Original Article

The Covid-19 Pandemic: A Challenge for Values in School Mathematics in Iran

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Abstract

World is divided into six continent and within each, there are many separate regions called "countries". Some are called "first world", trying to dominate the others whom are known as "third world" and rarely, people enquire about the "second world" in between (We are aware of this political/ideological division as aftermath of the World War II and the notion of "three worlds" suggested by Mao Zedong)! The claim is that this division has nothing to do with "ranking" the countries, but it is culturally weird to hear "ordinal numbers" and not giving them "values" of either "priority" or "inferiority"! And in the midst of everything, the world faced a horrible phenomenon called Covid-19 that soon became a pandemic! Within a short period of time, the whole world, despite of any ranking, felt how fragile and hopeless is in the battle with this monster! And yet, it is soon to expect that decision makers who govern the world, must be aware that without well-being of everyone, there is no other way to defeat the virus. This is an irony! Isn't it? No matter how wealthy or poor, dominant or dominated, so-called developed or developing the countries are, in our view, they only have one solution to this devastating problem that is to know that the world is connected and no part of it is in joy while others are in pain! Hopefully, we are entering a new era of deeper understanding of what humanity is! A big lesson to be taught by the opportunity that Covid-19 created for human beings! Thus far, Corona and Covid-19 pandemic is not just a treat but a wake-up call for humanity to believe that "If you've no sympathy for human pain, the name of human you cannot retain!"

Keywords: values, school mathematics, implicit vs. explicit values, covid-19 pandemic, face to face vs. virtual education

Human beings are members of a whole,
In creation of one essence and soul.
If one member is afflicted with pain,
Other members uneasy will remain.
If you've no sympathy for human pain;
The name of human you cannot retain!
Sa'adi (Gulestan, 1258 A.D).

بنی آدم اعضای یک پیکرند
که در آفرینش ز یک گوهرند
چو عضوی به درد آورد روزگار
دگر عضوها را نماند
قرار
تو کز محنت دیگران بی‌غمی
نشاید که نامت نهند آدمی

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I. INTRODUCTION

Reviewing the history of curriculum reforms in mathematics show that major developments in mathematics and other incidences including epistemological, psychological, philosophical, technological, political, geopolitical, economical and even environmental and social, have had great effect on mathematics curriculum (Clements & Ellerton, 1996; Robitaille & Dirks, 1982). Long time ago, Schoenfeld (1987) showed that how mathematical problem solving and mathematics curricula as their consequences, have undergone pendular changes and still the pendulum is swinging! To give some examples, the “new math era”, “social utility” approach, “back to basic” movement, “problem solving” and “problem posing” undertaking of 80’s and 90’s and “real- life mathematics” and finally the “mathematics literacy” and modelling of OECD enterprise, deserve to be studied. Of course, there had been many more sudden and short time pushes for school mathematics change that has greatly geared towards free- market demand and not necessarily rooted in research findings or superior occurrences.

One of these great occurrences that the world has challenged with, is devastating Covid-19 pandemic. The pandemic forced schools to close down and virtual teaching substitute the face-to-face teaching and at the best possible mode, hybrid teaching is used in some schools. The virtual education indeed, has and will change many aspects of education and in particular, curriculum, teaching and learning processes and students’ assessments. School mathematics has and will be challenged by the covid-19 pandemic and during the virtual education at the global and local levels as well.

On the other side, for years and years, there was a myth that mathematics education could be considered as culture - free and thus, value - free, due to the nature of it and therefore, it is acceptable to design an “international” curriculum for it. This firm believe was challenged by Alan Bishop (1988), when he brought up a vital issue regarding values and culture in mathematics education. Bishop provided opportunities for many mathematics education researchers around the globe to design and conduct rigorous research on this area and gather more solid evidences regarding the importance of value and culture in all aspects of school mathematics. To this end, it is helpful to have a glance on the origin of this conception in nearly half a century and its effect on mathematics education worldwide. The paper is presented in four distinct and episodes namely the importance of values in mathematics education, Covid-19 pandemic and its effect on schooling, virtual education as the main delivery system for teaching and learning, and speculation about new sets of values and mathematics education in the new paradigm as aftermath of pandemic, based on Iranian culture. Last not the least, connecting these four episodes by stressing on an overarching value that the world is much in need of that, since “human beings are members of a whole, in creation of one essence and soul. If one member is afflicted with pain, other members uneasy will remain. If you’ve no sympathy for human pain, the name of human you cannot retain!”

