

# The WEIRDness of QoE research: The diversity of QoMEX authorship considering locality and gender

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**Abstract**—The situatedness of researchers and developers influences the whole research process from ideas to methods to results. To assess the diversity of perspectives in the QoE field, we conducted a quantitative content analysis of QoMEX proceedings authorship examining five years of the locality of authors (2015-2019) and two years of gender and author type (2018-2019). Our results reveal the predominance of WEIRD, i.e. Western, Educated, Industrialized, Rich, and Democratic, authorship and the under-representation of *female* authorship, along with other alarming trends. Hence, we conclude with potential measures to counteract this development.

## I. INTRODUCTION & RELATED WORK

*There is no “god trick of seeing everything from nowhere”*  
– Donna Haraway ([1, p. 581])

The diversity of researcher and developer identities is not just an issue of social justice within society and within our scientific communities, it is also a matter of breadth, depth, and quality of our results. Indeed, when QoMEX introduced a diversity chair for the first time in 2020, “*to promote and extend diversity and inclusion in several ways in order to front QoMEX as an inclusive conference that reflects diversity and that welcomes a variety of perspectives*” [2], it implicitly underlined the importance of diversity for the research process and its outcomes. Also empirical analyses of researcher diversity support the need for such efforts. For example, only 30% of the world’s researchers are female [3]. Research shows the harmfulness of gender stereotypes for STEM, which, e.g., already negatively influence the choice of studies [4] and thus, the contribution to the scientific *discourse* (cf. [5]).

In addition to barriers on individual levels, researchers also observed inequality on regional levels. Recent work by Linxen et al. [6] adopted the “WEIRD”-acronym [7], i.e., **W**estern, **E**ducated, **I**ndustrialized, **R**ich, and **D**emocratic, to analyze to which extent CHI [8] study samples are skewed towards WEIRD societies. The authors revealed a strong over-representation (73%) of samples from Western societies [6]. Despite the primary focus on study samples, the results of [6] also indicate the correlation between researcher identities and results. They show that 81.23% of reported user studies were

conducted exclusively with participants in the same country. The limited diversity of researchers is thus potentiated, at least in user studies. Through human-centered design, however, it also leads to technological impact, because empirical results provide the basis for development and design. Such argumentation is even extended by feminist epistemologists: The social identity of the researching, developing, or designing subject influences the whole process from ideas to methods to outcomes. In fact, there is “*no god trick of seeing everything from nowhere*” as Donna Haraway states in her famous quote [1]. In her epistemological work, she applies the metaphor of gaze and vision to show that knowledge and knowledge production is always dependent on the individual subject and her personal and social background. Thus, she argues for an understanding of *situated* knowledges (see also [9], [10]).

In spite of some initial initiatives to put diversity and inclusion on the agenda, no systematic analysis of the situatedness of researchers involved in the QoMEX community has been conducted so far. Thus, we aim to raise awareness about (the lack of) diversity and its potential implications by presenting an analysis of QoMEX authorship to show which groups have a high influence on the scientific discourse. We aim to answer the questions: Which social groups considering locality and gender shape the discourse and to what extent is there diversity-related inequality and change over time? To do so, we adopt the WEIRD-concept [6] to analyze authorships for the period 2015-2019 through a quantitative content analysis of QoMEX proceedings and supplementary conference management system data. We want to position our analysis as an evocative contribution unveiling inequalities and hope that it may contribute to the inclusion of more diverse perspectives to QoE in the future. Moreover, the results can also serve as a basis for systematically monitoring researcher diversity and examining the impact on research output.

## II. METHODOLOGY

To answer the research questions, we conducted a quantitative content analysis of QoMEX proceedings and supplementary data. The material corpus consists of the proceedings from the five latest on-site editions of QoMEX (2015-2019). The most recent edition of QoMEX (2020) was excluded to

General paper information	
<i>Variable</i>	<i>Codes</i>
Title	Text
Year of publication	Year
Conference location	3-letter country code
Author information	
<i>Variable</i>	<i>Codes</i>
Author name	Text
Author position: first	No, Yes
Author position: last	No, Yes
Author institution	Text
Institution country	Text
Country code	3-letter country code
Author type	Student, Industry, Academia, NGO, Not indicated
Gender	Female, Male, Not indicated/Not available
WEIRD instrumentation	
<i>Variable</i>	<i>Codes</i>
Western	No, Yes based on [12]
Educated	Codes from Author type
Industrialized	GDP per capita [16]
Rich	GNI per capita [17]
Democratic	Political rights rating based on [18]

