Natural Language Process and Learning Analytics to Close Equity Gaps

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UTA Land Acknowledgment

- We are all joining in this conference from lands that have been stewarded by indigenous people.

- Please take a moment to name them with honor in a very specific way. For URA, we are sitting on lands that were stolen from the Caddo in 1841 when over 200 of their homes were burned by those colonizing the area.

- Over the next 18 years, surviving members of the Delaware, Chickasaw, Waco, Tawakani, Keechi, Caddo, Anadahkah, Ionie, Biloxi, and Cherokee were pushed into Western Oklahoma.

- Today, descendants have returned to this land to remind us to honor the land on which we live and work;

  - to be wise stewards of the land; and
  - to carry the wisdom of our ancestors within us.
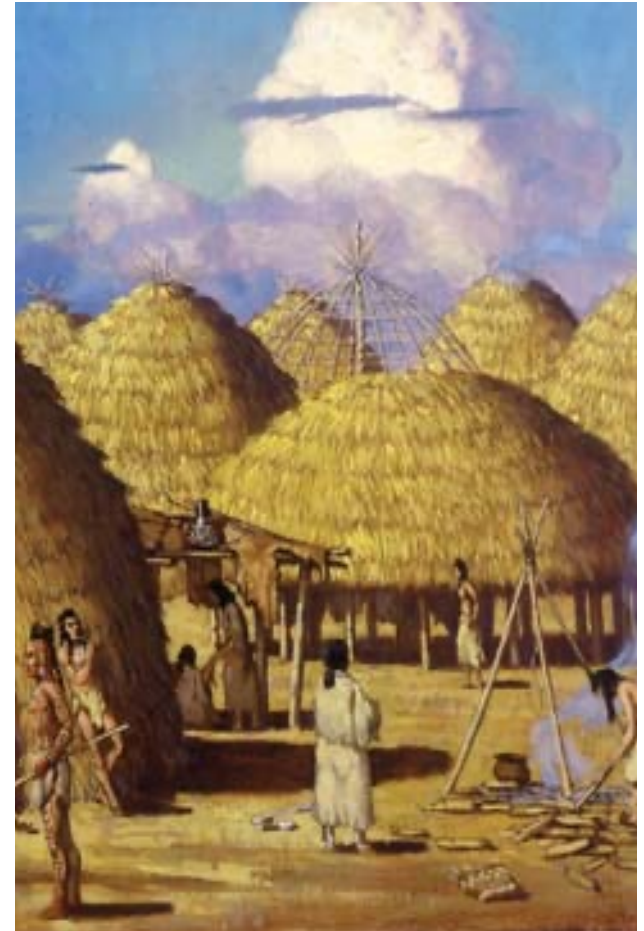
SDSU Land Acknowledgement

SDSU stands upon a land that carries the footsteps of millennia of Kumeyaay people. They are a people whose traditional lifeways intertwine with a worldview of earth and sky in a community of living beings. This land is part of a relationship that has nourished, healed, protected and embraced the Kumeyaay people to the present day. It is part of a world view founded in the harmony of the cycles of the sky and balance in the forces of life. For the Kumeyaay, red and black represent the balance of those forces that provide for harmony within our bodies as well as the world around us.

The students, faculty, staff and alumni of San Diego State University acknowledge this legacy from the Kumeyaay. We promote this balance in life as we pursue our goals of knowledge and understanding. We find inspiration in the Kumeyaay spirit to open our minds and hearts. It is the legacy of the red and black. It is the land of the Kumeyaay.

Eyay e'Hunn My heart is good.

