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# **Analysing Global Collaborations using a Post-Structuralist Model of Social Justice and Social Change<sup>1</sup>**

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## **Abstract**

The exponential growth of contacts and networks among educators around the world in an increasingly globalised market exists in a context of local and global inequality and stratification. Conflicting interests and agendas emerging from international collaborations have spurred the need for a theoretical model that can critically explore and reflexively assess the dynamics of international educational collaborations. In a previous paper, we put forth a model for socially just collaboration that is informed by feminist writings of Young and Fraser. In this current paper we problematise simplistic classificatory uses of such a model. Further, using data from a study of globalisation trends in mathematics education, we illustrate the use of this model for critical assessment and analysis of social justice issues by dispelling singular classification schemata.

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## **Introduction:**

The exponential growth of contacts and networks among educators in an increasingly multinational market exists in a context of local and global stratification. Conflicting interests and agendas emerging from global collaborations have spurred the need for a theoretical model that can critically explore and reflexively assess the dynamics of international educational collaborations. In this paper, we problematise our social justice model (Atweh and Ragusa, 2003; Fraser, 1997) to demonstrate how deconstructive practice, as an alternative methodology, can produce new insights on social change and justice in international educational contacts. Using tenets of critical theory, post-structuralism and post-modern feminism, we explore local examples of international collaboration to question if/how they reproduce elements of social injustice, or, contribute towards social change and justice. We make an argument that our model contributes towards critical assessment and analysis of social justice issues by dispelling singular classification schemata. Using case examples from mathematics education, we reveal the complexity of classificatory systems. Finally, we propose that models containing fluid boundaries, which acknowledge the plasticity of social relations, may be better situated to explain and understand social change than models which require location of data within boundary-rigid categories.

### **Initial Model for Social Justice**

In a previous publication (Atweh and Ragusa, 2003), based on theorisation by Young (1990) and Fraser (1995), we developed a model for social justice as it relates to international collaborations. Young's main critique of traditional conceptions of social justice is that they are based on "having" rather than "doing." Young argues grounding social justice in individual solutions allows little room for consideration of divergent social groups. Hence, extending traditional models based on the distribution of material goods to disadvantaged individuals, to other goods, such as self-respect, honour and opportunity for disempowered social groups, is problematic. To understand the struggles for social justice by a variety of groups, such as women, African Americans, and gays and lesbians, feminist theorists created a discourse of social justice based on *recognition*. Fraser (1995) expounds:

*Demands for "recognition of difference" fuel struggles of groups mobilised under the banners of nationality, ethnicity, 'race', gender and sexuality. ... And cultural recognition relaces socioeconomic redistribution as the remedy of social injustice and the goal of political struggle. (p. 68)*

Fraser argues social justice requires *both* redistribution and recognition measures. She discusses two types of "remedies" to deal with injustice that cut across the redistribution-recognition divide. These are affirmation and transformation. *Affirmative* remedies include those "aimed at correcting inequitable outcomes of social arrangements without disturbing the underlying framework that generates them" (p. 82), while *transformative* remedies are "aimed at correcting inequitable outcomes precisely by restructuring the underlying generative framework" (p. 82). Based on this discussion, we put forth a model comprised of four modes characterizing possible collaborations among academics from different cultures.

**The ADMC Model for Analysing Social Justice and Change:**

	<b>Affirmation</b>	<b>Transformation</b>
<b>Redistribution</b>	<p><b>Mode 1: <u>Aid</u></b></p> <p><i>Attributes:</i> Sharing of information and resources among countries. Represents cultural classification based upon access to knowledge. Can generate misrecognition.</p>	<p><b>Mode 2: <u>Development</u></b></p> <p><i>Attributes:</i> Restructuring of relations of knowledge production. Blurs group identification. Can help remedy misrecognition.</p>
<b>Recognition</b>	<p><b>Mode 3: <u>Multiculturalism</u></b></p> <p><i>Attributes:</i> Acknowledging cultural differences, such as cross cultural research. Supports group identification.</p>	<p><b>Mode 4: <u>Critical Collaboration</u></b></p> <p><i>Attributes:</i> Deep restructuring of relations of recognition. Blurs group differentiation</p>

In applying this model, it is important to recognize each mode possesses the potential to be "good" and "bad". The model is not intended as moral arbitrator, but rather as a heuristic tool designed to augment and facilitate critical thinking. We do not advocate a strong position of relativism and believe that each mode generates outcomes with real-world implications. The strength of the ADMC model is its challenge and encouragement to think “outside of the box”, while simultaneously remaining grounded.