TABLE I

CODING SCHEME USED TO ANALYZE THE CONFERENCE PROCEEDINGS (2015-2019) AND SUPPLEMENTARY MATERIAL (2018-2019).

avoid potential effects due to the COVID-19 pandemic. For 2018-2019, the technical program committee or general chairs provided supplementary author information available in the conference management system EDAS for the analysis. For 2015-2017, this information was not available as the license of the used conference management system had run out.

The coding scheme (available in Tab. I) was an adjusted version of the scheme used in [6]. As identity is a dynamic social construction [11], category applications always carry the risk of oversimplifications. Hence, our analysis serves only as an observation scheme.

The material was manually coded by five coders to minimize fatigue. In case of ambiguity, the coding team decided by consensus. For authors with multiple affiliations, only the primary affiliation was included. Further, *author type* and *gender* were handled as missing entries unless self-stated by the authors. It must be noted that the EDAS system only allows affiliation to one binary gender, i.e. either female or male.

Next, the data sets per year were thoroughly checked, harmonized, and merged. Finally, we added the operationalization of the WEIRD data (Western<sup>1</sup>, Industrialized, Rich, Democratic) as described in [6]. In contrast to the coding used in [6], the author type was used for the category *educated*.

### III. RESULTS

The final data set contains 188 papers and 1321 cases, where each case represents an individual author per paper. We report non-parametric test results, as Shapiro-Wilk-Tests show significant results (all  $p < .005$ ).

#### A. Locality of Authorship

Comparing *West* vs. non-*West* affiliations, 1159 authorships are assigned to *Western* and 161 to non-*Western* countries (see

<sup>1</sup>We agree on many issues of criticisms on [12] (e.g. [13], [14], [15]); the classification only allows for a pragmatic and descriptive comparison.

Fig. 1). Considering only first authors, 291 cases are assigned to *Western* and 43 to non-*Western* countries. In both cases, only a minority (12% to 13%) is affiliated with non-*Western* countries. Moreover, 39% of 1321 analyzed authorships are related to only three countries (Germany, France, and Great Britain). These data are also represented in Fig. 2.

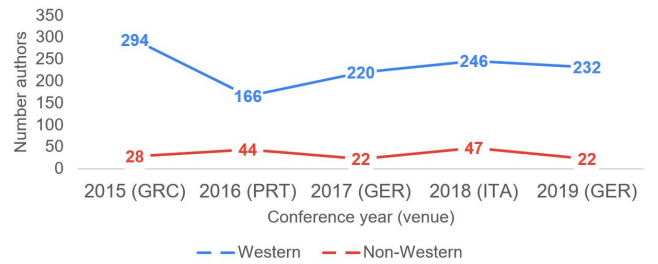


Fig. 1. Number of *Western* vs. non-*Western* authorships (annual figures).

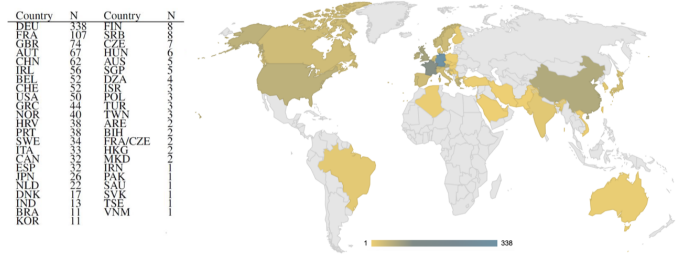


Fig. 2. Geographical representation of all authors (2015-2019).

#### B. Gendered Differences

In sum, *female* gender was stated 94 times, *male* was stated 387 times, and for 839 cases, no information was indicated, either because authors did not affiliate to a binary gender, did not want to indicate their gender, or submission system data was not available. Considering only the first authors, *female* was stated 40 times and *male* 96 times (*not indicated*:  $n = 198$ ). A chi-square test of independence was performed to examine the relation between *gender* and first-authorship, revealing a significant ( $\chi^2(2) = 25.446$ ,  $p < .001$ ) but not very strong association (Cramer's  $V = .216$ ,  $p < .001$ ). *Female* authorship is distributed with only 19 percentage points between the categories (59.5% vs. 40.5% within *female*), while for men there is a difference of over 44 percentage points (72% vs. 28%) indicating a higher probability for *male* first-authorship.

