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Developing and Validating a Sustainability Justice Instrument to Transform Curriculum, Learning and Teaching

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Developing and Validating a Sustainability Justice Instrument to Transform Curriculum, Learning and Teaching

Ανάπτυξη, επικύρωση και έλεγχος της αξιοπιστίας ενός εργαλείου
αιφορικής/βιώσιμης δικαιοσύνης για το μετασχηματισμό των αναλυτικών
προγραμμάτων, της μάθησης και της διδασκαλίας

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Abstract

This paper deals with the development, validation and reliability testing of a sustainability justice construct. The sustainability justice construct and its contextualization in teaching, learning and curriculum was tested empirically for their reliability with the participation of 258 pre-service teachers in the Department of Education at the University of Crete. The Cronbach alpha reliability analysis revealed that the items measuring these two constructs are valid and reliable ($\alpha = 0.81$ and $\alpha = 0.81$, respectively). It is emphasized that an instrument that measures sustainability justice issues, in general and, in particular, as it applies to teaching, learning and curriculum, could act as a starting point for increasing teachers and learners' sensitivity on sustainability issues, thereby acting as a catalyst for transforming unsustainable practices.

Keywords: *Sustainability justice, teacher education, reliability analysis*

Περίληψη

Η παρούσα εργασία ασχολείται με την ανάπτυξη, την επικύρωση και τον έλεγχο αξιοπιστίας ενός εργαλείου αιφορικής/βιώσιμης δικαιοσύνης. Το εργαλείο αυτό δοκιμάστηκε εμπειρικά με τη συμμετοχή 258 φοιτητών του Παιδαγωγικού Τμήματος Δημοτικής Εκπαίδευσης στο Πανεπιστήμιο Κρήτης. Η ανάλυση αξιοπιστίας *Cronbach* α αποκάλυψε ότι τα στοιχεία που μετρούν τις δύο κλίμακες που συνιστούν την αιφορική/βιώσιμη δικαιοσύνη είναι έγκυρα και αξιόπιστα ($\alpha = 0,81$ και $\alpha = 0,81$ αντίστοιχα). Τονίζεται ότι ένα εργαλείο που μετρά ζητήματα αιφορικής/βιώσιμης δικαιοσύνης, εν γένει και ειδικότερα, για τη διδασκαλία, τη μάθηση και το πρόγραμμα σπουδών, θα μπορούσε να αποτελέσει σημείο εκκίνησης για την αύξηση της ευαισθησίας εκπαιδευτικών και μαθητών σε ζητήματα αιφορίας/βιωσιμότητας, ώστε να αποτελέσει καταλύτη για το μετασχηματισμό μη βιώσιμων συμπεριφορών και πρακτικών.

Λέξεις-κλειδιά: *Δικαιοσύνη, αιφορία, αιφορική δικαιοσύνη, έλεγχος αξιοπιστίας*

1. Conceptualizing justice in the context of sustainability

Justice is one of the most important moral and political concepts that have triggered human interest throughout history. Searching through various dictionaries, it has been found that justice is mostly connected with morality, fairness, due and law. Such conceptions to justice are highly influenced by western and eastern theories of justice. For example, the conceptions of justice to righteousness and reason are found both in Platonic and Confucian philosophies. Plato (427-347 BC) and Aristotle (384-322 BC), two leading figures of ancient Greek civilization, were among the earliest philosophers who devoted much of their thoughts and writings on justice. Plato in his main book “The Republic” (Politeia) attempts to define justice (dikaiosyni) as a human virtue that makes a person self-consistent and good. Similarly, justice for Plato is considered as social consciousness that makes a society not only good but also harmonious. Aristotle, Plato’s student, had a different point of view concerning the meaning of justice. In his famous work “The Nicomachean Ethics”, especially in Book V, Aristotle deals in considerable depth with the moral and political virtue of justice. He regarded justice as “the most perfect virtue” and “the confluence of all virtues”, arguing that justice is the need to safeguard common interests and personal interests. Plato’s and Aristotle’s writings on justice have been greatly influenced medieval (e.g. Augustine and Aquinas), early modernity (Hobbes, Hume, Kant and Mill) and contemporary (Rawls and Walzer) philosophers. John Rawls’s (1971) major work, “A Theory of Justice” builds upon the theory of the social contract associated with Locke, Rousseau and Kant. He perceives *justice as fairness and a virtue of social institutions* as well as a matter of a society’s organization and internal divisions. Walzer (1983) in his famous book “Spheres of Justice: A Defence of Pluralism and Equality” argues for a conception of distributive justice that he refers to as “complex equality.” For him *distributive justice* refers to fairness in the way things are distributed, paying more attention to how it is decided who gets what, rather than what is distributed.