II. LITERATURE REVIEW

For many years, mathematics communities around the world have believed that “mathematics is the most value-free subject in school curriculum” (Seah et al., 2001). We can perceive this belief to mean that mathematics is void of cultural or ideological values and anything else except those inherited through mathematics per se (Gooya & Gholamzad, 2018). The research field of values in school mathematics teaching and learning has been conceptualised in explicit ways and developed by Alan Bishop in late 80’s.

Bishop (1988) as the pioneer in challenging the neutrality of mathematics education, introduced two concepts of “enculturation” and “acculturation” in school mathematics curriculum and explained that how implicitly, the local mathematics curricula have changed during new forms of colonialism in modern era. Bishop’s interpretation of “enculturation” and “acculturation” was that a foreign culture, imposed itself into another culture and deliberately and gradually, change the mainstream values that are rooted in that culture. He then went on to question the myth of “culture-free” mathematics by showing that mathematics has been “one of the most powerful weapons in the imposition of western culture” (Bishop, 1990). Along this line, he discussed the relation between culture and mathematics education at the second “Iranian Mathematics Education Conference” in 1997, using various examples from different cultures and focusing on ethnomathematics as a research method to facilitate the studies that are involved culture and values.

Bishop, FitzSimons, Seah and Clarkson (1999) expressed that teaching and learning of school mathematics have been regarded by many teachers, as being value-free as well and they do not consider teaching any values in their mathematics teaching. However, he argued that teaching the values inherited in mathematics, could promote education for democracy and of making school mathematics more relevant to the demands of everyday living.

Since the conception of the idea of values and culture in mathematics education, Bishop (1988) proposed three pairs of values in mathematics as “rationalism and objectivism”, “control and progress” and “mystery and openness”. His idea about these three pairs is that “rationalism claiming the inductive method to reach the only right way, denies the heuristic pragmatism and practical rules” and “when analyzing a reasoning and disproving a hypothesis, rationalism value guides us” and based on this description, Bishop concluded that “proving, abstraction and theorization, are the reflections of rationalism in decision making process” in mathematics education (Bishop, 1991). On the contrary, “while rationalism is about the rationale of the relationship between the ideas, its complementary dual, objectivism, is about the generation of ideas and facts. This denomination enables to deal with the symbols in mathematical knowledge and abstract assets as if they are objects (Bishop, 1991 & Bishop et al., 2003.)

Later in developing this idea, Bishop (1996, cited in Seah, 2008) introduced three interdependent categories of values as “general educational”, “mathematical” and “mathematics educational” that are reflected in the mathematics classroom, mathematics, and mathematics education. Though Seah (2004) found that general educational, mathematical and specifically mathematics educational values, do not

exist mutually exclusive of one another and some might be present across categories. He then gave “progress and its associated value of creativity” as an example of mathematical and mathematical education value, as much as a general educational value. However, Seah (2008) believes that majority of mathematics teachers are not aware that they are teaching values as well. But there are any evidences to show that how many education systems are pushing towards indoctrinate certain sets of values in all school subjects.

III. RESEARCH ON VALUES AND MATHEMATICS EDUCATION

In 2008, a large-scale study “Third Wave Project” was launched of valuing in mathematics and what students value in their mathematics (Seah and Wong, 2012). Since then, a number of large-scale studies conducted to shed more lights on the ways in which, valuing and values in mathematics education effect on different aspects of teaching and learning mathematics.