**Mode Definitions and Descriptions:**

**1. AID**

*Definition*

The non-critical transference of tactile or symbolic resources/goods from one social group or individual to another.

*Description*

Aid is a redistributive process that affirms the status quo. It seeks not to alter systems and normative structures but rather to affect immediate circumstances.

**2. DEVELOPMENT**

*Definition*

The critical or non-critical restructuring of modes of knowledge and commodity production internally and/or externally.

*Description*

Development is a transformative process whereby goods and/or knowledges are distributed across social structures, groups and/or

individuals. Development seeks to change pre-existing patterns and norms of knowledge production and may have short or long-term effects. However, it does not necessarily problematise differences in interests and needs of the different participants.

### 3. MULTICULTURALISM

#### *Definition*

The interactive process of recognizing and affirming cultural variation.

#### *Description*

Multiculturalism acknowledges differences among cultures and supports multiple identities. However, it is an affirmative process in that it recognizes but does not seek to alter/change access to, or production of, material and/or symbolic goods.

### 4. CRITICAL COLLABORATION

#### *Definition*

Self-reflexive assessment, individual or collaborative, of existing and pre-existing normative structures and relations that characterize access to knowledge and knowledge production, taking into account differences in interests and needs.

#### *Description*

Critical collaboration entails the deep restructuring of social structures and relations. It is a dynamic, dialectical process for assessing the ability to transform and change norms, political systems and codes of practice. Critical collaboration recognizes difference and creates a forum for authentic dialogue.

## **Theoretical Explorations of Social Justice and Social Change:**

### 1. *Social Justice*

Social justice is an elusive concept defined by many yet continuously contested in multiple discourses (Sturman, 1997). One definition put forth describes social justice as "a dynamic state of affairs which is good for the common interest, where that is taken to include the good of each and also the good of all, in an acknowledgment that one depends on the other" (Griffiths, 1998, p.301). In our opinion, the best theories of social justice are those expressing the dialectical relationship between individuals (individualism) and social structure (structuralism). In this paper, we conceptualize social justice as materialization of social relations that is manifested through individual and group interactions occurring within the parameters of systemic influence.

Although we appreciate postmodernism's insights regarding the active role and contribution individuals can make to social justice, we avoid a strong version of relativism and an individualistic model of social relations. Like Reiman (1990), our

affinity lies in social structural explanations of social justice, and, like Fisk (1989), we reject universalistic definitions. We oppose essentialist and deterministic explanations of injustice because, among other things, we understand social order as hegemonic and representative of some social groups more than others. Like Gramsci (1971), we believe ideology, propounded by the State as one social actor among many, exerts influence over what "counts" as just or unjust. We acknowledge Young's (1990) paradigm of oppression as a contributory factor to the actualization of social justice, but desire to incorporate symbolic expressions of social capital, in a Bourdieu-ian sense, to understand social justice. Finally, unlike Young (1990), whose theory is based on the "axes of oppression," we seek not to privilege structure over individuals, or vice versa.

In sum, we see neither social structure nor individuals as *causing* social injustice because the bifurcation and polarization of these two concepts is a fruitless pursuit. In contrast, we propose it is the irrevocably dialectical, interactive relationship among social structures, social groups and individuals that must be simultaneously explored. Furthermore, expressions of each must be historically and culturally contextualized, thereby giving birth to theories of justice making sense from a multiplicity of standpoints sensitive to location and time. As Rizvi (1998, p.47) expresses, predicated on Young's (1990) insights that social justice claims are arguments "addressed to others and await their response, in the situated political dialogue," social justice "is embedded in discourses that are historically constituted and that are sites of conflicting and divergent political endeavours."

