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3. THE ROLE OF MATHEMATICS IN THE DESTRUCTION OF COMMUNITIES, AND WHAT WE CAN DO TO REVERSE THIS PROCESS, INCLUDING USING MATHEMATICS

Parting of paths

Since the days of Francis Bacon, the father of European science, who articulated the purpose of science as having “the power to conquer and to subdue [nature]”, people (especially the educated) have lived in disharmony with nature. Mathematics – the “queen of sciences” – played a main role in “subduing and conquering” nature. In recent times, conquering and subduing physical nature was extended to human nature and human communities. For 12 years, education seduces students to live in a make-believe world and become active participants in the harm done to themselves, their communities, and to physical nature – believing all the time the claim that all is done for their own good!¹ As Wendell Berry (1990) says, harm that was done to the world prior to modern times was done out of ignorance or weakness; today, the “rape and plunder” of the world is done with full awareness and conscious intentions. The role of the sciences and mathematics is central in this process. For Berry, these conscious acts are a “new thing under the sun”. According to him, the main division in the world today is between those who work hard to protect life and those who (for greed and control) are consciously destroying it. Mathematics faces this parting of paths: it can contribute to protecting life or destroying it. This article is a personal reflection on one experience in such parting of paths: the Palestinian experience.

Plurality of maths and conquest of knowledge: How official mathematics contributed to dismantling Palestinian society

My first awareness of such parting of paths was when I became aware of my illiterate mother’s mathematics (Fasheh, 1990). The kind of mathematics I studied and taught was more in line with the values of greed, power, and control, while my mother’s mathematics was embedded in life, inseparable from it. My awareness happened in the mid 1970s when I was in charge of improving mathematics

¹The role of “elite” universities in creating current crises, in the US and UK as well as around the world, cannot be ignored. Most decisions taken in the various fields – politics, economy, finance, food, agriculture, education, military, raising children, health – were taken by graduates of elite universities.

instruction in the schools of the West Bank (in Palestine), and teaching mathematics at Birzeit University. It took me several years to realize that my mathematics and my mother's mathematics do not intersect; they belong to different worlds. That was my first deep understanding of what "plurality of knowledges" means. My mathematics could not be reduced to hers and hers could not be reduced to mine; nor was it possible to produce a synthesis higher than both. My mathematics and her mathematics were worlds apart. Such plurality of knowledges² is usually not acceptable in universities which propagate the myth of one and only one kind of mathematics. What made things even more shocking was my realization that even if I study mathematics for another ten years in universities, I still wouldn't be able to do what she was able to do without being taught, and without curriculum, tests, and grades! It was a moment of deep learning for me because it touched and dismantled basic myths I held as given.

That realization was a most profound turning point in my life. Questions that never left me since then include: "Why is my kind of mathematics considered valuable and worthy of being taught in schools and universities (almost all over the world) while my mother's kind of mathematics is totally ignored? Why is my kind of mathematics considered knowledge while hers is not? Is it because it is superior or better? Is it because it is more modern and thus supersedes all other kinds, including hers? Is it because it is more useful, and if so, to whom? What is the cost we pay as a result of my kind of mathematics winning over and wiping out hers?" Slowly I started realizing that the triad which was manifested by Western educational missions in Palestine – despising people and what they have, monopolizing what constitutes knowledge, and being ready to "help" people move along the dominant path of progress – has been fatal to the Palestinian society and its ability to regenerate itself. Gradually, I realized that the mathematics I studied and taught suppressed and won over my mother's mathematics through bullying; by devaluing, ignoring, and belittling her mathematics, and providing instead another mathematics that claimed to be neutral and universal – the only path into the future.³ It won not because it is superior or better but through being a tool serving interests of dominant political and economic powers, helping them in controlling people, suppressing their knowledges, and robbing them of what they have (including their biological abilities). What frightened me was the fact that I was an active participant in that process and doing it with good intentions,

² The plural for knowledge is not used in English. When Arabs first encountered Europeans and heard for the first time the phrase "Department of Education" the way they translated it was "House of Knowledges".