The importance of values in school mathematics has attracted a number of mathematics education researchers to focus on this issue. In particular, the East Asian Students’ achievements in TIMSS and PISA studies in one hand, and their poor attitude towards mathematics on the other hand, many mathematics education researchers became interested to conduct more in- depth studies to better understand this phenomenon. In the meanwhile, Clarkson, Seah & Bishop (2010), asserted that “mathematics does not readily provide opportunities for the explicit teaching of values” (p. 179). By referring to Bloom’s Cognitive and affective domains in his taxonomy of educational objectives, they used “positive emotional state” as “emotional domain” and looked for the possible relation between “mathematical wellbeing” (MWB) and values. Thus Hill, Kern, Seah, and Driel (2020) in their study, focused on students’ conceptions of mathematical wellbeing and values. They used three- domain framework for MWB as cognitive (the knowledge and skills required to do mathematics at school), affective (incorporating values in mathematics education), and emotional (feelings, responses, and reactions toward mathematics)” (p. 3). They justified the study by indicating that “as mathematics often evokes greater negative reactions among students compared to other school subjects, understanding student well-being in mathematics education is particularly important if we wish to improve the way the subject is received and experienced by students” (p.8). The findings showed that “there is a similarity between the factors that contribute to MWB and what students value in the mathematics classroom” (p.18). With this finding, the researchers concluded that “well-being is context-specific; thus, student well-being should be explored in individual subjects. Well-being is also value dependent, and the factors students value as important when learning mathematics are the same factors that promote MWB” (p.20.)

Tang, Seah, Zhang and Zhang (2020), investigated the mathematics learning attributes that are valued by students in Eastern China. They found that students’ mathematics learning values consist of seven elements including culture, memorization, technology, objectivism, practice, understanding, and control. Another important result of this study was students’ judgment about “what is important in mathematics

learning” that played an important role in regulating their learning activities. In return, what students valued as important in mathematics, guided teachers in designing learning activities. The researchers emphasized that “mathematics education reform is a kind of cultural practice; therefore, in the process of promoting education reform, it is necessary to pay attention to students’ values” that has “crucial practical implications for the ongoing reform of the mathematics curriculum in China, which aims at cultivating students’ key competencies, including reasoning, modeling, creativity, and spatial sense” (Ministry of Education of the People’s Republic of China [MOE], 2001, 2012, 2017, cited in Tang et al., 2020, p.2.)

Davis, Carr and Ampadu (2019) conducted a quantitative research involving elementary, junior high school and senior high school students, to investigate the effect of grade level on what Ghanaian students consider important in their mathematics learning. As well, how this importance, reflect their teachers’ values and how values adopted by curriculum and textbooks, echo the students’ values. The study concluded that “interesting differences in valuing in mathematics education across grade levels do exist for primary, JHS and SHS students. The mathematical value of control (Bishop, 1988) seems to be embraced more by students in higher grade levels from JHS to SHS”. Another major finding was that seven foremost values for the Ghanaian students were “achievement, relevance, fluency, authority, the use of ICT, versatility and Strategies in their learning of mathematics”. However, “some of them are more highly prioritised at different stages of schooling. For example, while control is valued at all levels, it is prioritised at the SHS level as compared to the Primary and JHS levels. The educational implication of this study is that “in order to provide a better understanding of valuing across grade level, it might be important to ascertain through research, not only on how students’ values reflect those of their teachers, but also how values espoused by curriculum materials such as the syllabus and textbooks reflect those of the students” (p. 100.)

In another study conducted by Akcak ı n, Dede & Kaya (2020), the purpose was to focus on mathematics, mathematics education and general education values that convey through mathematical modelling. The study was qualitative using document analysis. One of the finding of this study, was indication of the similarities and differences between mathematical modeling tasks in general and mathematical modeling tasks developed in different cultures, in particular.

Bishop’s (1997) suggestions regarding the potential of ethnomathematics for the study of culture and values in mathematics education, stimulated a number of Iranian scholars to conduct researches taking this approach. The studies varied from the historical development of counting instruments, carpet weaving, traditional buildings, mosques, painting and many other cultural artifacts and their relation to mathematics (Bayat, Abbaspour & Tafakori, 2004; Karamian, 2003 & Karamian, 2004).

