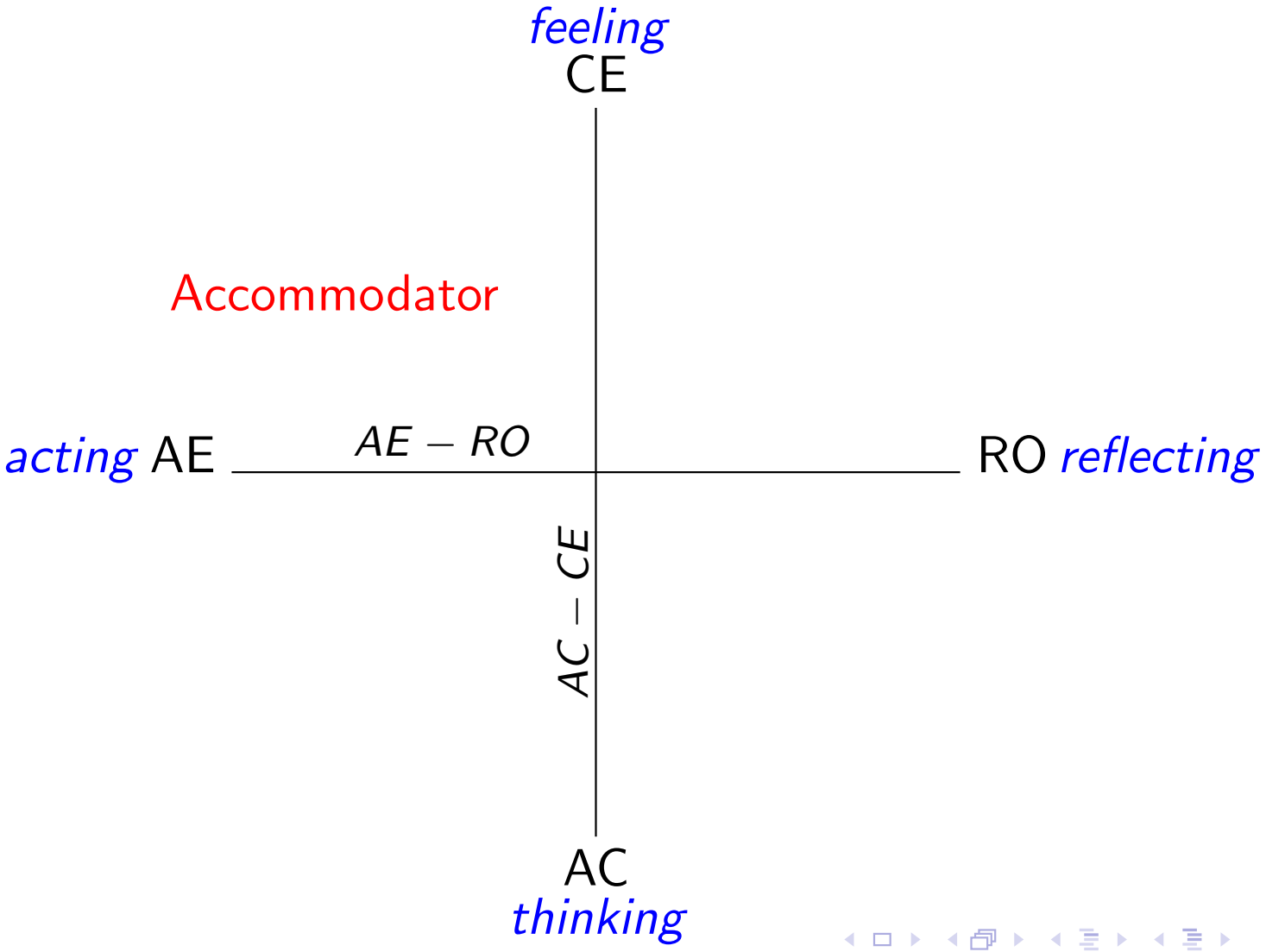
Learning styles

- Kolb [1984]
- two dimensions
- thinking versus feeling
  - abstract conceptualization (AC): using concepts to understand
  - concrete experience (CE): feeling, current situation
- reflecting versus acting
  - reflective observation (RO): watching, different points of view
  - active experimentation (AE): acting, pragmatic focus
- four learning styles
- nine learning styles