³ What happened to my mother's mathematics happened to her Christianity. Missionaries from the US came to our home to "convert" my Christian family into their Christianity! She was one of the last Christians that carried the spirit of Jesus as it was lived through generations over 20 centuries. It is hard to find Palestinians today who carry that spirit in their hearts and daily lives. Religious missions conquered my mother's Christianity the same way educational missions conquered her knowledge. Both, her mathematics and Christianity were wiped out in the name of progress! Just like I could not see my mother's mathematics, missionaries could not see her Christianity and educators could not see her wonderful ability for upbringing children. The same thing happened to the knowledge of Palestinian peasants in farming.

believing all the time that I was helping Palestinians move along the path of progress. I feel that I was given a degree, with all the privileges associated with it, once they were sure that I would carry this subtle weapon, not only into my classes but also into my home, and use it to wipe out people's knowledges, sense of self-worthiness, and biological abilities such as learning. My reflections on the above questions made me perceive official mathematics as one of the Trojan horses that helped conquer us from within. Those reflections also made me rethink meanings of crucial words related to education and life. I started in a spontaneous way (what later became a most important conviction in my life) perceiving people (especially children) as co-authors of meanings of the words they use, hear, or read. I started with words which my interaction with my mother's world triggered, such as learning, knowledge, the worth of a person, pluralism, progress, and humility. My reflections taught me humility. I realized that there are many worlds that inhabit this world and that life is much richer than what the human mind can comprehend and ideas can express. In contrast to my mathematics, which was aloof, my mother's mathematics was embedded in life like salt in food: we can taste it but not see it. It was useful, beautiful, meaningful, and fitting; no woman would have accepted a dress if it lacked any of these qualities. Her work was not only of art but also consisted of main scientific aspects: experience, observation, experimentation, and making sense.

While it was very common for me to use words and concepts that I had no idea what they referred to,⁴ my mother never had such a problem; she never used a word that she did not know the source of its meaning, or cut a piece of cloth not knowing where it fits with the other pieces into a whole which is a dress that fits a particular woman. To cite just another example, she never knew the meaning of "good citizen" but she had a deep understanding of what a good human being is.

Playing the role of the 'cultural imperialist' in my own home

It was very scary for me to realize that I was playing the role of the "imperialist" in my very home! I was a tool in conquering my mother's mathematics and knowledge; a tool in conquering her world through internalizing the myth that there is a single undifferentiated natural path for progress – the European path – which I acquired in schools and universities. Such conquering is an act of violence difficult to recognize by schooled institutionalized minds. I was a tool in this violent conquest where one kind of knowledge conquered and wiped out another – which is probably the deepest and most destructive conquest. That's why I believe that fundamentalism in the modern world did not start in religion or politics but in relation to knowledge.⁵ I was spreading the "virus" of believing in a single

⁴ In the sixth grade, the British textbook which was used included shares. I got full grades in all tests but up till now I never owned a share and never experienced its meaning.

⁵ Those who hold high degrees (consciously or not) hide this fact and blame religions and politicians for the mess in the world. It wasn't Roosevelt who convinced Einstein to build the atomic bomb but the opposite: it was Einstein who sent letters to Roosevelt convincing him to support making (and using) the bomb!

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universal path and source for learning and knowing – contaminating my students the same way a man with AIDS spreads his disease without knowing it. Like him, I was spreading the virus through loving and being loved; wanting to please and be pleased. I enjoyed teaching mathematics and my students enjoyed mathematics as I was teaching it. It was difficult for me as a product of American universities (the American University of Beirut, Florida State University, and Harvard University) to think otherwise. The belief in a universal path to learning and gaining knowledge was very strong. My encounter with my mother's world helped me see that the struggle in the world has always been between people-in-communities⁶ and those who actively want to tear apart the inner world in each person and the social-cultural-economic fabric of communities.

The power I had over my students can be likened to a person who has a loudspeaker in a crowd. People would listen to him not necessarily because his voice is nicer or what he says is wiser but simply because he carries a tool that gives him arbitrary power and authority. My "loudspeaker" was constituted by the degree I had and a job that gave me the power to inflict harm on those who refused to listen to me and follow my instructions.

One Palestinian man's response

This conquest at the knowledge level is absent – in general – from Palestinians' consciousness. One exception was Khalil Sakakini who seemed to have seen the damage that was happening to Palestinian children at a deep level as a result of establishing American and European schools in Palestine at the end of the 19th century. He saw it as early as 1896 and wrote his first book: *Wearing Someone Else's Shoes*. It seems he saw how children were turning into copies of an alien culture that had no roots in the community and no relevance to Palestinian life.