Further, in a study conducted by Hajazizi and Gooya (2016), they focused on a lay architect who was building a very sophisticated nursing home in one of the eastern cities in Iran with desert- traditional dome and ventilation system. They found out that the lay architect and his team members, had strong geometrical visualization, great computing proficiency, problem- solving competency and decision-

making ability that rooted deeply in culture and not in the formal schooling. Along with observing the traditional architects, they analyzed the content of mathematics textbooks suggested that instead of using artificial cultural symbols, it is more appropriate to implement the findings of various ethnomathematics (D'ambrosio, 1985) to help students to see the relation between mathematics and culture.

More recently, Aghajani (Jan. 2021) who had experiencing of working in gardens as a family profession during her childhood, designed a study to better understand the mathematical ideas beneath their activities of building and creating the gardens. For this purpose, four gardeners were observed and interviewed in the field and the data collected accordingly. Analysing the data showed that indeed, Iranian gardens respected as a cultural product and Aghajani was able to develop a model for combining ethnomathematics and mathematical modeling for secondary school mathematics using cultural aspects and values inherited within it.

These studies show that ethnomathematics approach helps to reveal the values imbedded in mathematics and mathematics education and could be conveyed implicitly, through school mathematics.

Nevertheless, in education system such as Iran¹⁾ and Malaysia that declare their education system is driven by specific ideologies, usually sets of explicit values are expected to be taught in schools via all subjects including mathematics. In the Malaysian curriculum where "The 16 moral values" are explicitly spelled out in the Moral Education syllabus. These values were identified from the four main religious and ethnic groups of the country - Malay (Islam), Chinese (Buddhism and Taoism), Indian (Hinduism) and Christians (Lim & Ernest, 1997). These values "are known as *Nilai-nilai mumi* (the pure, ethical or noble values) and include: compassion, self-reliance, humility, respect, love, justice, freedom, courage, physical and mental cleanliness, honesty, diligence, co-operation, moderation, gratitude, rationality and public-spiritedness" and could be put into three categories of "epistemological", "social and cultural" and "personal" values, according to Lim & Ernest (1997). The research concluded that "some of the 16 moral values (i.e., freedom, love, respect, humility and physical and mental cleanliness) neither occur explicitly or implicitly in the mathematics curriculum documents, nor were they espoused by any of the mathematics teachers". This is contrasting the official aim and expectations that all 16 values "inculcated via all subjects including mathematics."

The educational reform is a common practice that is driven by new needs and new research findings and its aim is to improve learning. Gholamazad (2021) in a large- scale study, investigated the elementary school mathematics curriculum in Iran. In her study, she used mixed method in which, different means and instruments were designed to collect data from different and innovative aspects. The methods she used for the data collection included document analysis, focus group, connoisseurship group (Eisner, 2017), teachers' narratives and living experiences, students' achievement tests and various questionnaires.

1) The education system in Iran is centralized and driven by ideology. The system went under severe changes in terms of structure, curriculum, teacher education and assessment in 2010-2011. The new system is divided into six years elementary, three years junior high school and three years upper secondary. The teacher education is solely through "Farhangian University" and "Shahid Rajaiee University."

She concluded that well- thought decisions should be based on reliable information gathered from implemented curriculum by teachers in schools. In addition, one of the main educational implication of this study, she formulated a number of areas that needs more in- depth study and in particular, she has mentioned the necessity of considering “culture” and cultural values as a crucial component of any major or small- scale reform in elementary school mathematics program in Iran. To give an example, Gholamazad (2021) argues that we need to redesign the mathematics curriculum taking into account that what issues have highest values in terms of mathematical concepts and processes that worth to be included in the mathematics curriculum at elementary school and how should they be organized and presented, as well as considering the great cultural variation in the country.

However, culture and values are both sensitive and complex issues in one hand and relative and implicit on the other hand. Therefore, dealing with them is a great challenge for mathematics education within general education. Because of these attributes, in most education systems, the development of curricula is severely influenced by kinds of interpretations that policymakers and decision makers provide from culture and values (Gooya & Gholamazad, 2016.)