In the last decades, the dramatic changes show that climate change caused mainly from the huge quantities of carbon that humans are releasing into the atmosphere threatens the very existence of all human life. There are warnings by many experts worldwide arguing that continued use of oil, gas and coal at current rates, especially among the fast developing and highly populated countries such as India and China, are likely to increase the global temperature by 2 to 2.5 degrees Celsius above pre-industrial levels. This is going to lead towards conditions that will make it difficult to handle any form of life on earth. According to [Stephen Hawking](#), “It will be difficult enough to avoid disaster on planet Earth in the next hundred years, let alone the next thousand, or million. The human race shouldn’t have all its eggs in one basket, or on one planet. Let’s hope we can avoid dropping the basket until we have spread the load.” Hawking says he is an optimist, but his outlook for the future of man’s existence is fairly bleak. The message passed by Hawking is that the capacity of the Earth to sustain future generations has reached its limits. Human society now consumes natural resources faster than they can be replenished, and as the Brundtland Commission stated in its report entitled ‘Our Common Future’, “sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987: 53). Since then, there are hundreds of definitions, showing the dynamism of the concept itself and its contextual nature. In a panel review of 37 international

experts, sustainable development was consensually defined as “*to making informed, contextual and conscious decisions driven by the principles of solidarity, justice, accountability, equity and transparency for the good of present and future generations, locally and globally and to act upon those decisions for advancing social, economic and environmental wellbeing*” (Makrakis, 2011). In both of these definitions, intergenerational justice makes an important presence. Thus, sustainability extends justice into the future and for the first time it brings the concept of intergenerational justice as a new dimension of justice that challenges the mainstream views about sustainability and justice. However, it seems that the discourse over the meaning of intergenerational justice becomes very complex.

Recently, the post 2015 Development Agenda with the 17 Sustainable Development Goals (SDGs) and the 169 targets drive the United Nations Framework Conventions on sustainable development and climate change, aiming to ensure that global temperature rise does not exceed 2°C above pre-industrial levels. This critical new framework for global action acknowledges the needs of future generations and intergenerational justice. Besides Goal 16 that makes special reference to justice for all and build effective, accountable and inclusive institutions at all levels, Goal 13 commits world leaders to take urgent action to combat climate change and its impacts, especially on climate vulnerable communities - those that are so often the least responsible for the problem. Failing to take action to protect the new climate change refugees, will probably have considerable impact on the target towards sustainable cities (Goal 11) and have an impact on global peace (Goal 16). Similarly, as climate change, affects oceans and land (Goals 14 and 15), people in many parts of the world are becoming unable to meet their basic needs of food (Goal 2), health (Goal 3), education (Goal 4) and clean water (Goal 6). Thus, climate change raises profound questions that extend ethical concern to current and future generations, making climate justice a global demand.

2. Defining sustainability justice

The concept of "sustainability justice" introduced by Makrakis (2016; 2017) reflects the four pillars of sustainable development: environment, society, economy and culture. Sustainability justice is perceived as a process, which: 1) seeks fair (re)distribution of resources, opportunities, and responsibilities; 2) challenges the roots of oppression, exploitation and injustice; 3) empowers all people to raise their voice, needs and rights; and 4) constructs knowledge, empathy, compassion, social solidarity and action competences. The concept of sustainability justice expresses an ideal that must find its place in teaching, learning and curriculum processes and practices.