What Sakakini seems to have noticed was that the use of grades to measure children's worth (by comparing them along a vertical line) is inherently a violent act against them. Shifting the source of the worth of a person from the person and community to numbers that claim to be objective and universal, and whose legitimacy came from London, led to conquering Palestinians from within. London matriculation became (in the 1920s, 1930s and 1940s) the main measure of the worth of Palestinian students. Curriculum and grades became idols at whose feet people worshiped and kneeled – Trojan horses the British left behind, which helped dismantle and subdue our communities. Using numbers to measure students' worth has been a destructive act, more dangerous than other forms because it is invisible to most and tries to measure what cannot be measured, which ends in degrading people (ironically called grading), tearing apart communities, harming nature.

It is worth mentioning that Sakakini did not criticize foreign education in words only but also in action. He built his first school in Jerusalem in 1909, basing it on

⁶ There is a word in Arabic *al Ahaali* which does not have a synonym in English. Briefly, it means people who are connected to a place, history, collective memory, and to one another through a social-cultural-economic fabric.

principles radically different from western schools: he did not start with goals and objectives but with values, the main one of which was dignity. He translated that by refusing to have grades, prizes, or punishment in his school. He was able to do that a hundred years ago, under the Ottoman rule. Today, a Palestinian principal who would even dare think of not using grades in his school will be expelled immediately. The British occupation of Palestine in 1917 wiped out Sakakini's spirit. In short, the two "crimes" mentioned above – exemplified by my mathematics wiping out my mother's (i.e., suppressing diversity in learning and knowing) and by using numbers to measure students' worth – were the first manifestations of how school mathematics was used to destroy communities in Palestine.

SCIENCE VS. WISDOM: HOW SCIENTIFIC AND MODERN TOOLS THAT BRITAIN
 BROUGHT INTO PALESTINE DESTROYED THE PILLARS ON WHICH
 PALESTINIAN COMMUNITIES RESTED

Community as I use the term here rests on three pillars: local soil, local culture, and local economy. They are the source of community's inner strength and the basis of its regeneration – yet, they are absent from education! Every child is nurtured by the land soil and the cultural soil. However, these two local soils would be mere slogans without local economy. The three form the fabric of community. Once children become rooted within these local soils, they can be enriched and nurtured further by other cultures.⁷ Without these pillars, children would lose their roots, and their source of nurturance and inner strength, and community would gradually wither away. The British brought into Palestine three tools (presented as inventions for progress) which destroyed these three pillars: *education* destroyed local culture, *flush toilets* destroyed local soil and wasted local water, and the *state* destroyed local economy. Mathematics is a main ingredient in all three: grading in schools, designing a device (that needs science and mathematics but lacks wisdom) to transfer our excrement, and using productivity and national income to measure economic activity. In all three, no questions are asked about consequences – an act that manifests lack of wisdom. For the mind to move without hindrance, wisdom had to be imprisoned.

Living in harmony with physical and human nature and refusing to do anything that would harm them and tear apart the social fabric of communities are part of living wisely. Wisdom has been ignored, actually imprisoned, when the mind (with its tools of mathematics, science, and technology and its values of competition, control, and winning) was elevated to the power of the throne. The state of the world today compels us to de-throne the mind, set wisdom free, and make science and mathematics go hand in hand with wisdom. One current challenge, thus, is how to conceive and practice science and mathematics in a way that is more in harmony with wisdom, i.e. with the values of respecting creation and protecting

⁷ A Palestinian anthropologist, Sharif Kanaaneh, uses the analogy to grafting fruit trees on bitter almond trees. Bitter almond trees provide strong basis against any diseases that can hit the trees.

nature to continue regenerating itself. This necessarily requires inventing ways that help remedy the harm we do (by our ways in living) to our selves, our communities, and nature.

This is what I have been trying to do since the early 1970s. It is a slow process simply because it is against interests of dominant powers that require current ways of teaching mathematics. However, we don't have any choice other than do what we can in a world that faces real threats to life. We need to ask about the cost to communities and nature, which we pay as a result of stressing formal skills and technical knowledge. It is here where I believe we need to rethink the meaning and role of logic in the mathematics curriculum and how to incorporate it in schools and universities. We stress formal logics and ignore how we can use logic in mathematics classes in terms of its relation to life. We rarely ask, for example: What is the logic that governs our actions and relations in education? What are the values that currently govern our behavior in schools and universities, and what values do we want to live in harmony with? A formal logical system starts with axioms that we do not violate. Similarly, we should ask about the values (axioms) that we currently do not violate in education. If we reflect on our actions in schools and universities, we notice that the values we do not violate are control and winning. Any claim by an institution to the contrary is an act of delusion and deception (no matter whether that is done consciously or not). These claims include slogans such as *Veritas* and *Lux et Veritas*.