(nativelikewater.org)

Thank you to the Whole Team

From University of Texas Arlington

Marilee Bresciani Ludvik

Kimshi Hickman

Catherine Robert

Amanda Olsen

Nasima Subedi

Haein Won

Pete Smith

Elizabeth Powers

Henry Anderson

Farhan Fahim

Ashley Purgason

Denisse Avila

Mitch Strahlman

Danielle Klein

From SDSU:

Stephen Schellenberg

Sandra Kahn

Nina Potter

Rey Monzon (In Memoriam)

Maureen Guarcello

Randy Timm

Lisa Gates

From UT Health Sciences Center:

Shiming Zhang

Overview of the Context and Purpose
Methodology
Findings
Questions and Reflection

Mini-Content
Reflection
Interactive Sharing
Resources

O V E R V I E W

Bresciani Ludvik, MS

What do you need to learn from this session?

"We do not learn from experience, we learn from reflecting on experience."
— John Dewey

THEORETICAL CONTEXT SETTING: NEURODIVERSITY

Learning and Development are inextricably intertwined

Student Learning Imperative, 1996

(aka – emotions play a role in the storage and recall of information)

The question is how do we meaningfully identify, measure, and then integrate students' emotional valence into our institutional decision-making?
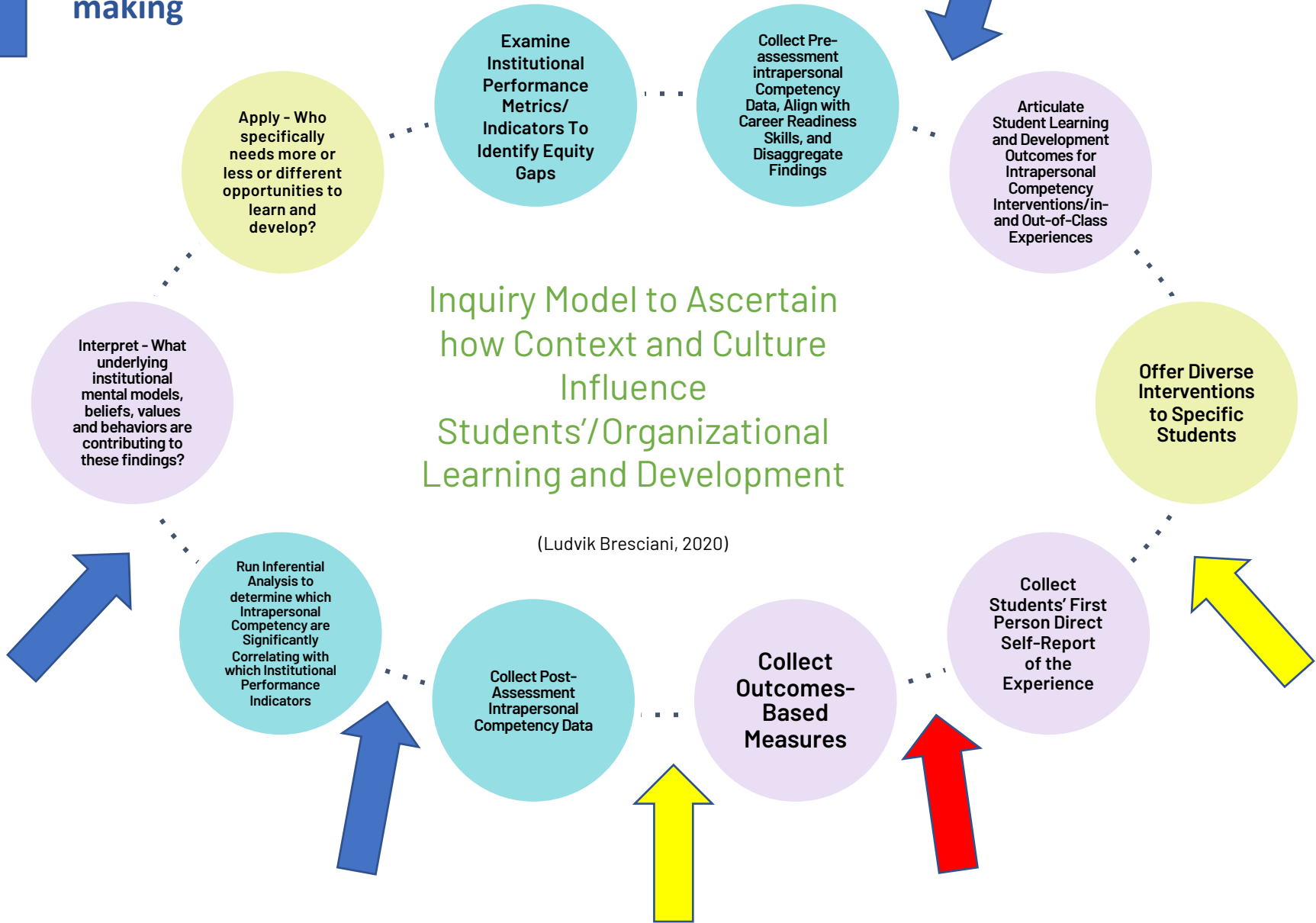
https://competencycultivation.uta.edu/
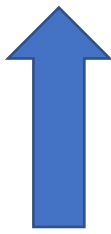
= Intended integration of first-person voice in evidence-based decision making

