Student Preschool Teachers' Views about the Pedagogical Context of Sustainable Kindergarten

Vasileios Papavasileiou, Eleni Nikolaou, Yota Xanthacou, Ioannis Papadomarkakis,
Dimitrios Matzanos, Maria Kaila
(University of the Aegean, Greece)

Abstract: The aim of the present research is to explore student preschool teachers' views about the pedagogical context of sustainable kindergarten. This research was conducted in February to March, 2014. Case study was selected as the main research method. The axis of this research was the principles that are included in the concept of pedagogical context of sustainable kindergarten. The population of the study was the students of the Department of Preschool Education and Educational Design of the University of Aegean in Rhodes. The selection of the sample was based on random sampling. The results of the survey show that the higher percentage of students has understood neither the interdisciplinary approach of knowledge nor the systemic approach. However, they recognize the importance of experiential learning, critical thinking, and creativity. Moreover, it appears that they distinguish the values of sustainability, but they do not realize the importance of utilizing local knowledge. They agree with the use of multiple methods in the pedagogical process and they regard students' participation in the design of educational activities, as well as in the evaluation as positive. Finally, they agree with the participation of students in decision-making about sustainable kindergarten.

Key words: preschool education, sustainable kindergarten, pedagogical context

1. Introduction

Education for Sustainable Development is grounded on a contemporary pedagogic context that promotes the active participation of students (Tilbury & Mula, 2009). It constitutes a constant process-lifelong learning, which begins from preschool age and continues across the lifespan through typical, non-typical and atypical education. It examines environmental issues from a local and international perspective and in conjunction with economic, social and cultural issues (Unesco, 2005).

It is aimed at all ages and includes the sensitization for environmental issues, knowledge, ability for problem solving and elucidation of values with the aim of shaping active citizens (Dobson, 2003, 2007). It underlines the complexity of environmental issues and therefore the need for developing the necessary skills for problem solving. It is grounded on various educational domains, a variety of methods and it focuses on practical activities and personal experiences (Tilbury, 2011). Environmental issues in the context of sustainable school are perceived in an

Vasileios Papavasileiou, Assistant Professor, Department of Preschool Education and Educational Design, University of the Aegean; research areas/interests: environmental education, education for sustainable development and preschool education. E-mail: vpapavasileiou@rhodes.aegean.gr.

interdisciplinary way, as they include concepts and approaches from physical and social sciences that are intertwined creatively (Brookes & Ryan, 2008). In addition, systemic thought is activated for exploring environmental issues in depth and in a systematic way, as the approach of these issues requires the understanding of the interactive relations that are associated with them (Goekler, 2003; Sterling, 2004).

A key fundamental aim of sustainable school is to educate students that will be able to design and implement programs. These students should "experience" methods and techniques that will implement in the future. Teachers select the topic in collaboration with students, which is based on a more general context that they define. Students participate in designing, implementing and evaluating environmental programs. In this way, students' active participation is intended to be assured (Jensen & Scnack, 1997; Scnack, 1998; Jensen, 2000; Jensen & Scnack, 2006; Pozzi et al., 2007).

The nature of learning is experiential, as it is achieved through students' experiences. The sustainable school is open to society. Learning is becoming more interesting, as teachers and students expand their experiences and knowledge through everyday practices (Hope, 2009). It is grounded on action; therefore the methods, techniques, and means selected are oriented towards the activation, interaction and cooperation with the aim of addressing existing problems (Marcinkowski, 1998). Class issues are associated with real situations, as the implementation of activities relates school knowledge to the environment. Simultaneously, students are provided with direct learning experiences, which they add realism and experiential knowledge to their studies (Dillon et al., 2005; Dillon et al., 2006; Barratt et al., 2007; DeWitt & Storksdieck, 2008).

Critical thought constitutes one of the priorities of sustainable school. The ability of recognizing, understanding, evaluating, and analyzing the various dimensions of environmental issues and the development of alternative scenarios of addressing these issues, demand a critical approach (Keating, 1988; Howe & Warren, 1989). The role of preschool education is regarded essential to the development of critical thought (Davis, 2009; Elliot, 2010).