Four learning styles



Four learning styles



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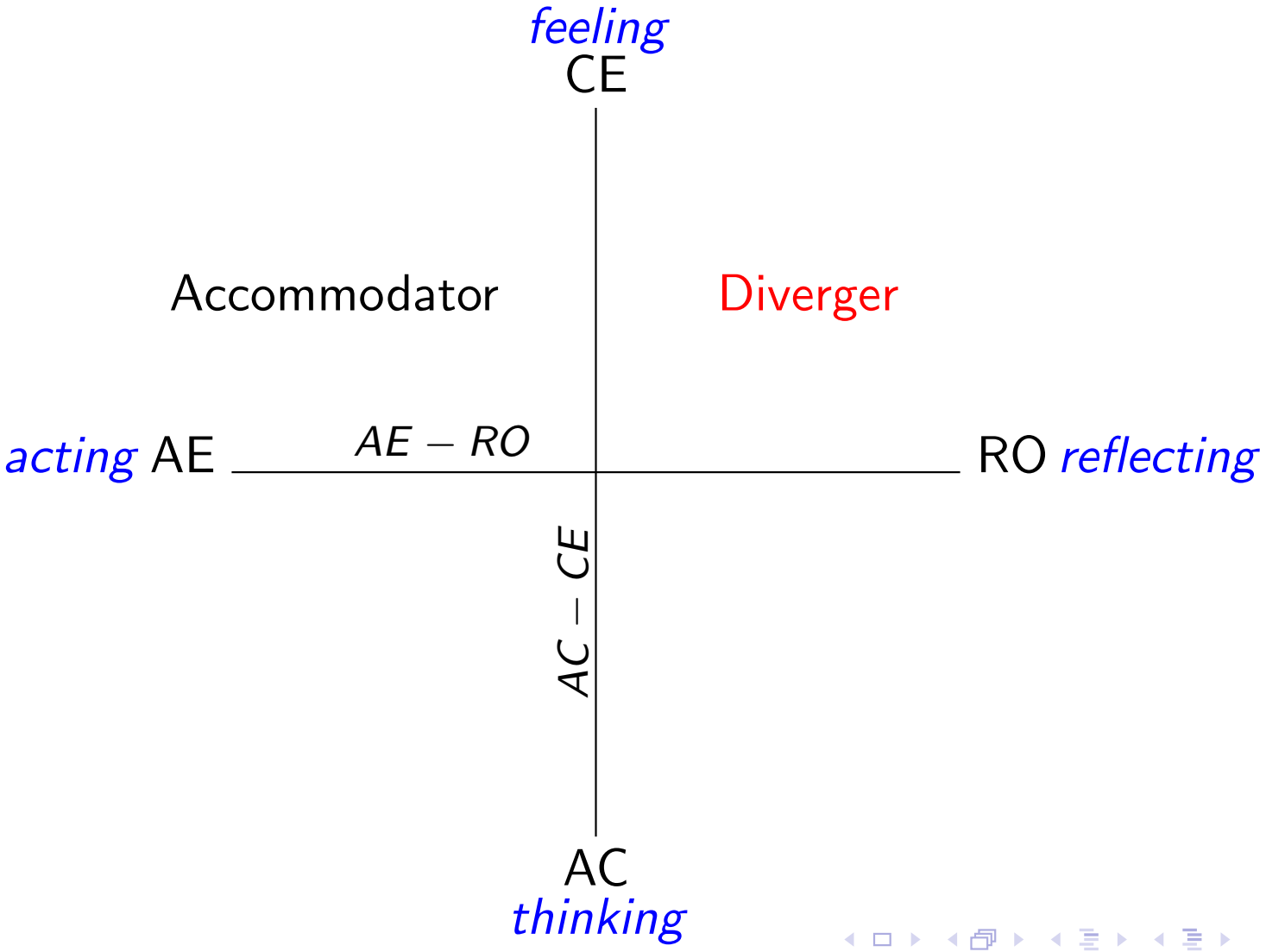

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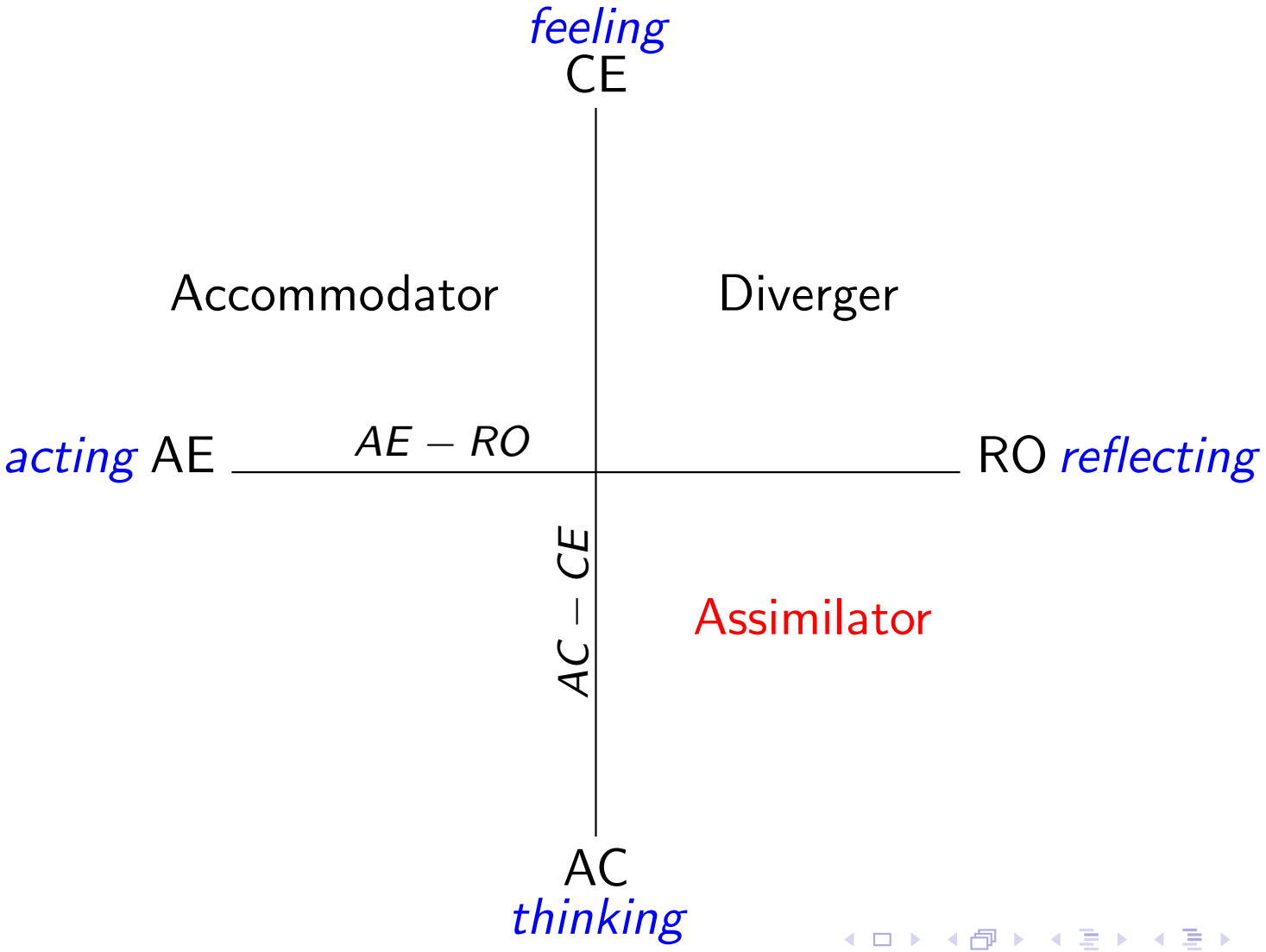

