

Understanding Perceptions of Equity and Diversity among Science Teachers: A Pilot Study in Israel and Michigan

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Background

Globally, we hear about diversity in culture, gender, race, and the need for equity. These differences often reveal themselves in schools along with diversity in students' abilities, diversity among teachers, and in the availability of resources.

Research Questions

What do we know about teachers' perceptions and challenges related to equity and diversity in education?
How can we create a survey that will yield authentic reflections?

What the Literature Says

Equity
Teachers' responsiveness to diverse learners is essential in creating strong learning contexts for youth from non-dominant communities in science classrooms (Bang & Medin 2010).
Recently, efforts have increased to study and characterize teachers' responsiveness in the context of complex classroom settings (Thompson et al. 2016).

Diversity
The lack of high-quality science education disproportionately affects minoritized groups, e.g., gender, people with special needs, or of different cultures. (Schuck & Fester 2020).

Teacher Surveys on Equity and Diversity

A survey was designed to measure the knowledge and understanding of Engineering faculty on diversity, equality, and inclusion. Challenges to the survey include hesitancy to answer the survey questions and incomplete ideas related to the topics. (Secules et al. 2021)
Education researchers need a better understanding of educators' views of equity in order to plan professional learning and curriculum that could take this into account and support teachers dealing with issues related to equity and diversity. (Lopez 2020)

The Research Tool - Pilot Survey

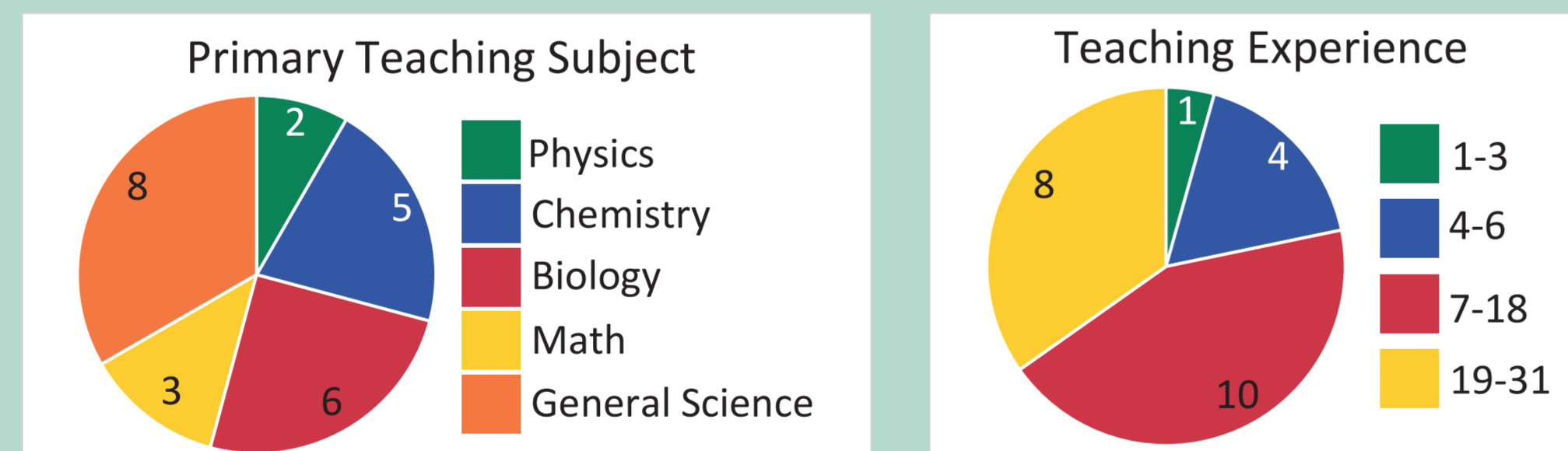
Rationale
Minimal use of the term "equity" to avoid leading teachers to give expected answers.
Opportunity for free reflection using open-ended questions.
Incorporation of close-ended questions in order to collect comprehensive responses and for comparison among teachers.

Structure
Eight open-ended, short answer questions. Example: What diversity characteristics do you face in your daily work?
Three Closed-ended, select-all-that-apply questions. Example: What resources would you find beneficial to support you in facing this diversity issue?
Anonymous personal and demographic information.

Analysis
For this pilot qualitative analysis.

Participants
High-school and Middle-school STEM teachers.
17 Israeli and 7 Michigan teachers.
20 female, 4 male.
One teacher did not specify their teaching experience.

Data collected using "snowball" sample.