Using mathematics to see patterns, relations, systems, and connectedness in life (physical and human) and to discover the values that govern our actions, can help us rethink our ways of living and gain, instead, self-knowledge and self-rule⁸. It is crucial in making sense of experiences. Trying to understand the logic that underlies the behavior of a person, group, or institution should be part of the mathematics curriculum. In 1979, I introduced a course for entering first-year students at Birzeit University, part of which was observing and seeing patterns in all aspects of life. One student in my class who was jailed by the Israelis, told the class – after he was released – how he collected from fellow prisoners questions they were asked during interrogations. He wanted to know the logic of the Israeli official mind. When I introduced the course, I never thought that it would go that far!

The role of mathematics in dismantling communities and degrading cultures was similar to its role in agriculture, where it considers productivity as the only measure of agricultural activity. Just like we don't ask about what happens to children as a result of education, we don't ask what happens to the soil as a result of stressing productivity. Such stress led to the corruption of local soil and destruction of the local economy. This corruption took a sharp increase when the

⁸ I use the phrase self-rule in the way Gandhi used it to mean *swaraj* in Hindi. I worked with 7th grade girls in Shufaat refugee camp at two levels: by every girl keeping a record of what she eats and how she spends her day (such as watching TV, talking over mobiles, using computers); and by every 4 or 5 girls producing a "magazine" (not for the market) without needing permit, money, or editors (to discover what they can do without institutions and professionals but with what they have).

Palestinian Authority was installed and the World Bank allowed in. There was more ecological sustainability and social equity before 1993. Development and investment which accompanied the Oslo accords (especially during the past 5 years) have been disastrous at the community level. One manifestation is transforming land and people into commodities. Land that was for 4000 years a source of living and dignity for Palestinian peasants, became in recent years a pure commodity. This means that the shift we need in teaching mathematics requires a shift in what we consider as measures. Teaching mathematics would go through a real transformation if the values that govern our actions shift from control and winning to the well-being of children, communities, and nature.

Communities and the ability of nature to regenerate itself cannot be created through plans and minds. Communities are formed over hundreds (if not thousands) of years, and the spirit of regeneration has been part of creation. Civil society perceived as consisting of NGOs has been effective in tearing apart communities; and development as was conceived in 1949 has been a main tool in killing the ability and spirit of regeneration.⁹

GRADING IS DEGRADING: THE ROLE OF MEASUREMENT IN CONQUERING COMMUNITIES

I once read in a mathematics book, “If you can’t measure what you are talking about, you don’t know what you are saying”. I was fascinated by it and enthusiastically taught it to my students. I can’t believe I was so blind not to see that most of what is valuable in life cannot be measured.¹⁰ When we talk about agriculture, with productivity as the only measure, not caring about the cost we pay at other levels, we become agents in our own destruction. Using numbers to measure human and community aspects helps distract us from fundamental aspects in life.¹¹ The Arab Human Development Reports sponsored by the United Nations Development Programme are excellent examples of how mathematics is used to distract us from seeing the source of strength in our communities and the threats to life on earth due to modern patterns in living. The purpose of such reports seems to be making us perceive ourselves as “less”, which compels us to move along the path of consumption so we would measure higher on the development scale; i.e. along what tears communities and nature apart. Such reports are a main source of deception using mathematics as means.

Using numbers to measure the worth of people, cultures, and countries marked – in my opinion – the beginning of decadence whose manifestations we can see

⁹ It is worth comparing the destruction done to Ramallah by trucks and tanks with the destruction done to Gaza through tanks and warplanes. Although the role of sciences and mathematics is crucial in both destructions, Gaza can recover while Ramallah is highly improbable.

¹⁰ An old Palestinian woman once said, “Anything that can be bought with money is cheap”. This is so true about education: anything we can measure is not significant. Aspects such as happiness, well-being, dignity, compassion, responsibility, and wisdom cannot be measured

¹¹ It is worth mentioning that the World Bank’s first priority (after it was allowed in Palestine after Oslo) was education. Once the mind accepts numbers as measure of people’s worth, other myths fall in place.