Inquiry Model to Ascertain how Context and Culture Influence Students'/Organizational Learning and Development

(Ludvik Bresciani, 2020)

Examine Institutional Performance Metrics/ Indicators To Identify Equity Gaps

Collect Pre-assessment intrapersonal Competency Data, Align with Career Readiness Skills, and Disaggregate Findings

Apply – Who specifically needs more or less or different opportunities to learn and develop?

Articulate Student Learning and Development Outcomes for Intrapersonal Competency Interventions/in- and Out-of-Class Experiences

Interpret – What underlying institutional mental models, beliefs, values and behaviors are contributing to these findings?

Offer Diverse Interventions to Specific Students

Run Inferential Analysis to determine which Intrapersonal Competency are Significantly Correlating with which Institutional Performance Indicators

Collect Students' First Person Direct Self-Report of the Experience

Collect Post-Assessment Intrapersonal Competency Data
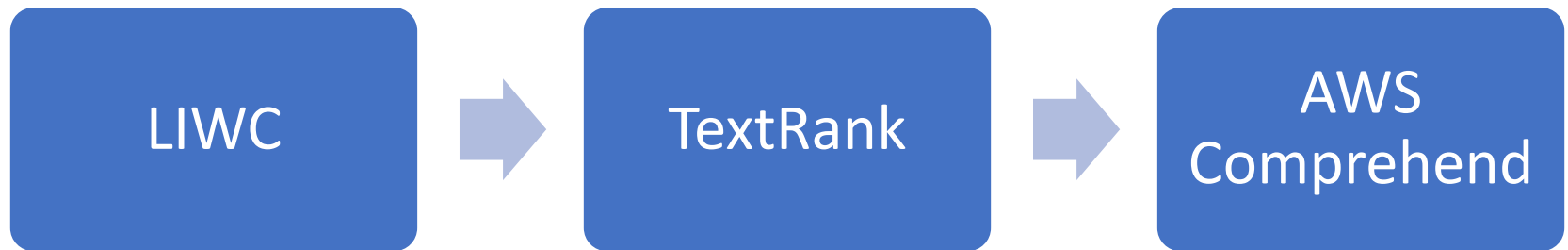
Collect Outcomes-Based Measures

Purpose: Can we quickly analyze first-person narrative to inform student success practitioner-based decisions that close equity gaps within the term that data is collected?

Methodology Overview

Comparing Decision-Making Use of 3 NLP Analytical Tools

LIWC → TextRank → AWS Comprehend

Findings of Diverse FTIC students completing an end-of-term open-ended question via Qualtrics (Urban HSI FTIC class)

Pre-Covid (fall 2019)

> 1,400 diverse students

LIWC – Predominantly positive experience;

lower affiliation significantly correlated with lower GPA

TextRank – concerns about work, time, and academic achievement; gave us semantically most-representative sentences that supported LIWC findings and gave more detail about student experience