In addition, the pedagogic process is developed, planned and implemented by deploying methods and techniques of creative learning (Puccio et al., 1994), so as to assure the conditions that lead to the development of creative thought. Creative thought is an essential requirement for adopting an active attitude towards environmental issues. It is also a prerequisite for devising and producing innovative ideas, practices and means, which are socially useful and have a positive impact on the environment (Xanthakou & Kaila, 2012).

Sustainable school utilizes contemporary pedagogical methods-techniques-strategies which are included in the context of active and experiential learning (Scoullos & Malotidi, 2004). In addition, it makes uses of modern information technology in order to utilize them creatively for the development of various educational and communication implementations (Moore & Huber, 2001; Watson, 2001).

In the context of the Education for Sustainable Development, several studies indicate that combining scientific data with local and traditional knowledge may expand the information needed for decision making regarding the ecosystem and the viable management of physical resources (Berkes & Folke, 1998; Berkes, Colding & Folke, 2000; Scoones, 1999). The combination of scientific and local Knowledge has the potential to upgrade the viable development of communities and environment (Huckle, 2004).

The orientation to values in the educational process may lead young people to a new vision that perceives the environment as a source of life. It can also help them adopt new attitudes and behaviours. As a result of the aforementioned issues, nature and individuals may have a common route. They may react to the destruction of the environment, may be activated and follow a new way of life that will be grounded on core values (Caduto, 1985;

Sosa, 1996; Briguglio, 2003).

Sustainable school has democratic foundations and it is grounded on several collective principles, such as active participation, collectiveness, common effort and cooperation that are particularly crucial (Schnack, 1998). Knowledge and skills of action strategies are among the core dimensions, which are related to the development of responsible environmental behaviour (Marcinkowski, 1998). Action strategies include the eco-management that is the direct work to the environment, consumption action, as well as individuals' or groups' persuasion and influence on people for solving environmental issues, such as political and legal action (Volk, 1998).

The principles that constitute the pedagogical context of sustainable kindergarten are the following: intradisciplinarity, interdisciplinarity, experiential learning, orientation to values, critical thought, systemic thought, cooperativeness, participation in democratic processes-ability for action and multiple methods-techniques (Papavasileiou, 2015).

2. Methodology

The existence of contemporary pedagogic principles is essential to the effective implementation of sustainable kindergarten that constitutes a flexible pedagogical context with qualitative characteristics. The purpose of present research is the exploration of student preschool teachers' views about the pedagogical context of sustainable kindergarten.

The present research was conducted from February to May 2014. Case study was the main method selected and a questionnaire was the main methodological tool for data collection. The questionnaire that was used in current research was consisted mainly of close-ended questions (Bell, 2010; Cohen, Manion & Morrison, 2011; Bryman, 2012).

Fourth-year student preschool teachers from the Department of Preschool Education and Educational Design of University of Aegean in Rhodes (Greece) were the population of study. The selection of sample was based on random sampling. The sample was consisted of 150 students. 9 were men (6%) and 141 were women (94 %). The axis of this research was the principles that constitute the pedagogical context of sustainable school: intradisciplinarity-interdisciplinarity, experiential learning, orientation to values, critical thought, systemic thinking, creative thinking, local knowledge, cooperativeness, participation in democratic procedures — ability for action and multiple methods — techniques.

After the questionnaires have been collected, we proceeded to the content analysis and categorization of the answers to the open-ended questions. Then, the coding of participants' answers was conducted, as well as the statistical analysis of research data.

3. Results

The research regarding students' preschool teachers' views about the pedagogical context of sustainable kindergarten is wider. The present paper presents a part of these research findings, the following descriptive data:

Table 1 presents the distribution of frequencies of participants' answers to the question whether planning in the context of intradisciplinary approach is organized by taking into account the dividing lines between courses. Research data show that the majority agree with this statement, 33.33% of students disagree, whereas 21.33% expresses no opinion. Therefore, we conclude that only one in three students gives the correct answer to the question, which is intradisciplinary approach exceeds the dividing lines between the courses.