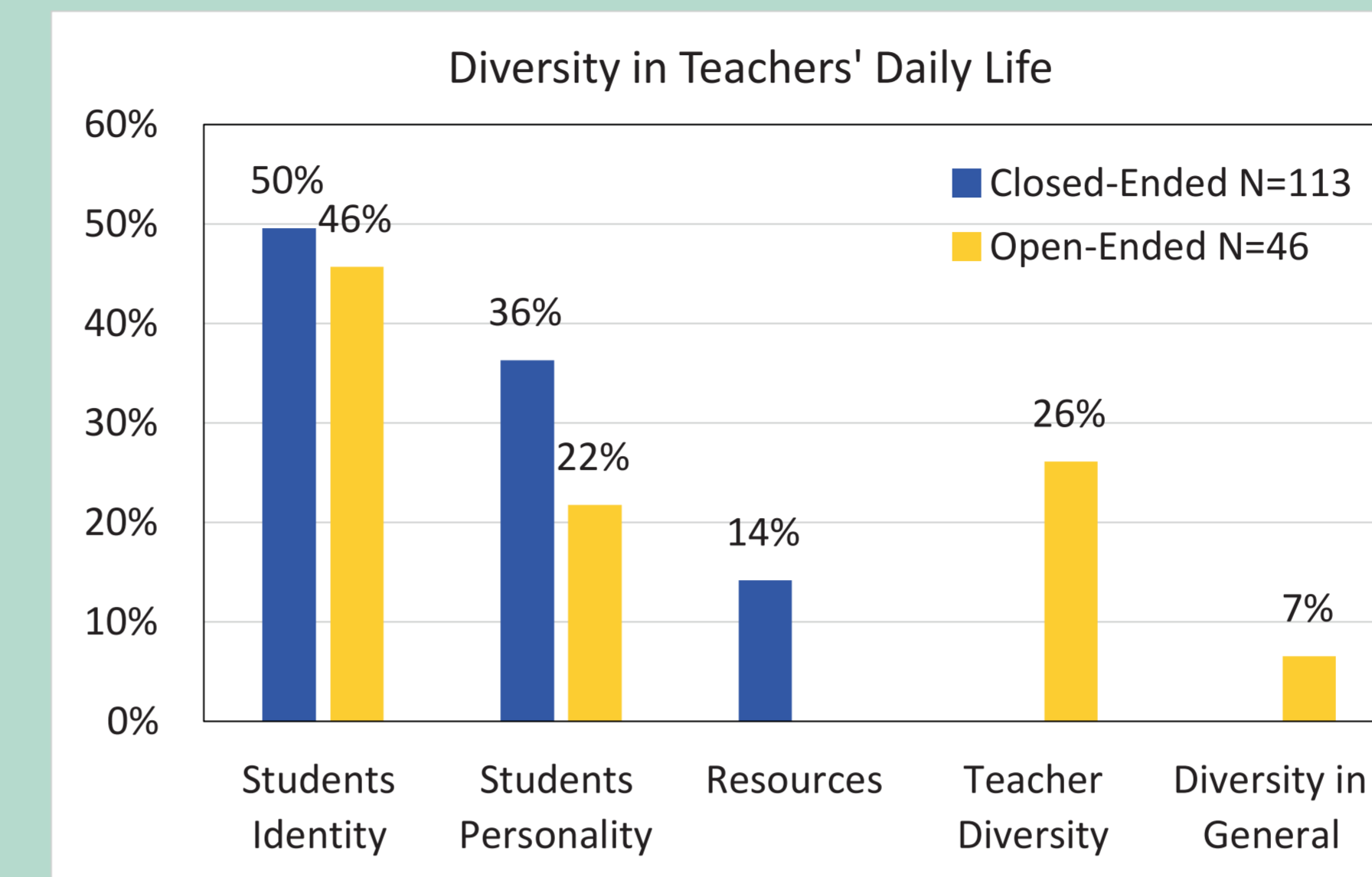
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Secules, S., Park, S. E., McCall C. & M. B. Kali M. B., (2021) Developing a Survey for Engineering. Faculty Knowledge and Interest in Diversity, Equity, Inclusion Topics, IEEE Frontiers in Education Conference (FIE), Lincoln, NE, USA, 2021, pp. 1-5.
Thompson, J., Hagenah, S., Kang, H., Stroupe, D., Braaten, M., Colley, C. & Windschitl, M. (2016). Rigor and responsiveness in classroom activity. *Teachers College Record*, 118(5), 1-58.