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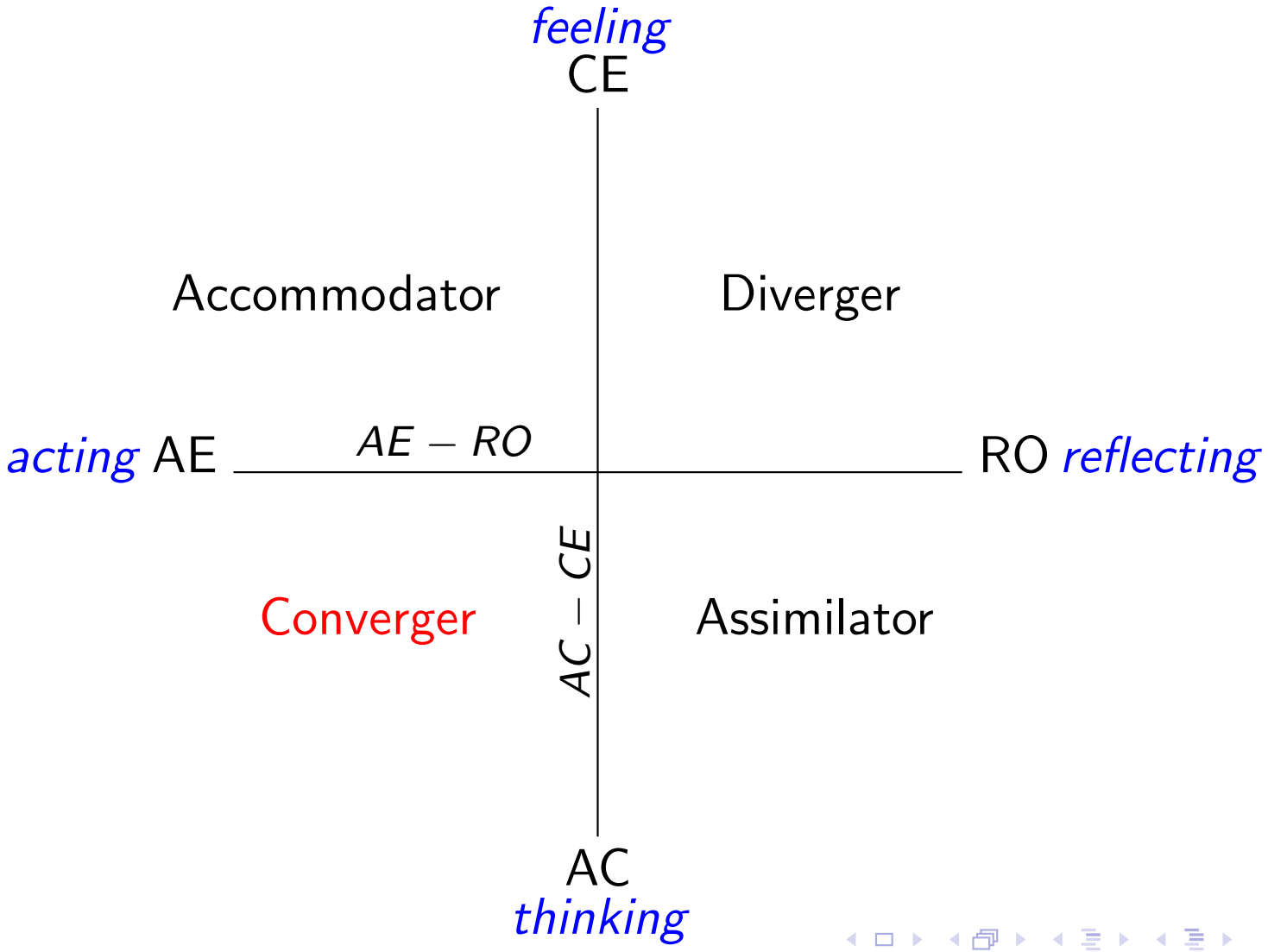