Further, we investigated gendered differences regarding the WEIRD categories. A chi-squared test shows a weak association of *education* and *gender* ( $\chi^2(8) = 60.635$ ,  $p < .001$ ; Cramer's  $V = .235$ ,  $p < .001$ ). A higher proportion of *female* authorship is by *students* (33%; *male*: 22%; *not indicated*: 3%) and less often associated with *industry* (5%; *male*: 17%; *not indicated*: 18%). For *academia*, there is almost no difference (*female*: 62%, *male*: 60%, *not indicated*: 76%) and only 3 papers are assigned to *NGO* authors, who are all *males*. Hence, the earlier stage career category *students* still shows a relationship to *female* authorship, corresponding to the risk of a *glass ceiling* effect.

A Kruskal-Wallis Test reveals significant differences regarding *democratic* locations ( $\chi^2(2) = 9.334, p = .009$ ). Post hoc tests show that whereas there is no significant difference between the affiliation countries of *male* and *female* authorships (*male*:  $M = 30.76, SD = 12.258$ ; *female*:  $M = 27.79, SD = 13.578$ ), the ratings of locations of persons with *not indicated* gender are higher ( $M = 32.44, SD = 12.404$ ; all  $ps < .05$ ).

In contrast, there is no significant association to *Western* ( $\chi^2(2) = .368, p = .832$ ), *industrialized* ( $\chi^2(2) = 4.788, p = .091$ ), and *rich* locations ( $\chi^2(2) = 4.474, p = .107$ ).

### C. Development over Time

Further, we investigated if (in)equality changes over time. Chi-squared test reveals a significant but weak relationship to the category *West* ( $\chi^2(4) = 28.297, p < .001$ ; Cramer's  $V = .146, p < .001$ ). Fig. 1 shows that the ratio between *Western* and non-*Western* authorship affiliations is varying but rather constant over time.

Regarding *education*, a chi-squared test shows no association ( $\chi^2(4) = 3.194, p = .526$ ). Hence, the proportion of author types, e.g. students, academia, industry, remains stable, but it must be noted that *education* data were only available for two years. Thus, there might be a longer-term change.

There is a significant difference for the category *industrialized* ( $\chi^2(4) = 169.147, p < .001$ ). Post hoc tests show that the only exception is the difference between 2017 and 2018. For that reason, we calculated a correlation coefficient, which indicates a weak to medium increase ( $r = .343, p < .001$ ) with a mean GDP of 42,056.89 ( $SD = 13,573.94$ ) in 2015 and 48,016.45 ( $SD = 15,706.22$ ) in 2019. Comparing this increase to the worldwide GDP per capita increase, this is more than a double increase [16]. Also the category *rich* differs between almost all years ( $\chi^2(4) = 184.531, p < .001$ ). Exceptions are the differences between 2015-2016 and 2017-2018. Spearman-Rho reveals a weak to medium effect size of time on GNI ( $r = .357, p < .001$ ). More specifically, the GNI increased from 42,315.19 (2015,  $SD = 13,901.96$ ) to 47,811.94 (2019,  $SD = 14,958.36$ ). Again, this increase is more than twice as high as the average global increase of GNI per capita [17]. These trends indicate that QoMEX is getting more privileged in terms of industrialization and richness of paper origins, further reinforcing WEIRD-countries' prominence.

A Kruskal-Wallis test reveals a difference between the years of the countries' *democracy* values ( $\chi^2(4) = 25.007, p < .001$ ). Post hoc tests show that 2017 stands out here: Whereas 2017 shows a mean rating of 34.2 ( $SD = 9.473$ ), all other years are significantly lower (2015:  $M = 27.22, SD = 13.253$ ; 2016:  $M = 28.44, SD = 13.558$ ; 2018:  $M = 29.98, SD = 12.858$ ; 2019:  $M = 31.00, SD = 12.207$ , all  $ps < .05$ ).