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worldwide. It underlies the falling apart of most societies in the Two-Thirds world (a phrase used by Gustavo Esteva and Madhu Prakash) in the 20th century. Our real enemy (as peoples in all countries) has become what we embrace and pay dearly for with our limited resources: it is our perceptions and ways of living that rob us of natural abilities such as learning, healing, walking, conversing, and making sense of experiences.

THE PARROT BY TAGORE: IMPROVING THE CAGE AND IGNORING THE BIRD

A few years ago, Claude Alvarez handed me a publication that included a short story *The Parrot* written nine decades ago by Tagore (see Bookmiddle in this book). That short story clarified for me aspects in education more than tens of books critical of it. One aspect I want to raise is related to structures. There is a radical difference between cages and nests as structures. Building a cage requires one kind of mathematics; making a nest embodies a totally different kind. This is similar to the difference between structures I used in my mathematics and those used by my mother. The bodies of women she made dresses for were the structures she worked with. Unlike the geometrical shapes I studied and taught, my mother had to start with the geometrical figure of the woman she was working with. Every woman had her own figure/ geometry. This led to my conviction that the shallowest learning is the one acquired through teaching (which is usually related to cages). This reflection raises the question of how to gain instrumental knowledge without losing the rich and tremendous mathematics that we can learn without institutions, professionals, technology and without instruction. We need to avoid what makes our bodies obsolete, unable to do what they can do on their own, such as learning, healing, walking, conversing, writing, and expressing.

Most projects and programs concerning improving the teaching of mathematics in Palestine today are related to improving cages: developing new curriculum, upgrading equipment, evaluation, training teachers, gaining technical skills, building schools, etc. Focusing on cages is covered up by claims that the purpose of improvements is to help and serve students. I want to stress again that I am not talking here about intentions but about perceptions. Claims of helping and serving usually rob people of dignity, natural abilities, and what they have. For example, the well-being of children, communities, and nature is not treated as a value in “quality education” espoused today by many organizations.

What can be measured belongs in general to the cage; what cannot belongs to what happens to people, communities, and nature. What can be measured can easily be transformed into commodities, such as what is happening to people and knowledge. We need to end the monopoly of using numbers to measure students’ worth and look for alternatives. Luckily such an alternative has existed in the Arab culture for 1400 years – but totally ignored. I will present it shortly.

UNIVERSALS VS. DIVERSITY

Analysis and searching for universals are very strong within Western culture. This, no doubt, was very beneficial at many levels. However, it has reached today a

dangerous state that the world cannot ignore anymore. Searching for universals today is not treated as a search that adds to our understanding but it has become a list of facts that are imposed on peoples and countries as the only absolute truth. What I wrote earlier compels us to regain “pluralism” as a most distinctive characteristic in life, nature, human beings, and knowledge and to realize that universals are contrary to humanity and Nature. This means that we need to start demanding to retrieve part of education’s budget and use it in various diverse settings. I already mentioned the centrality of talking about pluralism in relation to knowledge. One way I used in working with mathematics teachers to bring out pluralistic attitudes into teaching was stressing that every child is logical; there are many logics which are not compatible. This was very hard for teachers to accept. One positive aspect (still more potential than actual) of modern technology (especially the Internet) is it is increasingly making isolation impossible and making the pluralistic nature in life more obvious. We need to build paths that take us out of our provincialities, without dumping us into a single global culture. I suggest that we stress not the right to education but to educations – in the plural. The age of information does not add up to knowledge just like the age of knowledge, sciences, and technology did not add up to wisdom.

Western civilization is not the only one that believes in universals. However, it is the only one that succeeded in producing tools (such as schools and grades) that claimed to be universal, objective, and neutral. People around the world adopted them as such. This led to “evangelizing” the world through education, which was done mainly through people with good intentions but who carried the virus of the one and only one path for learning.