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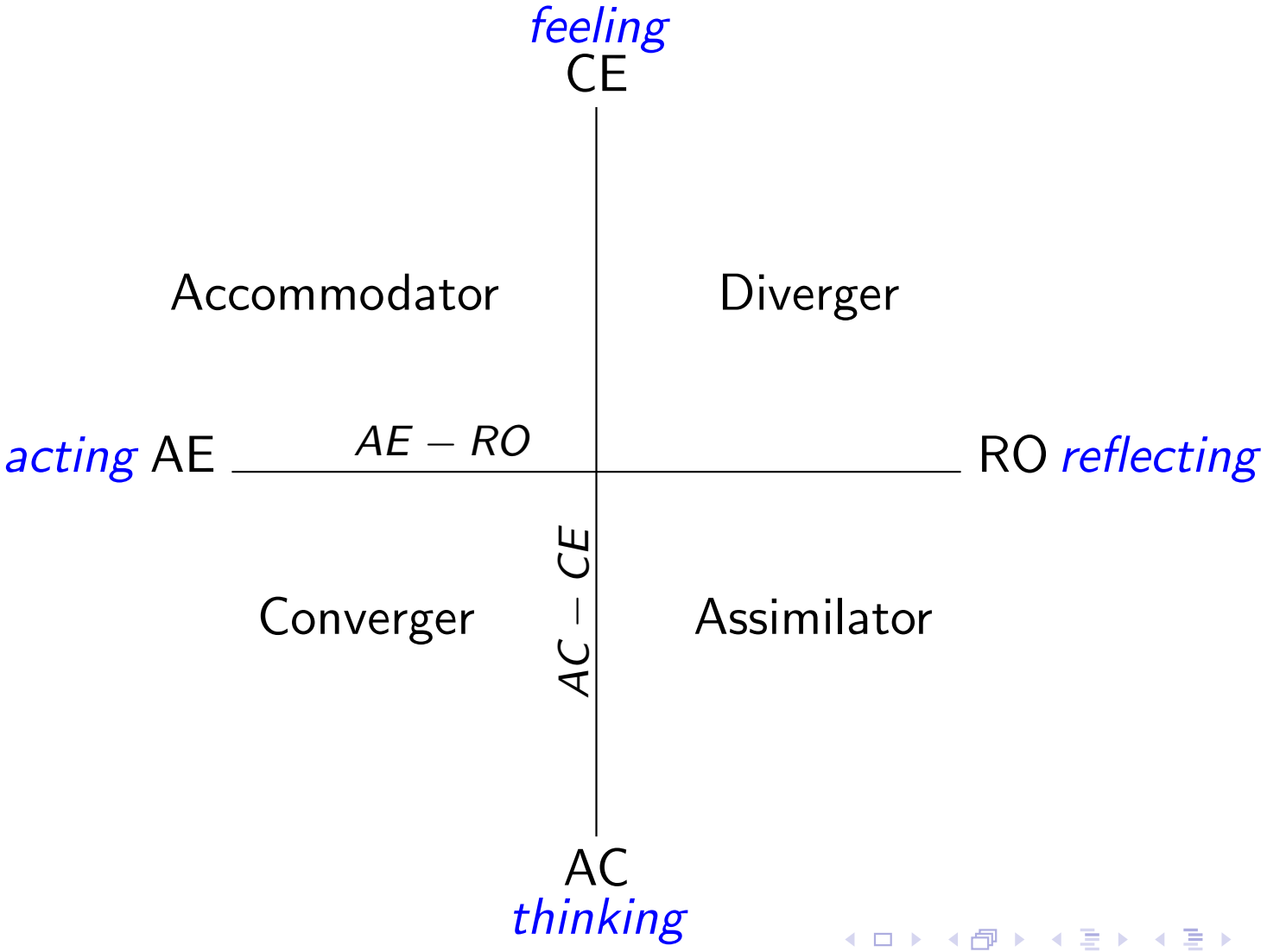

Nine learning styles

CE

NW *feeling* *acting* Accommodating	N *feeling* *acting reflecting* Northerner	NE *feeling* *reflecting* Diverging
W *feeling thinking* *acting* Westerner	C *feeling thinking* *acting reflecting* Balancing	E *feeling thinking* *reflecting* Easterner
SW *thinking* *acting* Converging	S *thinking* *acting reflecting* Southerner	SE *thinking* *reflecting* Assimilating

AE RO

AC

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AC

Prior research

- mostly abstract learners, so Convergers and Assimilators [Byrne and Lyons 2001, Wu *et al* 1998]
- prior research about first years at Wits contradictory
  - Convergers and Assimilators, so abstract learners [Min 2004]
  - using Felder-Silverman Learning Style Model, more concrete [Wedderburn 2005]
- CS classified as abstract, and slightly more active than reflective, hence Converger [Kolb 1984]