In designing curriculum, the general perception is that there is a positive correlation between mathematics performance and attitudes towards mathematics. However, as Pang and Seah (2020) stated, “Despite the outstanding performance in mathematics of Korean students, the lowest confidence in mathematics has been repeatedly reported” (p.18). They tried to explore this phenomenon from culture and value perspective. Their finding is eye- opening, since they identified two sets of external vs. internal values. According to Pang and Seah (2020), the external values of mathematics for Korean students are vary from having a good job to successfully pass “high stakes assessments such as college entrance examinations” and to achieve these goals, Korean students are aware of the value of “understanding” and “connections”, in accordance with “accuracy” and “efficiency”. The researchers are convinced that the four values could “explain to a great extent why Korean students can still achieve high mathematical performance, even though they may not like mathematics and/or doing mathematics” and conclude that the combination of these four values, “play a role to have willingness to attain high performance” (Pang & Seah, 2020.)

As Seah (2019) indicated, “student well-being experienced in mathematics might differ greatly from well-being experienced in English or music, which might differ greatly by student, depending on the extent to which they perceive and value the subject” (p.3). He then stated that “direct teaching of values during mathematics lessons, especially in the absence of any context, may not be an effective nor sustainable approach” (p.12). After these findings, Seah (2019) could say with more confidence about the seemingly conflict between Korean achievement and attitudes towards mathematics that what has been hard to observe directly is that Korean students value particular beliefs that motivate them to use “the relevant mental strategies, and to develop enabling emotions!” (p.18.)

Mathematics per se, is capable of developing certain values in learners that are unique and enhancing

human culture and society. Among them, there are sets of dual values, using Bishop's terminology at the outset of theorizing the issue in mathematics education. In a study focusing on the place of values in mathematics curriculum in Iran, the authors did a critical review of history of mathematics using a cultural lens and they found that the following dual sets of values are inherent in mathematics and so, mathematics education at both school and university level, is able to inculcate some of them in students, depending on how thoughtful the mathematics curricula are designed and implemented. In particular, we could identify numerous dual sets of values. To give some examples, logic and intuition, structure and deconstruction, problem solving and problem posing, rigor and speed, experience and abstraction, rule and exception, truth and refutation, personal and social, continuity and acceleration, patience and tolerance, giving reason and asking for reason, ensure and convince, and many other values could be cultivated in students through mathematics education. Taking these into account, there are a number of challenges that should be taken seriously by mathematics curriculum researchers in Iran. For instance, how to decide on values to be taught, what content is suitable for teaching those values, what values should be introduced explicitly and which ones should be implicitly woven into curriculum and teaching and which one could be presented explicitly, and how cultural context could facilitate the teaching of the values.

As Bishop (cited in Seah, Zhang & Bishop, 2020) has emphasized, there is a greater need than ever "to make explicit again the humanness of the mathematics discipline. What we would like to see emphasized is the bringing back of the person: (Mathematics) education is about people and about the exchange of ideas between people" (p.8.)

IV. THE BURST OF THE COVID-19 PANDEMIC: VIRTUAL EDUCATION REVISITED

Most education systems are influenced by implicit values interwoven into school curricula including mathematics, as well as sets of explicit value statements regardless of grade level or school subject that are mandated in some education systems. However, in the midst of all educational practices in one way or another, the world was confronted with an unwelcomed stranger called covid-19 virus. The spread of the virus soon led to a devastating pandemic that influenced all aspects of people's daily lives, including education. All of the sudden, teachers and students lost the chance of face-to-face teaching and learning and were forced to look for a different means of conduct. Virtual education became an alternative method for schooling. The virtual form of education has brought with itself great challenges including how to teach and how to make sure that students learn. So far, there is a body of reliable evidences based on the experiences of mathematics teachers that can help policy-makers to understand that the explicit non-mathematical values cannot be easily imposed on students via virtual education. On the contrary, there might be a new horizon for emphasizing on values embedded in mathematics such as rigor, precision, logical thinking, problem posing, problem solving, computational literacy, algorithmic thinking, etc.

In an issue brief by UNICEF (Alam & Tiwari, June 2020), six challenges have been mentioned during the pandemic that all education systems are facing as curriculum, students' individual differences and diversities, professional support system for teachers, technological infrastructures, parents' roles and safe home environment for learning.

At "The Friends School of Atlanta" (FSA), the focus is on co-curricular activities, community building and social and emotional learning. To support children and their families, weekly "Silent Meeting" is being held virtually and the value is placed on being a caring, inclusive and safe community.