THE IMPORTANCE OF CO-AUTHORING MEANINGS AND MEASURES

Another thing we need to do in mathematics classes is to encourage students to co-author meanings of words they use, read, or hear. I experimented with the idea with children in the 1970s (Fasheh, 1982). One question I asked was “What is a point?” I will never forget an answer by a 7-years old girl, “A point is a circle without a hole”; so creative and imaginative! Co-authoring meanings in the light of our actions, experiences, reflections, and conversations is most fundamental in learning. Without it, learning would be seriously deficient.¹²

A main struggle I always felt has been between what people can do by and for themselves and those who impose on them ways that rob them of all that in the name of helping, assisting, and serving. I lived such parting of ways several times in Palestine, especially in the 1970s and the first *intifada* (1987-91). In both periods, people asked what they could do and went ahead and did them. Dignity rather than rights, hope rather than expectations, mutual support rather than self-serving, self-rule rather than ruling or being ruled, giving rather than demanding,

¹² We need to ask why this fundamental right and biological ability is absent from the Universal Declaration of Human Rights, the UN Convention on the Rights of the Child, and institutions in general.

and being attentive to life rather than to distractions were what moved us. In both periods, cages were dismantled and life vibrations moved us.

Shifting the source of one's worth from a universal measure controlled by institutions back to the person and community has been a main struggle for me since the early 1970s when I was in charge of mathematics instruction in the schools of the West Bank. However, it was in 1997 (as part of trying to find guiding principles for the Arab Education Forum which I established in 1998 at Harvard University's Center for Middle Eastern Studies) that I came across a 1400-year old statement by Imam Ali which made much sense to me. I chose it as the title of the Forum's vision and publications. I find it relevant in the world today. In Arabic, the statement is: *qeematu kullimri'en ma yuhsenoh* قيمة كل امرئ ما يحسنه which means: the worth of a person is what s/he *yuhsen*. *Yuhsen*, in Arabic, has several meanings, which *together* constitute the worth of the person: the first meaning refers to how well the person does what s/he does, which requires technical knowledge and skills; the second refers to how beautiful/ pleasing what one does to the senses, the aesthetic dimension; the third refers to how good it is for the community; the fourth refers to how much one gives of self rather than what one transfers (as a commodity) from one place to another; and the fifth refers to how respectful of people and ideas one is. According to the statement, a person's worth is not judged by professional committees or "objective and universal" measures but by the five meanings embedded in the word *yuhsen*. Since I read it in 1997, I have been amazed by its simplicity, profundity, depth, insight, and by how it embodies diversity. It has been a main principle guiding my thinking and work. It is crucial, however, that we do not treat it as constituting another "super system" but as a statement about taking a stance in the effective presence of others. It reflects the belief that one is in relation rather than in opposition to others, or better than others.

When I read Tagore's story around 2005, I felt the same way as when I read Imam Ali's statement in 1997. Both were like a "magical pen" that drew a clear painting of my experiences. Both helped clean what was left over within me in terms of perceptions and assumptions that I acquired through education. Ali's statement exposes shallow and harmful aspects of current evaluations and replaces them by a principle that is diverse and has respect for people; its essence is dignity. Tagore's story provides a map that helps us see the way clearly through the boundaries created by education; it helps us see whether what we do is related to improving cages or to well-being of children and communities. It helps us heal from distractions and self-deceptions which may appear to be good but in fact destroy biological regenerative abilities such as learning, making sense of experiences, and being sources of understanding. By perceiving "learning from life" as insignificant, educational authorities help destroy people's biological ability to learn¹³, transforming it into a need, a right, and a service – to be provided by professionals.

¹³ This brings up the question as to how to acquire the "rational" form without losing the natural biological ability to learn; how can we gain instrumental knowledge without losing what we can
(continued)

Healing from dominant ideology and regaining sanity necessitate two things: first, stop using numbers to decide people and community's worth and, second, regain a pluralistic attitude towards knowledge. This necessarily treats mathematics as a means rather than as a master. As an artistic and scientific tool, mathematics can help us realize the harm we as humans do to nature, to ourselves, and to communities as a result of our ways of living and, thus, help us in how we can reverse this process. Where I currently work (Shufaat Refugee Camp), there are about 4,000 students in the four schools. If we assume (and this is a minimum) that every child urinates 1 litre a day, and uses the flush toilet only once (9 litres), that means 40,000 litres are wasted every day. It is pure madness to go on using the flush toilet in such a place where water is very scarce. Obviously, we need to find alternatives. This is part of what we are talking about and trying to replace at the camp.