Personality Types

- Myers-Briggs [1993], Keirsey [1984]
- four dimensions
  - Extraversion versus Introversion: outward or inward focussed
  - Thinking versus Feeling: logical versus emotions
  - Sensing versus iNtuition: experience versus possibilities
  - Judging versus Perceiving: planning versus flexibility
- S/N and T/F affect career preferences
- Keirsey temperaments
  - SP: working with machines
  - SJ: managing and organising
  - NF: working with people
  - NT: interested in organic and mechanical complexity

Prior research

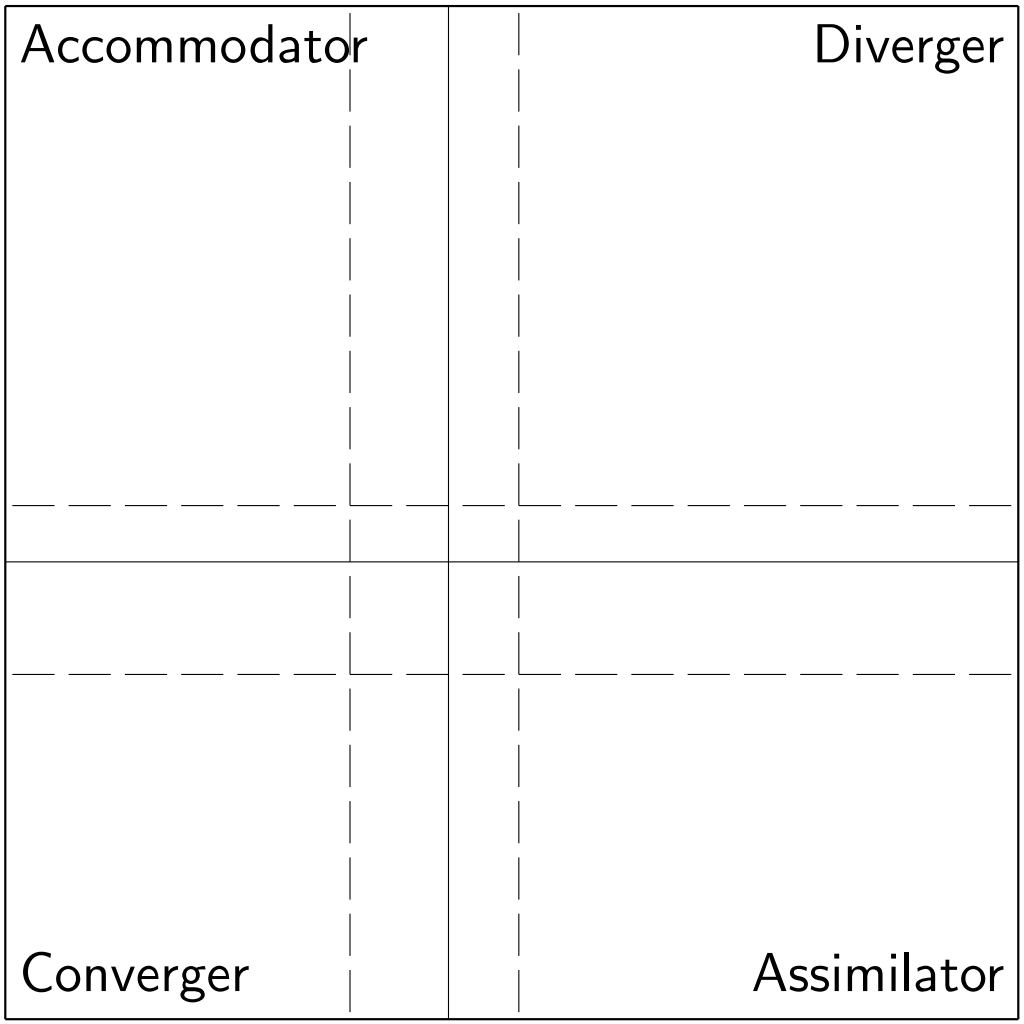
- computer professionals: ISTJ, INTJ, ESTJ, ENTJ [Teague 1998]
- computer security professionals: INTJ [Gates and Whelan 2005]
- software engineers: ISTJ, ESTJ [Capretz 2003]
- IS students at UCT: ESTJ [Eccles 2004]
- career preferences: ST and NT
- Keirsey temperaments: SJ and NT

Personality types of Wits CS students

- majority are Convergers and Assimilators
- no significant difference for 4 styles by year of study
- significant difference for 9 styles by year of study
  - strong increase in number in Southern category
  - decrease in number in SW and SE categories
  - implication: students become more balanced in terms of active and reflective learning as they progress