Finally, there is no significant relationship between *gender* and time ( $\chi^2(2) = .459, p = .795$ ). As noted for *education* and *gender*, only two years of data were available for the analysis. Thus, only limited conclusions can be derived.

## IV. DISCUSSION AND CONCLUSION

Our results show a pronounced predominance of certain social groups and a lack of diversity at QoMEX. The locality

analysis reveals a high concentration of specific countries, such as Germany and France, and high WEIRDness of QoMEX. Moreover, there is an alarming trend: Especially in terms of the categories *industrialized* and *rich*, we observe a significant increase, which is more than double the increase worldwide, indicating that the scientific discourse is getting more and more shaped by privileged groups. Also, *female* authorship is underrepresented, less likely to be the first authorship, and more likely to be associated with an early-career status. Even though there is no difference between 2018 and 2019, this might indicate a longer-term change. However, phenomena, such as the *glass ceiling* effect [19], [20], remind us to be skeptical. Additional data is needed to investigate such trends. Hence, we need to take action to meet requirements in terms of social justice and to ensure scientific quality by comprehensive perspectives. We propose the following actions:

1) *Establish systematic approaches to monitor trends and to define empirically-based measures*, e.g., systematic collection of WEIRDness and gender data (including non-binary options) and additional diversity dimensions, e.g., race or (dis)abilities, of authors, participants, and reviewers, while also accounting for additional variables, e.g., paper type, venue location. The presented coding scheme could inform such activities.

2) *Develop an action plan to increase participation from non-WEIRD societies*, e.g., we should critically re-evaluate the means of distributing calls for participation, use instruments such as special sessions to explicitly call for non-WEIRD perspectives, examine potential bias in topic setting and evaluation. The potential of digital conference formats should also be critically investigated in this respect [21]. Finally, we should develop a joint vision, respective goals and measures, and, importantly, systematically evaluate effectiveness.

3) *Nurture an inclusive conference culture and ensure accessibility for all* as a means to welcome different perspectives. Here, a mix of top-down actions (e.g. by diversity chairs) and bottom-up initiatives, such as [22], [23], could play a key role.

4) *Stimulate critical reflection on situated scientific knowledge, limited generalizability of results, and practical ways of how to deal with this*. In line with [6], the lack of diversity in locality has implications for QoMEX study samples and targeted user groups. Reporting on sample characteristics in a more transparent, comprehensive way would be an important first step towards knowing who is (not) represented. More empirical insight on the role of user diversity would foster awareness among researchers about this important topic.

Finally, we must also disclose our own situatedness: We ourselves are from WEIRD countries, feel that we belong to a cisgender, and therefore consider it even more necessary to state that our perspective is also shaped by this. We would therefore like to call on everyone, especially marginalized identities, to critically expand our work.