CURRENT SITUATION IN PALESTINE

In schools, we become conditioned to care only for ourselves, against others. This ideology of "each person for oneself" is the worst that can happen to people-in-community. This was the worst outcome of the Oslo agreement which took place in 1993 between the Israeli government and the PLO. The spirit of the 1970s and the first *intifada* was replaced by how much a person can get for himself. Before 1993, competition was confined to schools; after 1993, it permeated all aspects of life. It became a main tool in creating and spreading the ideology of "each man for himself". Competition (in the sense of comparing people along a vertical line) can never be in harmony with the well-being of people, communities, and nature. It turns things around where people and communities become agents in their own destruction. A challenge we face, thus, is how to teach without competition; this is harmonious with wisdom.

This fragmentation, where every individual cares only for self regardless of what happens to others, to community, and to nature, is accompanied by fragmentation due to restrictions on movement, which was actually started by the British and French occupations of the region after the First World War. Over the years, I have been experiencing how my world was shrinking and getting more fragmented. Borders have been increasing and tightening over the years – not only at the physical level but also at the perceptual, social, and cultural levels. It seems that fragmentation of knowledge into subjects at school, where every class/ field is not related to any other, paved the way for other aspects of life to be fragmented. This logic led eventually to the age of information where every piece of information stands alone. One thing I am increasingly noticing is that when young people interact through language, their sentences hardly intersect – they are like parallel sentences that never meet. The inability to connect aspects and phenomena is reaching the level of a plague. This is ironic because a main role of mathematics

gain without institutions, professionals, and technology. It is important not to lose the rich and tremendous mathematics that we can learn without instruction such as sewing, hand-writing, planting, playing, building, hiking, climbing...

is to see the logic that underlies reality and that brings the various parts into a system; a main role is to help us see the whole clearer and be able to make sense of our experience. Fragmentation and borders are always connected to occupation and conquest, not only of land but also of worthiness, knowledge, perception, language, and culture. To give just a small example, with my doctorate degree I only know two languages; my father left school in fourth grade and started working. He learned four languages. The concept of identity (which we are now experiencing in the form of Palestinian identity (and which is loaded with mathematical connotations/ aspects), is a very good example that combines borders, fragmentation, occupation, and conquest. The concept of identity was the prelude to the apartheid wall built by Israel. But while the wall is a very visible aspect, identity is embraced as a positive aspect. It seems it is much easier to fool the mind than fooling the eye. It always puzzled me that we as human beings brag about – the mind – is the easiest to deceive. I believe that this is so whenever the mind works without wisdom.

When I was growing up, my sense of belonging was to the Arab World. Now, I can only move within a very tiny part of Palestine. I am not even allowed to visit Jerusalem where I was born and which is less than 10 minutes away! Despite all the talk about “we are now living in a global village” and despite the tremendous technological advances in communication and movement, people everywhere seem to be confined by one form or another of border, fragmentation, occupation, and conquest. Those that are less visible are more dangerous.

Although all current indications point to Israel’s unwillingness to allow for a Palestinian state to emerge, still it would be very beneficial exercise, for us as well as for others, to be involved in reflections and discussions concerning the teaching of mathematics in anticipation of a state. The notion of foreground that Ole Skovsmose talks about is relevant in this regard. I believe that the Palestinian situation – because of its dynamic nature – can provide a rich case in exploring issues such as the relation between mathematics and the state (especially before its formation, even though it is not likely to happen). One question, in particular, is how we can avoid the pitfalls that others got into in relation to teaching mathematics in a way where it can help us live in harmony with values that protect life and enhance understanding.

Using Arabic language and culture to enrich the teaching of mathematics in Arab schools

Whenever possible (and this requires teachers who appreciate both), it would be very enriching to teach mathematics and Arabic together. The Arabic language has many characteristics that make it close to mathematics. First, the language is built on patterns, which means once you know the three-letter root of any meaning, one can form many other words according to patterns (for example, the words write, book, office, library, desk, etc. are all different in English, while in Arabic they are all formed from a 3-letter root. In addition, the same roots of different meanings show connections in the minds of Arabs in ancient times that can be inspiring today. For example, “discussion” and “chiselling” have the same root, which reflects the fact that ancient Arabs saw that the purpose of discussions – just like in