Table 2 shows that the higher percentage (91.30%) of students' states that agree with the view that experiential learning encourages active participation. 6% of the students express no opinion. Finally, 4 students disagree (2.70%). We conclude that the majority of students have a positive attitude to experiential learning and its role in encouraging active participation.

Table 3 indicates that the majority of students of the research sample (75.3%) disagrees with the view that the development of critical thinking is of secondary importance, in the context of the sustainable school. A low percentage (18.7%) seems to agree with this view, whereas an even lower percentage (6%) expresses no opinion. Therefore, the majority of the sample believes that the development of critical thought is of primary importance in the context of sustainable school.

Table 1   Distribution of Frequencies of Participants' Answers Regarding Their Views whether Planning in the Context of Interdisciplinary Approach is Organized by Taking into Account the Dividing Lines between the Courses

	N	%
Agree	68	45.33
Disagree	50	33.33
I don't Know	32	21.33
Total	150	100

Table 2   Distribution of Frequencies of Students' Answers Regarding whether Experiential Learning Encourages Active Participation

	N	%
Agree	137	91.30
Disagree	4	2.70
I don't Know	9	6
Total	150	100

Table 3   Distribution of Frequencies of Participants' Views whether the Development of Critical Thought is of Secondary Importance in the Context of Sustainable School

	N	%
Agree	28	18.7
Disagree	113	75.3
I don't know	9	6
Total	150	100

Table 4 shows the distribution of frequencies of students' answers to the question whether in the context of systemic approach each issue is addressed independently of one another. Research data indicate that the higher percentage (44.7%) disagrees, whereas a high percentage (25.3%) of the sample agrees. In addition, a high percentage (30%) has no opinion. Therefore, it seems that the majority have not understood the content of systemic approach.

Table 5 presents the data regarding the characteristics that are associated with creative thought. The higher percentage (79.3%) gave the correct answer, that is both A and B. The 7.3% of the sample answered that "fantasy" is associated with creative thought. Simultaneously, the 7.3% of students answered "all the above". A lower percentage (5.3%) gave the answer that "innovation" is associated with creative thought. Finally, one person gave

the answer "standard thought" (0.6%). Therefore, it seems that the higher percentage of students is aware of the characteristics that are linked to creative thought, which is "fantasy" and "innovation".

**Table 4   Distribution of Frequencies of Participants' Views regarding whether in the Context of
Systemic Approach Each Issue is Addressed Independently of One Another**

	N	%
Agree	38	25.3
Disagree	67	44.7
I don't know	45	30
Total	150	100

**Table 5   Distribution of Frequencies of Students' Answers regarding the Characteristics
That Are Associated with Creative Thought**

	N	%
A) Fantasy	11	7.3%
B) Innovation	8	5.3%
C) Standard Thought	1	0.6%
D) Both A and B	119	79.3%
E) All the Above	11	7.3%
Total	150	100%

Table 6 shows that students regard that the values that are associated with Sustainable Development are Responsibility (99.33%), Empathy (96.67%), Respect (99.33%), and Solidarity (98%). On the other hand, very few students regard Competitiveness (22.14%) and Consumerism as values of Education for Sustainable Development (6.71%). It is evident that the vast majority of the sample is aware of the values that are linked to Sustainable Development.

According to the research data of Table 7 regarding the role of local knowledge in contemporary globalized societies, we notice that half of the participants (50%) state that they agree with the view that local knowledge is nonessential, a high percentage (29%) states that disagrees, whereas a high percentage (21%) states that they do not know. It seems that most of the students of the sample have not understood the importance of creative utilization of local Knowledge.

Research data of Table 8 indicate that the higher percentage (64%) states that disagrees with the fact that the actions and activities of Environmental Education in the context of sustainable kindergarten are determined by teachers and implemented by students. Simultaneously, a high percentage (28%) agrees, whereas a lower percentage (8%) expresses no opinion.