As the four pillars of sustainable development are overlapping, so do the corresponding sustainability justice dimensions (Figure 1). For example, social justice does exist if economic growth is driven by environmental preservation strategies. Similarly, environmental justice does exist if there are effective policies for tackling economic and social injustices. Environmental, social and economic justices are driven by sustainable cultural norms and values. This places cultural justice as a core of sustainability justice, one that can balance all the other three dimensions of sustainability justice and drives sustainable development along the path of economic, social, and ecological justice. In an integrative way, the cultural justice component encompasses all the other three

components of sustainability justice in the same way as it does to the three sustainable development pillars.



Figure 1. The four pillars of sustainable development from a holistic perspective (Makrakis et al. 2012).

In the field of education, it has been revealed that the social justice dimension has gained recognition as a core component of the teaching and counselling profession (Ratts et al., 2016; Havig, 2013; Adams, 2010; Chang, Crethar, & Ratts, 2010; Miller et al., 2009). Bettez (2008), in her discussion of university teaching, outlines seven skills, practices and dispositions of activist social justice education. These include: (1) promoting a mind/body connection, (2) conducting artful facilitation that promotes critical thinking, (3) engaging in explicit discussions of power, privilege, and oppression, (4) maintaining compassion for students, (5) believing that change toward social justice is possible, (6) exercising self-care, and (7) building critical communities (p. 276). Grant and Gillette (2006) also claim that there is a number of knowledge bases necessary for effective, socially just teaching. They suggest that teachers need to be culturally responsive in the classroom, to know themselves and be open to change, to hold a well-developed philosophy of education and to have substantial pedagogical skills and knowledge. Similarly, the other three sustainability justice dimensions could also play their own role in turning education to function as an agent of social transformation.

Sustainability justice education (SJE) can be understood and defined as a process and praxis. As a process, SJE is perceived as a journey seeking to integrate sustainability justice across the curriculum and teaching practices. It also aims at instilling the ethics of sustainability justice within and in the out-of-school context of students' lives. As a praxis, SJE seeks to actively engage learners and teachers in learning to transform oneself and society. This places transformational change as a key driver for sustainability justice education. In this context, a sustainability justice teacher is someone who:

1. Models democratic, egalitarian and humanistic values.
2. Considers his/her teaching as inherently ethical and praxis-oriented.

3. Encourages his/her learners to uncover and critically assess their implicit beliefs and values.
4. Engages with a critical reflective practice that redefines his/her role as a teacher.
5. Is critical to a curriculum that tends to reproduce existing social norms and values in an unquestioned way.
6. Rejects uncritical forms of teaching and knowledge driven by depoliticized and dehumanized values.
7. Is aware of the wider world and has a sense of his or her own role as an active citizen.
8. Respects and values diversity, personal experience and feelings.
9. Feels uneasy by social, environmental, economic and cultural injustices.
10. Is willing to act and make the world a more equitable and sustainability-just place.
11. Takes responsibility for personal actions and shares responsibility for others' actions.
12. Feels an ethical responsibility to the disadvantaged, marginalized and oppressed.
13. Ensures that learners' voices, opinions and ideas are valued and respected.
14. Helps learners to see each other as co-learners rather than competitors.
15. Uses ICT technologies and media to raise awareness of sustainability injustices.
16. Contextualizes abstract knowledge with real-life local/global issues.
17. Uses learning resources that present different perspectives and voices.
18. Encourages learners to build bridges from one culture to another.
19. Rejects apathy and silence.

These roles imply that questions of sustainability justice are fundamentally questions about the ethics of knowledge (curriculum), learning and teaching. It is also about the ethics of fair and equitable allocation of resources, rights and obligations in society (social justice), environmental racism, especially in cases of disproportionately and unequal exposure to environmental hazards (environmental justice), unfair trade, economic exploitation, socio-economic polarization and income distribution (economic justice), violation of human rights, gender, diversity and heritage (cultural justice).