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Selected Results

Teachers' Views on Diversity



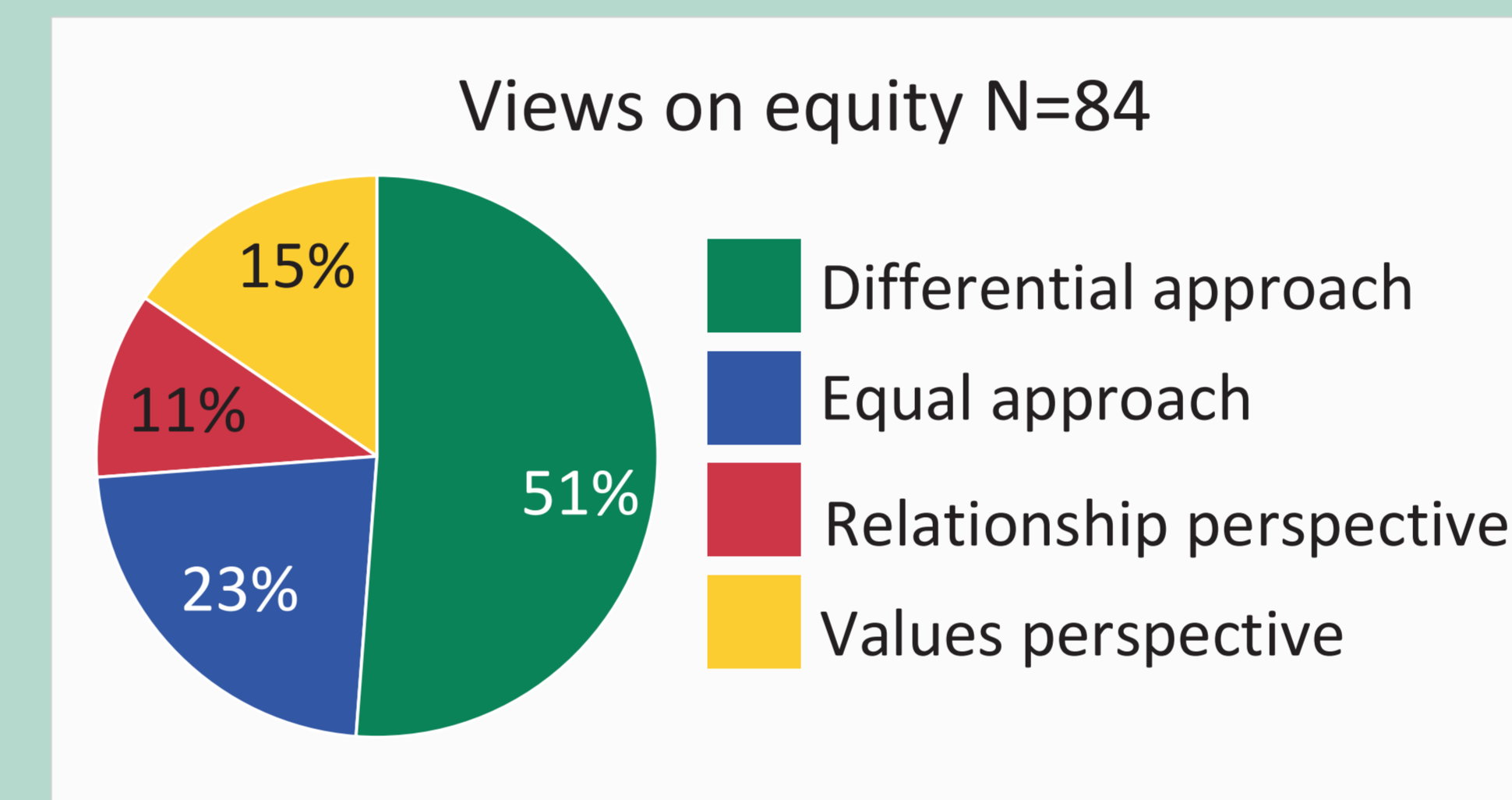
We coded two categories of answers:
Identity - Characteristics a person is born with or into. Examples: gender, disabilities, native language, religion, and socioeconomic status.
Personality - Characteristics related to personal ability, behavior, and actions. Examples: talent, motivation, and learning abilities.
But more categories emerged.

Material resources selected when given as an option.
In open-ended questions, teachers referred to diversity among teachers, and diversity among people in general.

How to Deal with Diversity

Varied teaching tools – Use of numerous pedagogical strategies to reach all students.
Awareness – Noticing students and listening to them.
Both strategies were mentioned by a similar number of teachers.

Views on Equity



Differential approach - Equitable practice means giving attention fitted to each student, aiming to help all to learn.
Equal approach - Equitable practice means teachers treat all students the same way.
Relationship perspective – Equity is related to the relationships between teachers and students, or between teachers and other stakeholders they work with.
Values perspective - Equity is related to general values for life.

Were Teachers Consistent in Their View of Equity?

11 teachers gave variable responses corresponding to different views.
10 teachers gave consistent responses.
3 teachers did not answer all questions.

Conclusion About Teachers' Views

Our data suggest an association between how teachers view diversity to their strategy for dealing with it daily. Teachers hold contradictory views around equity: Differential Approach and Equal Approach. Results suggest that teachers' views were inconsistent around the concept of equity. Do they need opportunities to develop their views or is it just a result of unclear questions?

Pilot Limitations

Small sample size did not enable analysis and comparison related to teachers' characteristics.
The survey and Hebrew translation were not validated by peers.
On some topics (like resources) open-ended responses did not match options given in close-ended questions.

Michigan and Israeli Teachers' View on Diversity

	Michigan	Israel
Characteristics of diversity	Identity	Equal mentions of identity and personality
Areas of diversity important in education	Awareness	Both varied teaching tools and awareness
Where is diversity noticed?	Mostly among students	Among students and teachers alike

Conclusion About the Survey as a Research Tool

Questions promoted open reflection.
Combining open-ended and closed-ended questions can be useful for inviting bottom-up views.
"open" before "closed" – enabled wide view: teachers wrote of wide aspects and marked aspects not written.
"closed" before "open" – an opportunity to discover the most important aspect, without directly asking to give a rating

Next Step for Developing the Surveys

Rephrasing for better focus and clarity.
validation needed, giving consideration to variances in language, culture and school system.
Avoid repetitive questions and keep the survey short.