Learning styles of Wits CS students

1st year
2nd year
3rd year



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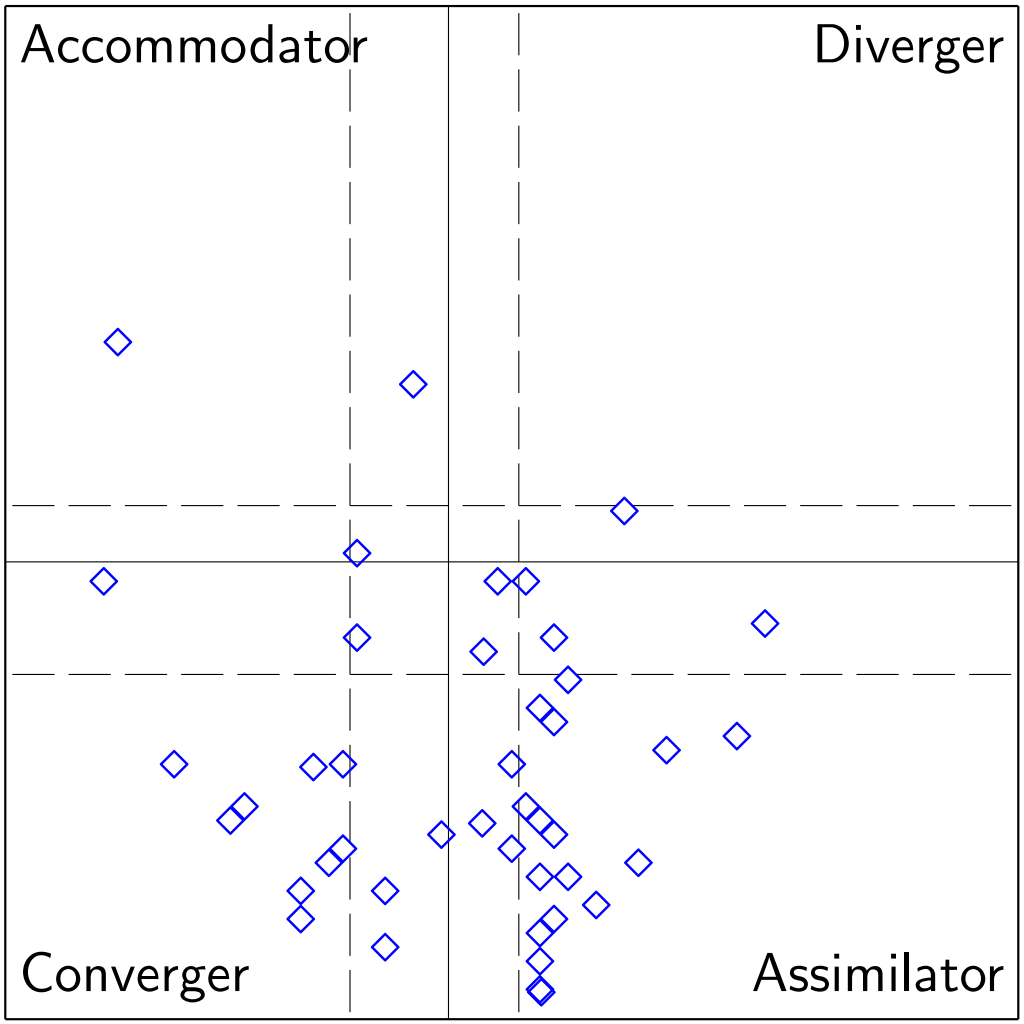

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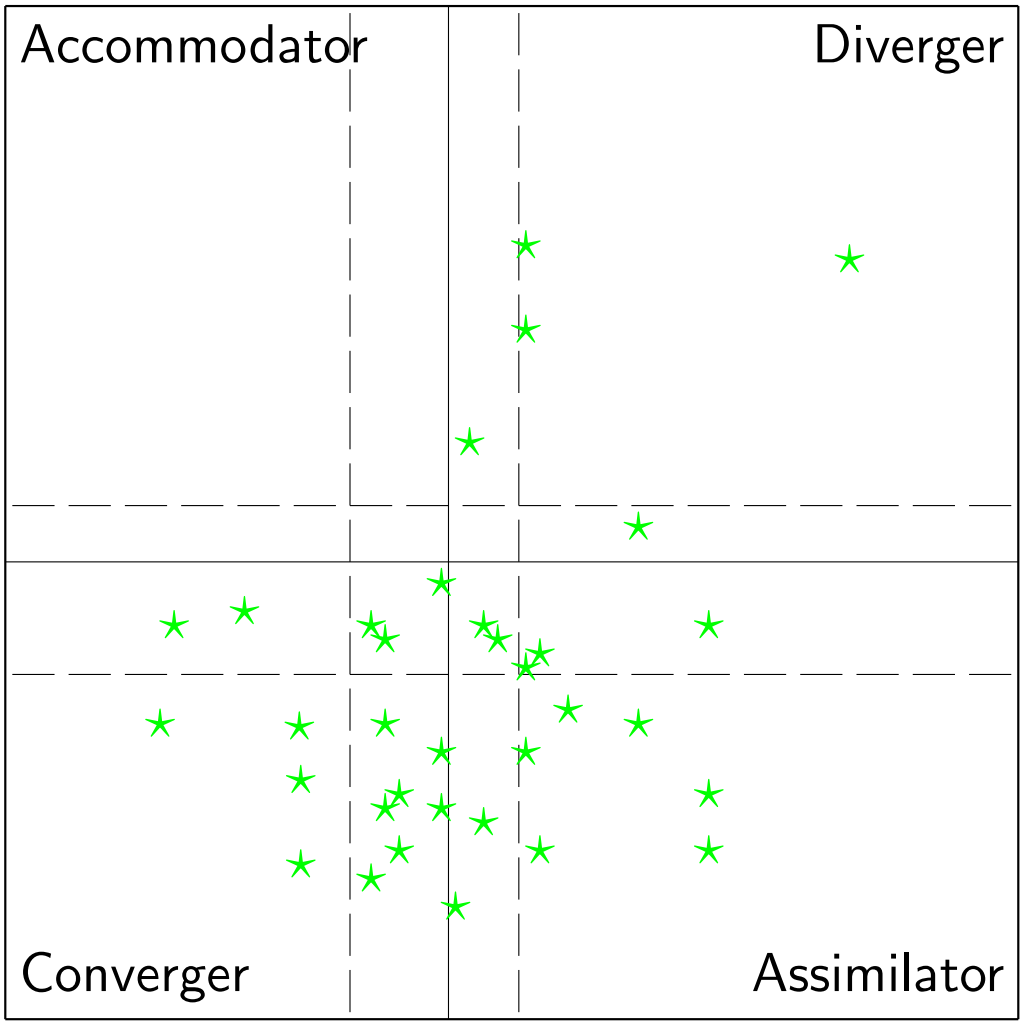