Acknowledging the benefits dual-level of analysis provides for conceptualizing social justice, such as recognizing responsibility for social injustice lies within micro/individual, everyday interactions and macro/socio-political, State-level policies (Gewirtz and Cribb, 2002), we use a multi-level unit of analysis to address social justice. At the level of nation-state, we argue reproduction of social stratification and inequality, based upon race, ethnicity, culture, economics and social status, is facilitated and compounded by the reproduction of power and hierarchical systems at individual and group levels.

In order to disaggregate social justice, avoid reductionism and circumvent the controversy over its pluralist vs. monolithic nature, we focus on instances of social change that evidence social justice without becoming overly concerned to categorize the *type* of injustice, such as grounded in economic, cultural, and/or identity politics. Whereas Fraser's (1995) model is concerned with measures of redistribution and recognition to assuage social injustice, and Gewirtz and Cribb's (2002) model identifies three measures (distributive, cultural and associational) to supersede the transition between the pluralist and the particular, we seek to transcend epistemological critique and categorization to create a didactical model that is simultaneously dialectical and trans-categorical.

## **2. *Social Justice and Social Change:***

The history of social change is the history of changing ideas. Ideas about social justice, the benefits and costs of globalisation, and what constitutes change and *progress*, have shifted over time and are contingent upon who is putting forth the ideas. Theories of social change can enhance conceptualizations of social justice and

facilitate our demonstration of how changes in international collaboration techniques might encourage socially just global relations.

Sociologically, there are many ways social change occurs. Social change can be articulated as "the quantitative and qualitative changes in the appearances of social relations which continue throughout periods of dissidence and quiescence alike" (Foss and Larkin, 1986, p.2). Using a social justice framework, we argue shifts in international collaborative efforts among education researchers must be understood as changes in social relations. Critical assessment ought to be less concerned with singular instances that reify notions of "social justice" (Reiman, 1990; Nozick, 1976) and more concerned to revisit ideas expressed by Macintyre (1985) regarding the socio-historical nature of social justice. In short, we advocate changes in and expressions of socially "just" practices ought to be understood as *characteristics of social relations* that influence and shape the production of material and symbolic goods, which in turn, impact changes in knowledges about social justice.

Emerging from the phenomenology of knowledge is a theory that contemporary society is experiencing a shift in the way knowledge is produced. Previously, knowledge was created within disciplinary and cognitive boundaries. Presently, this is shifting to trans-disciplinary, social and economic contexts (Gibbons et al., 1994). The impact global economics has on the relationship between collaboration and social justice cannot be over-emphasized. Non-critical praise of collaborative arrangements risks underestimating the negative by-products these undertakings produce. Critical assessment of changes within and among countries, resulting from global networks, including research collaboration, is essential to understanding shifts in material and symbolic goods and socioeconomic relations. As Gibbons et al. (1994) caution in describing the effects of globalization on the production and use of scientific knowledge:

*while science is international, its funding mechanisms are still national. Although there is a marked growth in international scientific cooperation, mostly because no country can afford to finance the largest scientific projects alone, and although scientists are among the most internationally minded and mobile workers, their career path is still overwhelmingly shaped within the context of individual countries... Consumption of scientific knowledge and of advanced technological products and systems is a function of the level and distribution of overall economic performance. Countries that perform well economically are more likely to be consumers of the most advanced scientific knowledges. Conversely, the inability to participate in consumption leaves large regions or countries locked out of the action (p. 129).*

This quote reveals that increased technological capability does not translate into changes in the equitability of global knowledge sharing practices. Even as computer networks facilitate collaborative research, those from the periphery "will experience pressure against working in native languages, or on questions different from those attracting attention in the main centres. They will be measured against their peers in the centres, not against those in their own institution or region" (Gibbons et al., p. 131 citing Goonatilake, 1984). Ultimately, "globalization destroys local cultures and organizations" (Gibbons et al., p.131) and fosters standardization over plurality, contributing towards Western imperialism.