In a recent study in Iran (Hassani & Gholamazad, 2021), the researchers found that more than 96.5% of teachers used smart phones to teach, even if they had access to tablets and laptops. As well, about 96% of teachers used Telegram and WhatsApp social media along with SHAD (Education Network for Students) that is designed and supported by the Ministry of Education. The point is that Telegram is filtered in Iran and users need VPN to access it! Majority of students share one smart phone with parents and other siblings at home and they have to take turns for using it. Therefore, teachers have to prepare the lessons using voice, film, video clips, animations and such for students to help them with this situation. Since online teaching requires straight access to internet and reliable technology.

Immediately after schools closed downs, the Ministry of education with the cooperation of national TV and a number of volunteered teachers across the country, sat up a platform to deliver school curriculum for all 12 grades via two canals and announced schedule. This quick act was greatly appreciated by the public at large, since it helped all students to finish the school year of 2019- 2020, keeping in mind that most students had difficulty accessing internet for different reasons including infrastructure, tablet, cost and else. However, after summer and disappointment of public to know that the pandemic will not be over for new school year, the scene has changed and teachers are exhausted. They tried their best to overcome the barriers and this wish did not come through!

They have tried to create an interactive environment for teaching and learning through "canals" or "groups" using social media that each form, has its own limitations. Group environment allows for more interactive virtual classes and yet, the distractions are hard to control. On the other hand, teachers as admins, could control the virtual classes in the expense of reducing the number of interactions. The choice of delivery system for teaching is deeply a matter of cultural sensitivity and complexity. For instance, some teachers use Instagram for their virtual classes, but many parents have cultural problems with this media and it is hard to forecast the consequences on the long run.

Covid-19 pandemic, shivered the world and education in particular and forced almost all education systems to either completely switch to virtual teaching or adopting some sort of hybrid model of face to face and virtual depending on the possibilities and limitations. Spar (2020) argues that "these seismic changes are both a direct result of the COVID-19 pandemic and a long-delayed response to demographic and economic shifts. But they are also-subtly, and critically-the result of technological change" She then explains that how efforts for "online learning has actually been underway since around 2010, when

universities and private entrepreneurs first began to experiment with Massive Open Online Courses, or MOOCs”, an endeavor that did not succeed to the degree that be able to change the traditional practice of higher education. However, the pandemic “forced the entire landscape of higher education to embrace the technologies of online learning”. Spar’s (2020) forecast is that the changes brought about by new technologies and new modes of learning, will fundamentally change all aspects of higher education and there will be “a new attention to MOOCs” (Sep. 2020).

There are enormous evidences to show that virtual education will endure to play an essential role in education since the school’s lockdowns continued and there is no clear horizon for schools’ reopening worldwide. This is the main reason to scrutinize the scope of virtual teaching and learning from different perspectives.

To better understand the culture of virtual learning, Hofsted (2001) focused on five dimensions of “power distance”, “uncertainty avoidance”, “individualism/collectivism”, “masculinity/femininity” and “long- term orientation”. Seraji & Attaran (2011) explain that virtual learning environment, is not limited to certain timeframe or physical place, and is multi- media and vast possibility of communication and variation of information sources. In their view, these attributes create an appropriate possibility for curriculum designers and curriculum developers in any curriculum reform attempt. They continue to say that information societies are based on learners who are critical, self-evaluator, enquirer and cooperative; learners that are capable of realizing their learning needs. By changing teachers and learners’ roles and designing suitable learning activities for virtual environment, they expect that students will gradually changing from dependency to independency in learning, form responding to external incentive towards motivating by intrinsic satisfactions, from short-time learning to life-long learning and from subject-matter to problem- based learning.

V. PARADIGM SHIFT!

Schools and curricula, will not go back to the situations before the pandemic! We believe that we have already entered or thrown to the new world! When Kuhn (1962) talked about Paradigm Shifts and their relations with the scientific revolutions, for many, the concept was more abstract than concrete. However, in the midst of pandemic, it is understandable for educators to see and feel that how this great shift is happening before our eyes. Despite the fact that it is scary for teachers and curriculum developers since they have not much idea about the new needs, possibilities, audience, delivery systems and many other unpredicted and unexpected factors. However, the certain reality is that things have changed! This is what Corona endowed to the world! The World have opportunity to restart, learn from the past and begin with new perspective.