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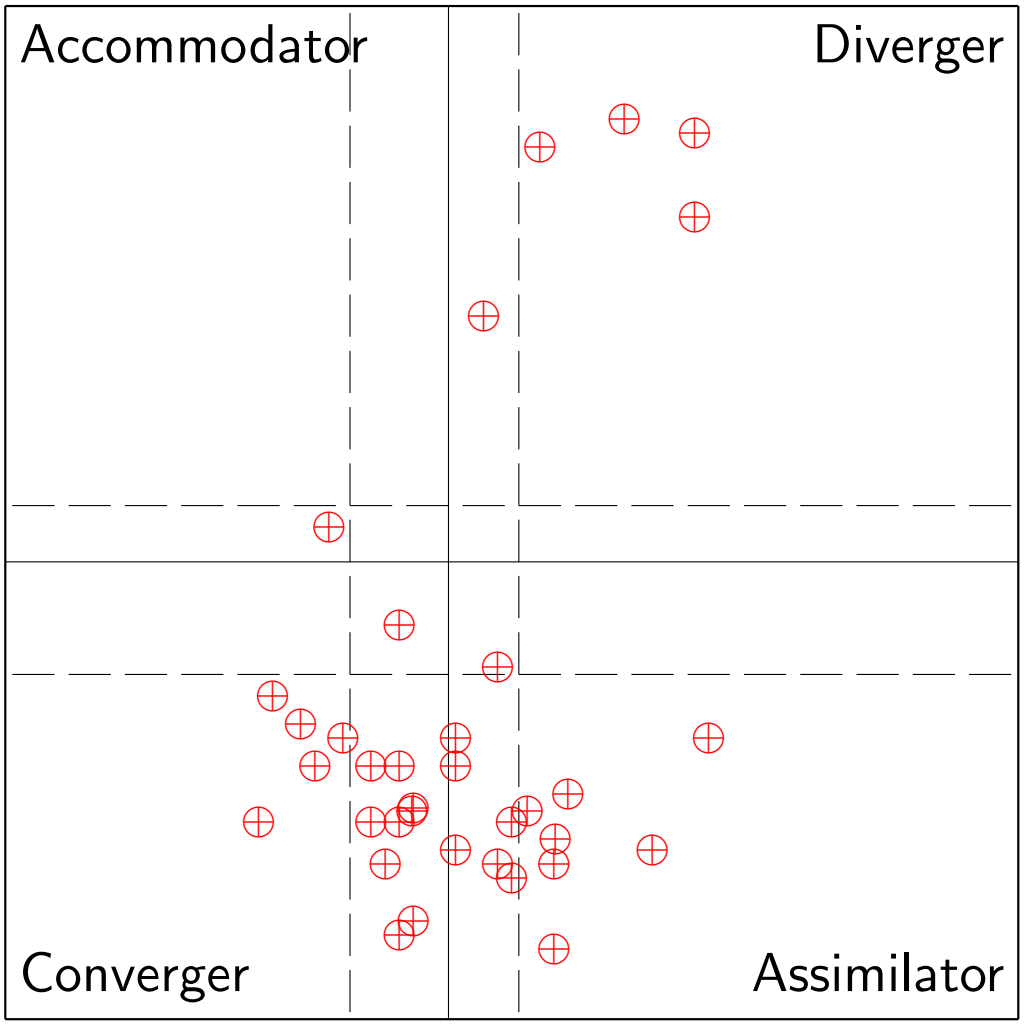