As argued, although market mechanisms impact knowledge production greatly, they are only a partial explanation of social injustice. Relating issues of social justice to global collaborative processes, we may note the trend towards an increasingly privatized higher education system also contributes towards change. As the role of the State changes, and governments place economic pressure on educational institutions, the mechanisms of the market play a greater role in affecting *the types of knowledges* that are produced. Hence, changes in *social relations among systems, social groups and individuals* have concrete implications for what counts as knowledge and/or socially just practices and the valuation and production of material and symbolic goods.

To highlight the plasticity of social justice, and understand how knowledges are constructed and social change occurs, we evoke a hybridization of postmodernism that incorporates potentially antithetical aspects of post-structuralism. By locating our social justice model in a refashioned formulation of critical theory, we hope to transcend the limitations of uni-dimensional thought. In light of Lyotard's (1979) classical insights, which Latour's (1987)<sup>2</sup> work exemplifies, we see research as an activity irrefutably grounded in socioeconomic class reality: "The games of scientific language become the games of the rich, in which whoever is wealthiest has the best chance of being right" (Lyotard et al., 1979 p.45). Collaboration between developed and underdeveloped nations risks reproducing the stratified socioeconomic order. Critical postmodernism provides one means for exploring mechanisms that cause power to be self-legitimizing. Applying these insights to investigations of global collaboration enables us to remain cognizant of the privileges location within social structures provides some and not others, such as the authority and granted "right to speak" (Habermas, 1984; 1990; 1993).

Lorber's (1994) discussion of gender norms illustrates the mechanisms of legitimation and shows how the multidimensionality of social power perforates boundaries inhibiting change. Drawing upon Foucault (1972) and Gramsci (1971), Lorber writes:

*Gendered social arrangements are justified by religious and cultural productions and are backed by law, but the most powerful means of sustaining the moral hegemony of the dominant gender ideology is that the process is made invisible; any possible alternatives are virtually unthinkable (Lorber, 1994, p.26).*

We argue without self-reflexive, critical thought, the very outcomes of social action risk becoming predefined. The social norms and arrangements characteristic of global collaborations between status unequal countries exert a hegemonic influence on social interactions. In other words, systemic organization naturalizes social injustices and inequalities, is grounded in socioeconomic stratification, and renders invisible the dynamics of power and authority shaping and naturalizing social relations.

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<sup>2</sup> Among Latour's insights is the observation that technical apparatus requires investment. Within universities, and other knowledge-producing institutions, capitalism can be viewed as solving the scientific problem of funding via privatization and corporate grants to universities. However, technological fixes are a short-sighted solution, as is relying on capitalism to solve knowing-based questions. In particular, "scientists, technicians and instruments are purchased not to find truth, but to augment power" (Lyotard et al., 1979 p.46). Applying the insights of power-elite and actor-network theory, to believe otherwise is to one's own detriment.

This dialectical understanding of social relations complements our conceptualizations of the processes shaping international collaboration. The normative structures of gender, race, class and nationality impact and create cultural constructions of knowledge that govern research practices. The normativity of Western superiority in science and research makes non-Western knowledges and practices invisible and/or inferior. Hegemonic imperatives, such as whose research one quotes, what topics one explores, make are invisible these components of the research process that reproduce the system. For these reasons, foregrounding the "unthinkable" should be prioritized.

*We should be encouraged by historical examples of social change, by how surprising changes take place suddenly, when you least expect it, not because of a miracle from on high, but because people have labored patiently for a long time (Zinn and Barsamian, 1999, p.33).*

Social change is most likely to occur at the margins of society, where, to use Mary Douglas' phrase, the system is "most vulnerable." Cycles of sovereignty can and do break, although those with the most at stake are more likely to notice. Denaturalizing social categories, such as "first-world" and "third-world" countries, is a start. However, social change "cannot be addressed as a homogeneous social phenomenon, but only as a variation in social relations" (Melucci and Lyyra, 1998, p. 209). It is the disruption of normative, everyday practices that characterize modern forms of resistance to the status quo. Activities that work to reject and challenge dominant systems entail the protection of identities and the reinforcement of culture (Melucci and Lyyra, 1998).