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## REFERENCES

- [1] D. Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies*, vol. 14, no. 3, pp. 575–599, 1988.
- [2] "QoMEX 2020 - Inclusion and Diversity." [Online]. Available: <https://qomex2020.ie/authors/inclusion-and-diversity>
- [3] "UNESCO Institute for Statistics (UIS: Women in Science." [Online]. Available: <http://uis.unesco.org/en/topic/women-science>
- [4] E. Makarova, B. Aeschlimann, and W. Herzog, "The gender gap in stem fields: The impact of the gender stereotype of math and science on secondary students' career aspirations," *Frontiers in Education*, vol. 4, p. 60, 2019. [Online]. Available: <https://www.frontiersin.org/article/10.3389/educ.2019.00060>
- [5] M. Foucault, *Archaeology of Knowledge*. London: Routledge, apr 2012. [Online]. Available: <https://www.taylorfrancis.com/books/9781135143015>
- [6] S. Linxen, C. Sturm, F. Brühlmann, V. Cassau, K. Opwis, and K. Reinecke, "How WEIRD is CHI ?" *Chi '21*, no. January, 2021.
- [7] J. Henrich, S. J. Heine, and A. Norenzayan, "The weirdest people in the world?" *Behavioral and Brain Sciences*, vol. 33, no. 2-3, pp. 61–83, 2010.
- [8] "The ACM Conference on Human Factors in Computing Systems." [Online]. Available: <https://dl.acm.org/conference/chi>
- [9] S. Bardzell and J. Bardzell, "Towards a feminist HCI methodology," in *Proceedings of the 2011 annual conference on Human factors in computing systems - CHI '11*. New York, New York, USA: ACM Press, 2011, p. 675. [Online]. Available: <http://dl.acm.org/citation.cfm?doid=1978942.1979041>
- [10] R. Clarke, J. Briggs, A. Light, and P. Wright, "Situated encounters with socially engaged art in community-based design," *DIS 2016 - Proceedings of the 2016 ACM Conference on Designing Interactive Systems: Fuse*, pp. 521–532, 2016.
- [11] S. Hall, "Cultural Identity and Diaspora," in *Diaspora and Visual Culture. Representing Africans and Jews*, N. Mirzoeff, Ed. London: Routledge, 1999, pp. 222–237. [Online]. Available: <https://warwick.ac.uk/fac/arts/english/currentstudents/pg/masters/modules/asiandiaspora/hallculturalidentityanddiaspora.pdf>
- [12] S. P. Huntington, "The Clash of Civilizations?" in *Culture and Politics*, L. Crothers and C. Lockhart, Eds. New York: Palgrave Macmillan US, 2000, pp. 99–118.
- [13] E. W. Said, "The Clash o Ignorance," *The Nation*, oct 2001. [Online]. Available: <https://www.thenation.com/article/archive/clash-ignorance/>
- [14] —, "The Clash of Definitions," in *The New Crusades*, E. Qureshi and M. Sells, Eds. New York Chichester: Columbia University Press, 2003, pp. 68–87. [Online]. Available: <https://www.degruyter.com/document/doi/10.7312/quire12666-003/html>
- [15] J. Fox, "Paradigm Lost: Huntington's Unfulfilled Clash of Civilizations Prediction into the 21st Century," *International Politics*, vol. 42, no. 4, pp. 428–457, dec 2005. [Online]. Available: <http://link.springer.com/10.1057/palgrave.ip.8800116>
- [16] "GDP per capita, PPP (current international \$.)" [Online]. Available: <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>
- [17] "GNI per capita, PPP (current international \$.)" [Online]. Available: [https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD?name\\_desc=false&year\\_high\\_desc=true](https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD?name_desc=false&year_high_desc=true)
- [18] "Freedom House. 2020. Countries and Territories." [Online]. Available: [https://freedomhouse.org/sites/default/files/2021-02/Aggregate\\_Category\\_and\\_Subcategory\\_Scores\\_FIW\\_2003-2021.xlsx](https://freedomhouse.org/sites/default/files/2021-02/Aggregate_Category_and_Subcategory_Scores_FIW_2003-2021.xlsx)
- [19] D. A. Cotter, J. M. Hermsen, S. Ovidia, and R. Vanneman, "The glass ceiling effect," *Social forces*, vol. 80, no. 2, pp. 655–681, 2001.
- [20] J. F. Jackson and E. M. O'Callaghan, "What do we know about glass ceiling effects? a taxonomy and critical review to inform higher education research," *Research in Higher Education*, vol. 50, no. 5, pp. 460–482, 2009.
- [21] H. J. Niner, S. Johri, J. Meyer, and S. N. Wassermann, "The pandemic push: can covid-19 reinvent conferences to models rooted in sustainability, equitability and inclusion?" *Socio-Ecological Practice Research*, vol. 2, no. 3, pp. 253–256, 2020.
- [22] N. Kumar, N. Ahmed, N. Dell, J. Chen, K. Heimerl, D. Nemer, N. Karusala, A. Vashistha, S. M. Dray, C. Sturm, L. S. Gaytán-Lugo, and A. Peters, "HCI Across Borders," in *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*. New York, New York, USA: ACM Press, 2018, pp. 1–8. [Online]. Available: <http://dl.acm.org/citation.cfm?doid=3170427.3170666>
- [23] A. Strohmayer, R. Bellini, J. Meissner, S. Mitchell Finnigan, E. Alabdulqader, A. Toombs, and M. Balaam, "#CHIiversity," *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*, pp. 1–10, 2018. [Online]. Available: <http://dl.acm.org/citation.cfm?doid=3170427.3188396>