**Table 6   Distribution of Frequencies of the Answers of Students' Sample
Regarding the Values of Sustainable Development**

	Yes	f %	N	f %	Total	Total %
Competitiveness	33	22.14	116	77.86	149	100%
Consumerism	10	6.71	139	93.29	149	100%
Responsibility	149	99.33	1	0.67	150	100%
Empathy	145	96.67	5	3.33	150	100%
Respect	149	99.33	1	0.67	150	100%
Solidarity	147	98	3	2	150	100%

Table 7   Distribution of Frequencies of Students' Views Whether the Role of Local Knowledge to Modern Globalized Societies is Nonessential

	N	%
Agree	75	50.0%
Disagree	43	29%
I don't know	32	21%
Total	150	100%

Table 8   Distribution of Frequencies of Students' Answers Whether the Actions and Activities of Environmental Education Are Determined by Educators and Implemented by Students

	N	%
Agree	42	28%
Disagree	96	64%
I don't know	12	8%
Total	150	100%

According to the research data of Table 9, the higher percentage (61.34%) of students regard that evaluation in the context of education for sustainable development is shaped by the cooperation between teachers and students. A high percentage though (33.33%), believes that the evaluation should be determined by teachers, whereas a low percentage (5.33%) asserts that evaluation should be determined by students. It seems that one of three students of this sample believes that the evaluation is the educators' task (teacher-centered approach).

Table 9   Distribution of Frequencies of Participants' Answers regarding the Evaluation in the Context of Education for Sustainable Development

	N	%
A) Actions and Activities are determined by educators	50	33.33%
B) Actions and activities are determined by students	8	5.33%
C) Actions and activities are determined by the cooperation between teachers and students	92	61.34%
Total	150	100 %

Research data whether the sustainable school should utilize multiple methods, indicates that the higher percentage (94%) states that agrees, whereas 5% of students disagree and another 5% answers that has no opinion.

Table 10 presents the distribution of frequencies of the answers of students' sample regarding children's participation in decision making for sustainable kindergarten. Research findings indicate that the higher percentage (81.3%) agree, a lower percentage of students (10.7%) disagree, whereas an even lower percentage expresses no opinion (8%). Therefore, the majority of the sample does not object to the participation of students in decision making for the effective implementation of sustainable kindergarten.

Research data of Table 11 regarding students' views whether the ethical dilemma is an appropriate pedagogical technique for teaching preschool children indicates that the higher percentage (53%) disagrees, fewer students state that they agree (30%), whereas 17% of students answer that has no opinion. Therefore, more than half of students do not agree that ethical dilemma is an appropriate pedagogical technique for teaching preschool children.

Table 10   Distribution of Frequencies of Students' Answers whether Children should Participate in Decision Making for Sustainable Kindergarten

	N	%
Agree	122	81.3%
Disagree	16	10.7%
I don't know	12	8%
Total	150	100%

Table 11   Distribution of Frequencies of Students' Answers to the Question Whether the Ethical Dilemma is an Appropriate Pedagogical Technique for Teaching Preschool Children

	N	%
Agree	44	30.0%
Disagree	80	53.0%
I don't know	26	17.0%
Total	150	100%

4. Conclusions

Research findings indicate important data regarding students' views, future preschool teachers, regarding the pedagogical context of sustainable kindergarten. Research findings cannot be generalized to the whole population, as they refer to the students of a specific department of one specific academic year. However, they could be the foundation for further thought and stimulate further research.

Research data shows that the higher percentage of students have not understood the intradisciplinary approach to knowledge, as they have not realized that in the context of intradisciplinary approach, the dividing lines between the courses are not taken into account. On the contrary, they agree with the view that experiential learning encourages active participation, through the selection of planned actions that have an educational value, as it provides them with the opportunity to study the problems in their real dimensions.

The majority of students seem to have understood that the development of critical thought is very important, in the context of sustainable kindergarten. They apparently regard that the application of critical thought to the exploration of environmental issues can contribute to effective problem solving. Creativity is considered very important as well, which is associated with fantasy and innovation. On the contrary, they have not understood that systemic thought explores relationships and interactions.

Moreover, research findings indicate that the students of this sample are aware of the values of sustainability, such as responsibility, empathy, respect and solidarity. They do not realize though the importance of utilizing local knowledge in the context of globalization, as it seems that they have not understood that local tradition and the experience of local residents are important learning tools.