Postmodern feminists, such as Nicholson (1990) and Fraser (1997), are sympathetic to this call for multidimensionality. They reject universalizing and totalizing theories and principles that purport to organize social life. Issues of social justice are said to stem from "cultural misrecognition" and are expressed by modernity's economic/cultural rift (Fraser, 1997). One of postmodern feminism's most generous contributions is a historically and culturally sensitive way of theorizing issues of change and justice, while simultaneously remaining cognizant of social cleavages and collectivities. Without *a priori* seeing the world as either socially cohesive or socially antagonistic, critically informed strains of postmodern feminism provide the intellectual freedom to create localized assessments, remind us to be critical of meta-narratives and independently offer an epistemology equipped with historically and culturally grounded theoretical tools. They put forth categories as genealogized, pose a cross-cultural, trans-epochal, comparative mode of theorizing that is non-universal and tolerates, indeed requires a plurality of definitions for social beings (Fraser and Nicholson, 1990, pp. 34-35). Therefore, we argue to understand social change, questions of social justice ought to be answered in light of fluid, yet identifiable, outcomes resulting from social interactions occurring in normative systems of social structure characterized by status unequals benchmarking progress and classifying others according to perceived and real attainment of symbolic, cultural and material goods.

### **Putting the Model into Action: Two case studies**

Extending theory to practice, i.e. performing praxis, we shall now use real world examples to test our model of social justice, expose the complexities of global

collaboration and locate cleavages evidencing change, or non-change, at both individual and systemic levels. The following examples are taken from the field of mathematics education, which is argued to be the most international subject in higher education (Robitaille and Travers, 1992). The first example relates to an informal collaboration project between researchers from nine countries with differing experience and interest in research. The second relates to an area of research that has attained a global following in the field.

### **Case Study 1: International Collaboration and Knowledge Networks**

#### *Project Background*

The first example we consider is an informal collaborative project by mathematics educators from around the world investigating classroom interactions in mathematics classes. The idea for the project stems from an informal conversation between David Clarke<sup>3</sup>, from Australia, and Christine Keitel, from Germany, whereby they discussed some of the limitations of the Third International Mathematics and Science Study (TIMSS) video study. Among TIMSS' shortcomings are its lack of ability to capture student-to-student discussions in the classroom and access students' construal of teacher actions and classroom events. The agreed aim of the project was to develop a means of collecting data from the three countries involved in the original TIMSS video study— Germany, Japan and the United States, plus Australia. Yoshinori Shimizu was recruited from Japan, and Joanne Lobato from the US to allow for validity of data collection from those countries. Initial project funding was obtained from the four participating countries. As communication developed regarding the project, the project's scope expanded to include more countries. For example, Sweden expressed an interest in participating and then, through further individual contact and discussion, the project extended to include Hong Kong, mainland China, Israel and the Philippines.

Participation by the Philippines is particularly interesting. Although the Philippines' educators wanted to join the international team, they were concerned about the lack of Philippine funds available to conduct such a study, as well as their ability to participate at the group's international meetings. To encourage participation, other project participants elected to subsidise the Philippines by sending them equipment previously used in the Australian study. In addition, two technicians were sent to train educators how to operate the equipment. Further specialised training, in Manila, was provided by the Australian team about how to conduct the interviews. Finally, Australian funds were used to subsidise the Philippines' participation at the international research team meeting.

#### *Project Data Analysis*

Project data is generally subjected to three types of analysis:

1. *Project analysis* - First, a project-wide analysis is conducted in accordance with the mutually agreed upon aims of the project. This

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<sup>3</sup> Data in this section arises from an interview with David Clarke about the project.

analysis is done on group wide categories, such as lesson structure, and is based on Clarke's earlier work in the Negotiation of Meaning project.

2. *Subgroup analysis* - Second, countries are sub-divided into groups, according to specific interests, and data analysis is performed. Examples of clusters included: Hong Kong and Sweden, who are interested in theory of variation, Germany and South Africa, who focus on social justice, the United States and Sweden, who explore mathematics as a discipline, and Australia and Hong Kong, which are concerned about issues of knowledge generation in the classroom.
3. *Individual analysis* - Third, individual countries and researchers have the option to perform analysis on their own data.