Comprehend – gives us a general overview of student sentiment - disaggregated by identities - with regard to positive, negative, and neutral experiences

URM student experience was more positive in fall 2021 while Not URM was more positive in fall 2020

First Gen and Pell student sentiment is declining

Inferential Analysis in progress

During Covid (fall 2020)

>1,900 diverse students

LIWC – Predominantly negative experience;

lower affiliation significantly correlated with lower GPA

TextRank – concerns about work; and gave us semantically most-representative sentences that supported LIWC findings and gave more detail about student experience

Comprehend – gives us a general overview of student sentiment - disaggregated by identities - with regard to positive, negative, and neutral experiences

See left column

Inferential analysis in progress

YES

TextRank
Revealed a consistent set of themes for all students

LIWC
Revealed emotional tone by percentage Responses

AWS Comprehend allows you to dissaggregate by identities and is rather accurate with sentiments and key phrases

NO

All lost detail of the richness of first-person Voice in analysis

TextRank and **LIWC** are difficult to disaggregate by identities
and intersection of identities to inform just-in-time practitioner-based decision-making for specific students

Comprehend/LIWC are not freely available; the key phrase analysis is useful for establishing confidence levels of analysis only

Methodology Challenges

- LIWC, TextRank, and Comprehend are limited by how they were trained
- We determined we need to train the data on detail of sentiment (e.g., anxiety, stress, happy, anger, etc.) and intrapersonal competencies
- Comprehend output was in JSON (JavaScript Object Notation) format, and an additional conversion step was needed. *
- None of the tools provided an integrated option for disaggregating by student groups. **
- We do not have access to the actual programming logic that was executed in the analyses for Comprehend.***
- Caution is needed to preserve student voice, when preparing text to be optimally useful for analyses. Again, this is where algorithmic training comes in.

Discussion

Helpful for summative discussion

Perhaps because of the prompt and the data collection point in time

Much quicker analysis than hand-coding IF you have the folx with the capacity to conduct this analysis quickly

We are left with lots of questions

Immediate Questions

- How accessible are NLP tools to student success practitioners who seek to gain actionable insights and provide interventions informed by the findings?

- Which NLP tools can be quickly learned and used by practitioners?

- What does it look like to use these tools on student data collected during the term?

Immediate Questions, 2

- What NLP tools can remain trustworthy as we disaggregate data by identities?

- What better ways are there to collect and analyze first-person student narrative to close equity gaps?

- What else are we missing/should we be asking?

What are the Accepted Limitations?

The evidence may be driving our decision making, but humans are making the decisions.

Even with evidence, we may not understand how students are learning in a manner that informs specific improvements.

Humans will be interpreting all of this through their own experience and bias is inherent.

Even if it is a small improvement, each student is counting on us to prevent and repair negative student success outcomes.

What else?

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Questions and Comments?

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Intrapersonal Competency Cultivation Research Team

https://competencycultivation.uta.edu

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EQUITY-DRIVEN, HIGH ACHIEVEMENT

Assessment of Student Learning and Development

Marilee Bresciani Ludvik

With contributions from Marjorie Dorimé-Williams, Lara Evans, M... Brianna Lynn Kuhn, Valerie Nye, Bill Sayre, Caren Sax, Charl... Andrea Vonny Lee, Stephen Wall, and Felix Wa...