chiseling a rock – is to beautify what you are dealing with; i.e. the purpose is for the two persons to come out more beautiful as a result of the discussion. Second, *al-muthanna* (which has no synonym in any European language, with the exception of ancient Greek, and loosely means “dual”) embodies logic different from Aristotle’s and Hegel’s. Whereas anything is either A or not A and cannot be both in Aristotle’s logic, and whereas A and not A can form a synthesis which is higher than both, *al-muthanna* can be thought of as a triad where A remains A and B remains B but a relation between the two develops that is very important to both. This is extremely relevant to the concept of the “other” which is so popular in the world today. Third, Arabic poetry falls into 16 basic patterns. Fourth, Arabic script has harmony and beauty that can bring out the aesthetic dimension in mathematics; where art, Arabic, and mathematics can meet. Fifth, the sounds of reciting the Koran reflect enchanting patterns (but for one to feel it, s/he has to hear it from a real person, not from a recording). In addition, which is the sixth point, the movement of the moon is central in Arab culture which makes it excellent material for teaching mathematics.

NOTES

- ¹ The role of “elite” universities in creating current crises, in the US and UK as well as around the world, cannot be ignored. Most decisions that were taken in the various fields – politics, economy, finance, food, agriculture, education, military, raising children, health – were taken by graduates of elite universities.
- ² The plural for knowledge is not used in English. When Arabs first encountered Europeans and heard for the first time the phrase “Department of Education” the way they translated it was “House of Knowledges”.
- ³ What happened to my mother’s mathematics happened to her Christianity. Missionaries from the US came to our home to “convert” my Christian family into their Christianity! She was one of the last Christians that carried the spirit of Jesus as it was lived through generations over 20 centuries. It is hard to find Palestinians today who carry that spirit in their hearts and daily lives. Religious missions conquered my mother’s Christianity the same way educational missions conquered her knowledge. Both, her mathematics and Christianity were wiped out in the name of progress! Just like I could not see my mother’s mathematics, missionaries could not see her Christianity and educators could not see her wonderful ability for upbringing children. The same thing happened to the knowledge of Palestinian peasants in farming.
- ⁴ In the sixth grade, the British textbook which was used included shares. I got full grades in all tests but up till now I never owned a share and never experienced its meaning.
- ⁵ Those who hold high degrees (consciously or not) hide this fact and blame religions and politicians for the mess in the world. It wasn’t Roosevelt who convinced Einstein to build the atomic bomb but the opposite: it was Einstein who sent letters to Roosevelt convincing him to support making (and using) the bomb!
- ⁶ There is a word in Arabic *al Ahaali* which does not have a synonym in English. Briefly, it means people who are connected to a place, history, collective memory, and to one another through a social-cultural-economic fabric.
- ⁷ A Palestinian anthropologist, Sharif Kanaaneh, uses the analogy to grafting fruit trees on bitter almond trees. Bitter almond trees provide strong basis against any diseases that can hit the trees.
- ⁸ I use the phrase self-rule in the way Gandhi used it to mean *swaraj* in Hindi. I worked with 7th grade girls in Shufaat refugee camp at two levels: by every girl keeping a record of what she eats and how she spends her day (such as watching TV, talking over mobiles, using computers); and by every 4 or 5 girls producing a “magazine” (not for the market) without needing permit, money, or editors (to discover what they can do without institutions and professionals but with what they have).

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- ⁹ It is worth comparing the destruction done to Ramallah by trucks and tanks with the destruction done to Gaza through tanks and warplanes. Although the role of sciences and mathematics is crucial in both destructions, Gaza can recover while Ramallah is highly improbable.
- ¹⁰ An old Palestinian woman once said, "Anything that can be bought with money is cheap". This is so true about education: anything we can measure is not significant. Aspects such as happiness, well-being, dignity, compassion, responsibility, and wisdom cannot be measured.
- ¹¹ It is worth mentioning that the World Bank's first priority (after it was allowed in Palestine after Oslo) was education. Once the mind accepts numbers as measure of people's worth, other myths fall in place.
- ¹² We need to ask why this fundamental right and biological ability is absent from the Universal Declaration of Human Rights, the UN Convention on the Rights of the Child, and institutions in general.
- ¹³ This brings up the question as to how to acquire the "rational" form without losing the natural biological ability to learn; how can we gain instrumental knowledge without losing what we can gain without institutions, professionals, and technology. It is important not to lose the rich and tremendous mathematics that we can learn without instruction such as sewing, hand-writing, planting, playing, building, hiking, climbing...

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