Some apprehension exists on the part of poorer countries that rich countries, due to their greater resources, may "appropriate" their data by completing analyses more efficiently. To address these concerns, the group developed stringent gate-keeping mechanisms to safeguard each country's data from the others. Data from one country can only be used by another with the permission of the first country's group leader. Intended data users are expected to send a draft of any paper intended for publication, making use of the data, to the representative for approval. This ensures the data is not misinterpreted and that it will not have a negative effect.

While different group players have different levels of experience in research, and access to facilities, the project has been a professional learning experience for all participants. More experienced researchers have gained access to wide data sources, and have had their views about classroom teaching and learning, as well as their research methods and processes, challenged. Similarly, less experienced researchers, with limited access to resources have gained access to international forums and training in research and publishing. In addition, all involved have learned invaluable lessons about the stresses and realities that accompany working in a multi-national and multi-cultural research team. The groups became aware of cultural sensitivities, annoyances and different means and norms of communication. These were sometimes dealt with by the groups on a case by case basis. In short, team meetings became a venue for significant learning experiences and an on-going forum bringing sensitisation and awareness of the political and cultural issues of significance to each research group and country.

#### *Project Contextualization within the ADMC Model*

What mode of social justice does this collaboration represent? This example illustrates several problems that may arise during collaborations among academics with varied interests, backgrounds and cultures, as well as experience in research and access to resources. In order for this global collaboration project to include less affluent cultures, sharing of financial burdens was a prerequisite to collaboration. Hence, part of the project can be classified under the *Aid* mode. However, the project also contained elements of the *Development* mode for researchers from less experienced countries. Arguably, the contributions different researchers made have not been equal because the initial model for gathering and analysing the data was

driven by the more affluent countries. However, experienced researchers from more affluent countries also experience professional development as a result of mentoring developing countries. They gained knowledge and appreciation of different research and mathematics teaching traditions. Such collaborations reflect the *Multicultural* mode. Finally, one can also argue that the project reveals certain elements of *Critical Collaboration* in its dealing with safeguards against possible data “appropriation” by the richer countries.

Stepping outside of our model to apply a reflexive, critical lens to this project, one can argue that the research questions posed and procedures followed represent the more affluent countries’ interests. As Atweh and Ragusa (2003) reported, issues about globalisation of the discipline, arising from a focus group with leading academics in the Philippines, reveal concerns that Filipino researches are “very much influenced by what they see in [international] journals” (p. 10). Research questions are not judged according to their ability to contribute towards improving the practice of teaching in local contexts. Some research pursuits were classified as “trivial topics” (p. 10). Although this comment is not repeated in reference to the collaborative project discussed here, we argue critical collaboration necessarily includes questioning the relevance research holds for addressing case specific needs and realities exhibited in different socio-cultural contexts.

## **Case Study 2: International Collaboration and Knowledge Variation**

### *Project Background*

Current literature in mathematics education problematises viewing mathematics as a universal discipline. While constructivism (Ernest, 1994) has dealt with individual construction of knowledge, anthropologically informed research has questioned the universality of mathematics from a cultural perspective. Whereas Eurocentric, Western models posit local and culturally-contingent knowledges and practices of mathematics, often performed by indigenous social groups, as “deficit” in comparison to dominant mathematical paradigms, “ethnomathematics” celebrates and highlights alternative mathematical forms, including those practices developed by un/under-privileged socioeconomic groups. Ethno-mathematicians have problematised the international acceptance and status of mathematics resulting from Eurocentrism and colonialisation (D’Ambrosio, 1999; Powell & Frankenstein, 1997).

The popularisation of ethnomathematics is often attributed to the keynote address given by Ubiratan D’Ambrosio (1995) in Adelaide, Australia in 1984. Since 1984, the concept of ethnomathematics has gained international consideration with significant contributions from Brazil, Africa, New Zealand, and North America. In 1985, an International Study Group on Ethnomathematics was established, replete with website, newsletter and meetings. Although ethnomathematics has arguably become a global movement in approaching mathematics education (Barton, 1995; Gerdes, 1994), it fails to be universally accepted. Arguably, this illustrates the difference between globalisation of a concept and universalisation. Ethnomathematics has received a certain amount of critique. Dowling (1998) observed nearly all research and writing in mathematics education comes from researchers within cultural groups who identified with the dominant “Western” mathematics tradition. These “external” researchers have looked at the practices of cultural groups different than their own