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OUTCOMES-

CLOSING ACHIEVEMENT GAPS IN- AND OUTSIDE

BASED

THE CLASSROOM WITH ALIGNMENT TO

PROGRAM

PREDICTIVE ANALYTICS AND PERFORMANCE METRICS

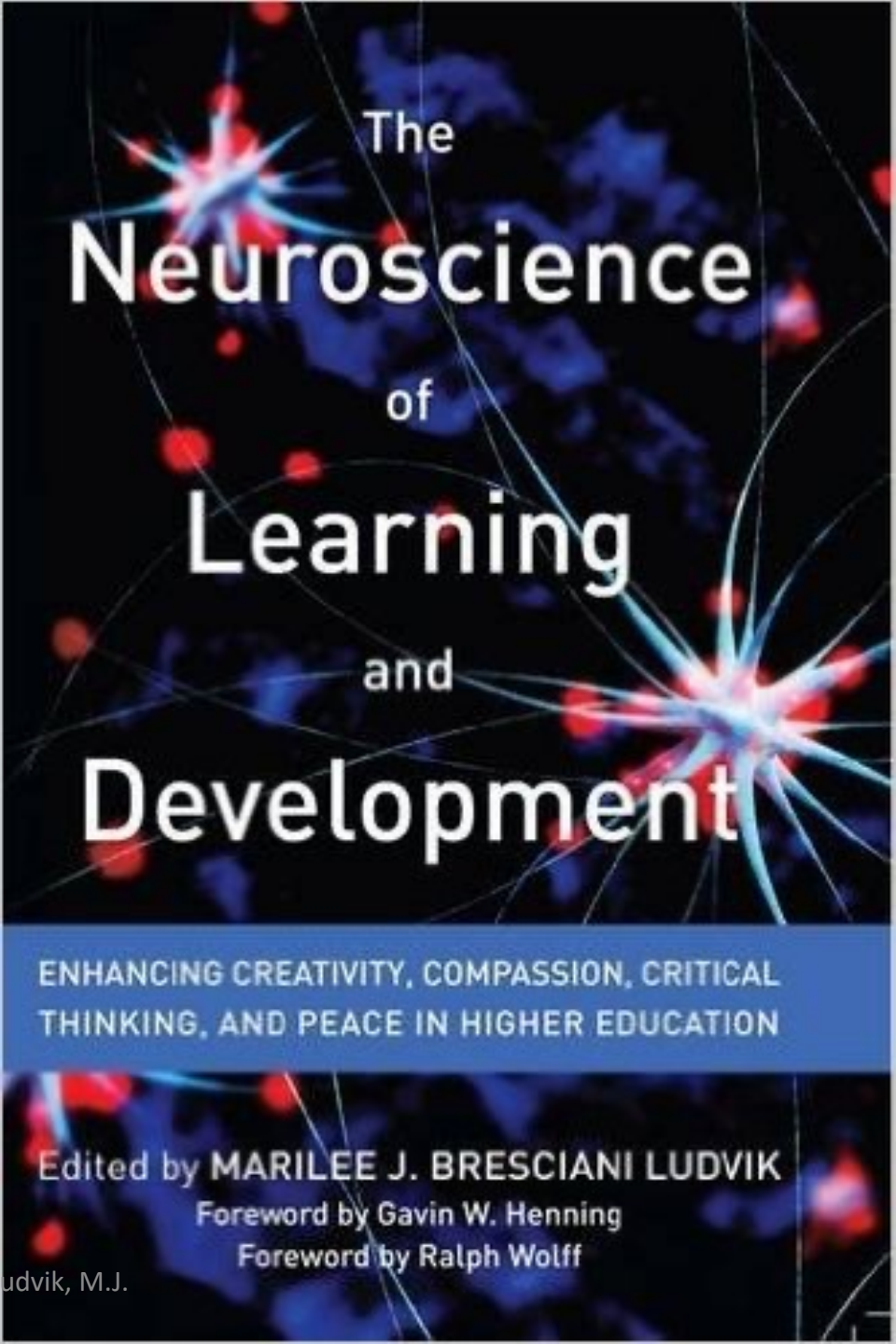# REVIEW

MARILEE BRESCIANI LUDVIK
Foreword by Ralph Wolff

Second Edition of *Outcomes-Based Academic and Co-Curricular Program Review*

The
Neuroscience
of
Learning
and
Development

ENHANCING CREATIVITY, COMPASSION, CRITICAL
THINKING, AND PEACE IN HIGHER EDUCATION

Edited by MARILEE J. BRESCIANI LUDVIK
Foreword by Gavin W. Henning
Foreword by Ralph Wolff

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