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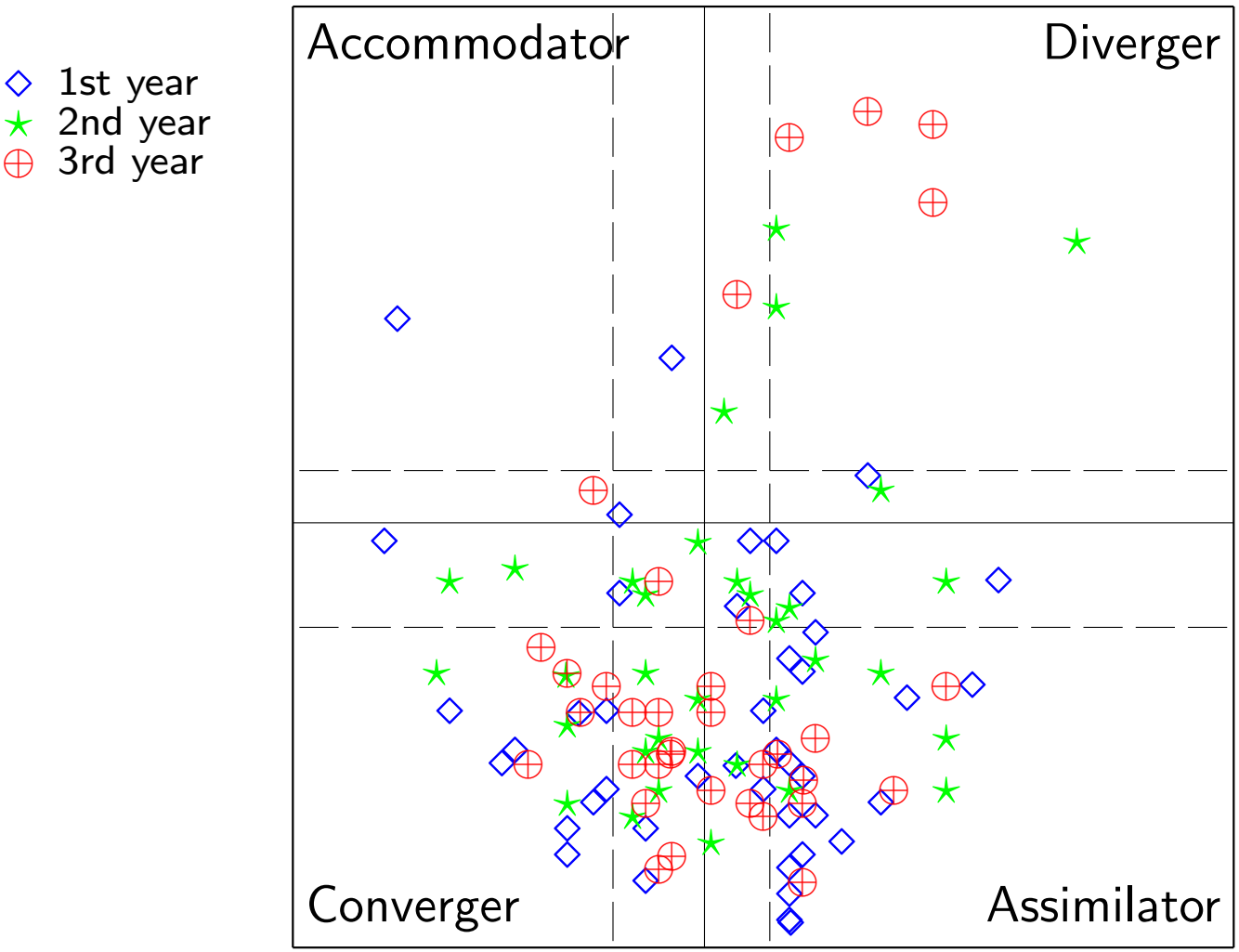

Personality types of Wits CS students

- majority are ISTJ, ISFJ, ESTJ and ESFJ
- career preferences: ST (42%) and SF (29%)
  - differs from expected results: ST and NT
- Keirsey temperament: SJ (63%)
  - organisation and management rather than complexity (NT)
- no significant difference by year of study

Personality types of Wits CS students

ISTJ	17.7	ISFJ	12.9	INFJ	1.2	INTJ	4.7
1st	9.8	1st	7.3	1st	0.0	1st	7.3
2nd	27.0	2nd	15.4	2nd	3.9	2nd	0.0
3rd	22.2	3rd	22.2	3rd	0.0	3rd	5.6
ISTP	1.2	ISFP	2.4	INFP	2.4	INTP	4.7
1st	2.4	1st	4.9	1st	2.4	1st	2.4
2nd	0.0	2nd	0.0	2nd	3.9	2nd	3.9
3rd	0.0	3rd	0.0	3rd	0.0	3rd	11.1
ESTP	4.7	ESFP	3.5	ENFP	4.7	ENTP	3.5
1st	7.3	1st	2.4	1st	7.3	1st	4.9
2nd	3.9	2nd	3.9	2nd	3.9	2nd	0.0
3rd	0.0	3rd	5.6	3rd	0.0	3rd	5.6
ESTJ	18.8	ESFJ	8.4	ENFJ	5.9	ENTJ	2.4
1st	24.4	1st	4.9	1st	9.8	1st	2.4
2nd	11.5	2nd	15.4	2nd	3.9	2nd	3.9
3rd	16.7	3rd	11.1	3rd	0.0	3rd	0.0

Our teaching

- lectures: large groups
  - use role play, think breaks, talk to your neighbour
  - try to cater for verbal and visual learners
  - most suited for reflective learners
- tutorials: small groups
  - structured at first year level, less so later
  - group work
  - suitable for active learners
- laboratories: some group work
  - structured at first year level, less so later
  - suitable for active learners

Conclusion

- future work
  - longitudinal study
  - more reflection on teaching practices
- learning style results
  - mostly abstract learners
  - change to a more balanced style of learning on the active/reflective dimension
- personality type results
  - ISTJ, ISFJ, ESTJ, ESFJ
  - no significant difference between years of study