and thus risk seeing the world from their perspective, and not from the “other”. Vithal and Skovsmose (1997) argued, while ethno-mathematicians have studied the development of mathematics as interactions of power “between” different cultural groups, they have not studied power interactions “within” the different cultural groups. They argue questions of power need to explore and see the mathematics in every day practices of different cultural groups, as well as the effects and changes “outsider” mathematics produces in the lived reality of people on the inside. Questions over how and if ethnomathematics can be used by indigenous persons, or “insiders”, to challenge their subordination within and outside particular cultures must be addressed. It is our position that ethnomathematics researchers have a responsibility to demonstrate the implications of their work to keep the practices of ethnomathematics consistent with its critical stance.

### *Project Contextualization within the ADMC Model*

One way to do this is to ask “what mode of social justice is reflected in ethnomathematics research?” Clearly, ethnomathematics has contributed to the recognition of a variety of mathematics reflected in the lived experiences of the social groups studied. Still, concerns exist that such research has failed to develop an ability to produce knowledge about people from within. Moreover, the knowledges generated have failed to assist in the transformation of reality, leading not to social change in justice but rather confirmation of the status quo. As traditionally understood, ethnomathematics is situated within the mode *Multiculturalism*. Ethnomathematics recognizes, but does not seek to change, cultural variation. The ethnomathematics movement, understood multi-dimensionally, also processes elements of change and *Development*. For examples, international ethnomathematics researchers have contributed to the development of novice researches from developing societies around the world. One indicator is the growing number of doctoral degrees conferred in mathematics worldwide. A second indicator is the type of research questions being explored. Traditionally, international doctoral students trained in Western institutions chose research questions and theories modelled on those expounded by their host institutions. Slowly, this is changing. Ethnomathematics has facilitated shifting one’s gaze from global issues to local conditions and social groups. This not only lends visibility to previously unrecognized groups and realities, but also paves the way for the development of *Critical Collaboration* based on other methodologies such as critical ethnography and action research that have agendas based on empowerment rather than mere representation of voice.

In sum, we have argued our second case example, viewed critically and post-structurally, ethnomathematics possesses the potential to be transformative as well as affirmative. Ethnomathematics research can remain within the multicultural mode of social justice, or, it can be understood as a steppingstone in the development of disadvantaged societies or even critical collaboration between mathematics educators around the world.

### **Conclusions:**

We first argued the ADMC model to be a useful tool for critically assessing global collaboration. Next, informed by post-structural, feminist and critical theory, we

problematized the model to encourage multidimensional thinking about international projects. Using examples from focus group research, we showed how two case examples can simultaneously manifest expressions of multiple modes of social justice. In so doing, we created an argument of the necessity of self-reflexivity and critical analysis to the process of questioning how specific cases relate to models of social justice.

It is our hope that trans-categorical application of the ADMC model will enable researchers to reassess problems they may encounter in global, culturally sensitive projects. By approaching qualitative data from a non-linear framework, multidimensional, trans-categorical patterns may manifest unanticipated trends in the data. If data is prematurely fit into pre-conceived categories, relationships and interactions in the data risk remaining invisible. However, if, from the onset, a dialectical approach is taken, then interrelations will be presupposed, and critical thought encouraged.

Overall, we believe numerous implications resulted from our critical application of the ADMC model. Had global collaborations been *a priori* asserted as expressions of, say, *Development*, then we may have underestimated, or not noticed at all, those aspects which affirm current relations and structures. Conversely, had global collaborations been automatically assumed to be a form of *Aid*, then the potentially transformative components of the interactions might have been missed. Additionally, by viewing collaborations as dynamic social relations, not static occurrences, we were better positioned to notice changes in interactions, and consequently, prepared to continue, over time, re-thinking and shifting the location of examples within our model modes. Had we adopted a static framework, we may have been content to simply categorize the examples once. Thus, at the end of the day, we argue it is plasticity of thought that holds the greatest hope for contextualizing social interactions and material and symbolic goods within models of social justice and change.

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