3. Testing the reliability of the sustainability justice construct and its educational determinant

A questionnaire was designed that seeks to measure and analyse pre-service students' representations about sustainability justice. The sustainability justice items in the questionnaire represent the four dimensions of sustainability justice, namely, social, environmental, economic and cultural. Besides the scale of sustainability justice, a number of items were included to contextualise sustainability justice with education. The questionnaire also includes a number of background variables, such as gender, year of study, socio-economic status, engagement with environmental, social and political actions, as well as perceptions of education roles and socio-political orientation.

The questionnaire was delivered and answered by 258 students at the department of primary school education, University of Crete. The sample consisted of 88% females and 12% males. Their distribution in terms of the study year was 29%, first year, 27% second year, 16% third year and 28% fourth year. Respondents' socio-economic background depicts a mean of 2.3 on a 4-point scale concerning parents' education and 2.3 concerning parents' economic status. Similar mean trends have been found with respect

to environmental actions engagement (Mean 2.3, SD 0.68) and engagement with social actions (Mean 2.3, SD 0.94). However, engagement with political actions (e.g. participation in peace and anti-racist demonstrations) is much lower (Mean 1.6, SD 0.75). The highest percentage of respondents perceive themselves as progressivists (69%) with 2% belonging to the extreme traditionalists, 23% traditionalists and only 6% to radicals. Also, the great majority of respondents perceive the role of education as an agent for developing the whole person and only 6% for socialisation and reproduction of the status quo.

Whenever a research instrument is used for data collection, the validity and reliability of that instrument must be examined. Validity refers to the degree in which a research instrument is truly measuring what it is intended to measure. In this study, the validity of the construct was examined through the consultation of three experts familiar with the construct of sustainability justice and feedback taken from a number of students. The experts assessed the content of the sustainability justice instrument in terms of theoretical rigor and relation to the four dimensions of sustainability justice (environment, society, economy and culture) and students examined the clarity of the items in relation to their meaning. Based on the feedback received for validation, the two sustainability justice measures were constructed.

Cronbach's alpha was used to assess the reliability or internal consistency of the items in the two sustainability justice constructs. Internal consistency describes the extent to which all the items in a scale measure the same concept or construct. Cronbach's alpha is not a measure of dimensionality or uni-dimensionality. To check for dimensionality, an exploratory factor analysis is needed. Cronbach alpha is expressed as a number between 0 and 1 and is computed by correlating the score for each scale item with the total score for each observation and then comparing that to the variance for all individual item scores:

$$\alpha = \left(\frac{k}{k-1} \right) \left(1 - \frac{\sum_{i=1}^k \sigma_{y_i}^2}{\sigma_x^2} \right)$$

...where: k refers to the number of scale items

$\sigma_{y_i}^2$ refers to the variance associated with item i

σ_x^2 refers to the variance associated with the observed total scores

In our case, twenty-questions or items were conceptualized and operationalized in order to measure sustainability justice and sixteen items to contextualize sustainability justice in teaching, learning and curriculum. Each question was measured with a 5-point Likert scale from "strongly disagree" coded to 1 to "strongly agree" coded to 5. Table 1 shows the output of the Cronbach *alpha* reliability analysis for the sustainability justice construct. In the last two columns, we find the corrected item/total correlation and the expected resultant alpha if item deleted. The table indicates that if item 8 (All people should be equally exposed to environmental pollution and risks) with the lowest item/total correlation (0.15) will be deleted, then the value of Cronbach alpha will be increased a bit more than the current total of 0.81, and more specifically to 0.82. This indicates that item 8 contributes lower than the other items of the scale for measuring sustainability justice, but if deleted the total increase of the alpha reliability

will be only 1% higher. This increase does not make any significant difference. However, from a theoretical point of view, the concept of environmental justice has been underpinned by the fact that people are not equally exposed to environmental pollution and risks. Accordingly, the attempt to reach a higher Cronbach reliability coefficient could be misleading as the deleted items could be of high value from a theoretical point of view. Thus, if we decide to delete items in order to reach a higher value of alpha, we may come with an increased alpha, but with a poor construct.