In imposed situation, teachers do not have access to face- to face interactions with students. Thus, they are not able to use body language, five essential feelings, dialogue and quick feedback. Teachers are

no longer the facilitators and moderator of learning process in class. More importantly, teachers should evaluate the effect of his/ her teaching on students' mathematics learning in a very abstract way.

In Iran, the current mathematics textbooks are designed around "seat work", "activity" and exercise and the focus are not on "text" as "lesson". In addition, the number of pictures, so- called real- life incidences, word problems and using multi- representations for mathematics concepts are stressed overwhelmingly. However, in virtual teaching, teachers are modifying the textbooks to suit the extremely diversified situations by virtual education. As a result, teachers cannot faithfully follow the textbooks or other guidelines. On the contrary, the need to use their initiatives, innovative ideas and creative lesson designs. Thus far, they are doing everything by themselves, but there is an excessive necessity to revise all programs for professional development of mathematics teachers at this pandemic era.

Another major concern at the global level, is students' evaluations, ranking and promotion to the next grade level. An area that almost all of the existing measures have proven to be unsuccessfully, although practically and not based on research findings.

What constitute knowledge in this new world? Changing view about learning, teaching, knowledge and assessment. Pandemic has brought with it, many unexpected or even unimaginable challenges that school mathematics education is facing and as result, the paradigm change is near!

In the new paradigm, it is necessary to think that what values could be either implicitly or explicitly be developed via school mathematics. In particular, in virtual education, teachers do not have much evidences of what values they are disseminating to students through mathematics. However, with regard to Iranian cultural heritage, mathematics values will find an even higher place in the mathematics curriculum. In new paradigm, it seems necessary to pave the path for cultivation of new sets of values that are needed to make the virtual education more effective. Among those are spontaneity, self- motivation, self- regulation, independent thinking, autonomy, honesty, trust, justice, right decision-making, responsibility, perseverance, obligation, cooperation and collaboration, to give some instances. Mathematics is capable of cultivating these values on students through curriculum, textbooks, teaching and learning process and assessment procedures. This area needs new insights, and mathematics education researchers interested in value and valuing, should design new research and develop different kinds of research methodologies and paradigms to better suits the new situation. We can think of new sets of dual values to assist students' mathematics learning and bridge the gap between individual nature of virtual education and collaborative nature of human learning.

VI. CONCLUDING REMARK

The world is struggling with the strange and unexpected pandemic that has been unique in the written history. As many documents and survey studies have indicated, what has happened to education and schooling, is unbelievable and the consequences last long. There is no way of facing this big challenge

except the sincere determination of the whole world as one, to overcome the future disasters for human beings. Corona pandemic proved to the world that no matter how wealthy or poor the countries are, how dominating or dominated the governments are, how powerful or oppressed the people are, no matter what and what, all are hopeless by an extremely small virus! No government could claim that its country is safe and so, there is no need to think about others! No country could vaccinate its people and close down its border forever to keep people safe. In another note, there will be a paradigm shift in education! Virtual education has given access to the occasion of information and facts to children. They are not waiting for adults to tell them what to believe and what to avoid. They need to have critical minds to choose for themselves what is best for them. They question the world at large for justice and equity that is stolen from them. World will not be the same after Covid-19. The pandemic has taught us many great lessons and most importantly, we are connected to each other and as Sa'adi²⁾, the great Iranian poet of 12 century said, "human beings are members of a whole, in creation of one essence and soul. If one member is afflicted with pain, other members uneasy will remain. If you've no sympathy for human pain, the name of human you cannot retain!"

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

DEDICATION

We would like to dedicate this paper to honourable professor Alan Bishop who gave us inspiration and confidence to focus on two important issues of "culture" and "values" in school mathematics in Iran.

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2) This poem was suggested to be written at the entrance door of the United Nation at the time of its establishment. In 2005, the poem was woven in a Persian carpet and gave to the UN as a gift.

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