It is thus critical, first, to decide what would be the acceptable ceiling rate of Cronbach alpha, taking into consideration the purpose, the theoretical underpinning of the construct and the nature of the study. Second, if the scale shows poor reliability, then individual items that are theoretically important, but contribute less on the total reliability of the scale must be re-examined and possibly modified or completely changed/deleted. Regarding the standards for what makes a “good” or acceptable alpha (α) coefficient, the trend ranges between 0.65 and 0.80. However, if all of the items have a very high alpha coefficient that approaches 100, it may suggest that some items are redundant as they are testing the same question. Thus, an alpha higher of 0.95 and close to 100, means that the scale has no meaning, as the items are identical and not capturing the breadth of the construct. In some cases, an alpha around 0.60 is acceptable, but it should be considered with caution. Cronbach α coefficient that is less than 0.50 is usually unacceptable, since the items are not fitting together very well.

Based on the Cronbach alpha reliability results depicted in Tables 1 and 2, the achieved alpha (α) coefficients for the two constructs, the one measuring sustainability justice and the other measuring perceptions of sustainability justice in the context of teaching, learning and curriculum, are very good. This means that the items measuring these two constructs are fitting together in measuring them.

Table 1. Cronbach alpha reliability results for the sustainability justice measure

Statements Measuring Sustainability Justice		Mean (SD)	Corrected Item/Total Correlation	Cronbach α If Item Deleted
<i>Cronbach alpha (α) = 0.81 (Standardised items) Item Means 4.0, Min. 2.8 to Max. 4.7, Range 1.9 Max/Min 1.68, Variance 0.28</i>				
1	When I see injustice and do nothing about it, I feel guilty.	4.1 (1.0)	0.48	0.77
2	Helping those less fortunate than me will change my life.	3.6 (1.0)	0.29	0.78
3	I appreciate the presence of the refugees in my city.	3.2 (1.0)	0.42	0.77
4	The public expression of the identity of the culturally different should be limited.	2.0 (1.1)	0.33	0.78
5	All groups should feel the need and the right to express their peculiarity in the public space.	4.0 (1.0)	0.43	0.77
6	Resources should be distributed so that everyone can live a decent life.	4.5 (.79)	0.44	0.77
7	Members of the different groups should be treated equally.	4.6 (.76)	0.44	0.77
8	All people should be equally exposed to environmental	2.8 (1.3)	0.15	0.80

	pollution and risks.			
9	An alternative to the minimum wage could be a salary that calculates a decent standard of living.	4.3 (.90)	0.42	0.77
10	All people must have the opportunity to participate in decisions that can influence them.	4.6 (.64)	0.44	0.78
11	Economic activity should be within the bounds of morality.	4.1 (1.2)	0.38	0.78
12	It is an act of life for me to struggle to build a just and sustainable world.	4.2 (.86)	0.57	0.76
13	I can make the difference for a better future.	4.0 (.93)	0.46	0.77
14	I feel that we have to claim the common good through our active action on an individual and collective level.	4.5 (.79)	0.56	0.77
15	The marginalized people must have their own voice in public affairs.	4.3 (.84)	0.46	0.77
16	The interests of today's generations should not be at stake for those who will be born after 50 years.	3.3 (1.3)	0.20	0.81
17	We must respect the cultural heritage of others as well as ours.	4.7 (.62)	0.42	0.78
18	The right to the goods of nature belongs to everyone.	4.7 (.63)	0.24	0.78
19	Economic prosperity is not an indicator of the wealth we hold, but how well this wealth is distributed in a fair way.	3.9 (.99)	0.38	0.78
20	When I buy products that I like at affordable prices, I do not care about where they come from.	2.6 (.93)	0.20	0.80

Table 2. Cronbach alpha reliability results for the sustainability justice in education measure

Statements Measuring Teachers' Perceptions for Sustainability Justice in Teaching, Learning and Curriculum		Mean (SD)	Corrected Item/Total Correlation	Cronbach α If Item Deleted
<i>Cronbach alpha (α) = 0.80 (Standardised items) Item Means 4.1, Min. 2.9 to Max. 4.7, Range 1.8 Max/Min 1.61, Variance 0.22</i>				
1	Teaching is more a moral and political act than acquiring the knowledge and skills required in the labor market.	3.4 (1.2)	0.28	0.79
2	I believe that learners are able to co-create their own learning.	4.1 (.93)	0.38	0.77
3	I believe that learners can change the world: They are not simply the future. They are the present.	4.0 (1.0)	0.31	0.77
4	I believe that learners need skills that go far beyond what they have learned at school.	3.7 (1.1)	0.27	0.78
5	I believe that learners love learning but are oppressed with sterile knowledge.	4.4 (.74)	0.42	0.76
6	I believe that learners have a voice and should be heard.	4.6 (.58)	0.52	0.76
7	I believe that learners are not empty containers waiting to be filled with knowledge.	4.3 (.90)	0.36	0.77
8	I believe that learners can make a difference.	4.5 (.69)	0.55	0.75

9	I believe that I can get more from the learners than I can teach them.	4.1 (.86)	0.47	0.76
10	I think my learners will need less.	2.9 (1.1)	0.30	0.77
11	I believe in the advisory role of the teacher.	4.3 (.73)	0.38	0.77
12	I believe that the teacher should fight injustice even at the risk of losing his/her job.	4.2 (.89)	0.39	0.77
13	I believe that the teacher should bring the school to society and society at school.	4.4 (.76)	0.41	0.77
14	I believe that the teacher should talk to his/her learners about the power structures, social injustice and oppression.	4.1 (.90)	0.41	0.77
15	I believe that the teacher should aim to teach the transformation of self and society.	4.3 (.79)	0.59	0.75
16	I believe that the teacher should see the curriculum as a process and praxis.	3.5 (1.1)	0.27	0.78

4. Concluding remarks

This study aimed at conceptualizing, developing, and validating an instrument for measuring sustainability justice and its contextualization in teaching, learning and curriculum. A sustainability justice instrument contextualized in education could be a means to transform teaching, learning and curriculum practices towards building a more sustainable society. Usually, we say that environment is “polluted” by peoples’ behaviors, without thinking that behind such behaviors is the way we are educated, formally and informally. Although, education in the 20th century has experienced a tremendous growth and has contributed much to the social and economic development, it has not helped to unlock people’s potentiality for sustainable ways of living. On the contrary, based on a values system driven by anthropocentrism, egocentrism and individualism, education has contributed much to the current sustainability crisis. The sustainability crisis can be, thus regarded as a crisis of values as, it is the values systems that drives people to behave on certain ways.

This new instrument incorporated the broad issues of sustainability justice as they relate to environment, society, economy and culture. An instrument that aims to promote action and social change in building a more sustainable society is critical to help move learners from silence and apathy to hope and possibility. Learning about sustainability justice issues and learning to engage in critical reflection and action provides opportunities for turning down disempowered feelings, such as “Nothing can be changed”; “I can’t change anything by myself”; “It is not my job”; “I don’t have time to change anything”. Indeed, it is a usual practice of those maintaining an unjust society that there is nothing people can do or should do about injustices. Those who attempt to critique and challenge such ideologies and practices are usually seen as a threat to society. Educators should disrupt the notion of silence and apathy and instead promote co-responsibility, raising voice, critique and active citizenship. The sustainability justice instrument developed and validated through this study could act as a starting point for increasing teachers and learners’ sensitivity on sustainability issues, thereby acting as a catalyst for transforming unsustainable behaviors and practices.

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