As far as the designing of educational activities in the context of education for Sustainable Development is concerned, the majority of the sample expresses the view that it is shaped by the cooperation of teachers and students. They share the same opinion about evaluation (a lower percentage). Nevertheless, it is worth pointing out that one in three students of this sample believes that evaluation is exclusively teachers' task (teacher-centered approach).

We also conclude that the higher percentage of students agree with the participation of students in decision-making about the implementation of sustainable kindergarten. The majority consider that children can participate in decision-making, which may contribute to the effective implementation of sustainable kindergarten. Simultaneously, children's participation in decision-making can provide opportunities for valuable experiences and make them more responsible.

Finally, most students of this sample states that they agree with the utilization of multiple methods in the pedagogic process of sustainable kindergarten. However, when they were asked about the ethical dilemma, they were skeptical about whether it is an appropriate method in preschool education, as they believe it is appropriate for older children.

In conclusion, it is essential to reconsider and design the courses that are linked to sustainable kindergarten, which should emphasize the understanding of intradisciplinary approach. The implementation of systemic approach practices is also essential. Moreover, it is highlighted the importance of utilizing local knowledge, the importance of cooperativeness and active participation at all stages of pedagogic process, as well as the implementation of novel methods.

References

Bell J. (2010). *Doing Your Research Project: A Guide for First-Time Researchers in Education Health and Social Science* (5th ed.), Maidenhead: Open University Press.

Berkes F. and Folke C. (Eds.) (1998). "Linking social and ecologic systems for resilience", in: Berkes F. & Folke C. (Eds.), *Linking Social and Ecologic Systems for Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*, Cambridge: Cambridge University Press.

Berkes F., Colding J. and Folke C. (2000). "Rediscovery of traditional ecological knowledge as adaptive management", *Ecological Applications*, Vol. 10, pp. 1251–1262.

Brigulio L. (2013). "The ethical dimension in the national strategy for sustainable development", in: *The International Conference on Sustainability Indicators*, available online at: https://secure2.gov.mt/tsdu/file.aspx?

Brooks C. and Ryan A. (2008). "Education for sustainable development interdisciplinary discussion series report", Higher Education Academy, available online at: https://www.heacademy.ac.uk/system/files/interdisc_discuss_series2008_1.pdf.

Bryman A. (2012). *Social Research Methods* (4th ed.), Oxford: Oxford University Press.

Caduto M. (1985). "A guide on environmental values education", in: *UNESCO-UNEP International Environmental Education Programme*, Environmental Education Series, 13, Division of Science, Technical and Environmental Education.

Carpenter J. and Myers C. K. (2007). "Why volunteer? Evidence on the role of altruism, reputation, and incentives", accessed on 19 May, 2015, available online at: http://ftp.iza.org/dp3021.pdf.

Cohen L., Manion L. and Morrison K. (2011). *Research Methods in Education* (7th ed.), London: Routledge.

Davis J. (2009). "Revealing the research 'hole' of early childhood education for sustainability: A preliminary survey of literature", *Environmental Education Research*, Vol. 15, No. 2, pp. 227–241.

DeWitt J. and Storksdieck M. (2008). "A short review of school field trips: Key findings from the past and implications for the future", *Visitor Studies*, Vol. 11, No. 2, pp. 181–197.

Dillon J., Morris M., O'Donnell L., Reid A., Rickinson M. and Scott W. (2005). "Engaging and learning with the outdoors — The final report of the outdoor classroom in a rural context action research project", Slough: National Foundation for Education Research.

Dillon J., Rickinson M., Teamey K., Morris M., Young Choi M. Y. and Sanders D. (2006). "The value of outdoor learning: Evidence from research in the UK and elsewhere", *School Science Review*, Vol. 87, pp. 107–111.

Dobson A. (2003). *Citizenship and the Environment*, Oxford: Oxford University Press.

Elliott S. (2010). "Essential, not optional education for sustainability in early childhood centers", *Education for Sustainability Exchange Magazine*, March-April, pp. 34–37.

Goekler J. (2003). "Teaching for the future: Systems thinking and sustainability", *Green Teacher*, Vol. 70, Spring, pp. 8–14.

Hope M. (2009). "The importance of direct experience: A philosophical defense of fieldwork in human geography", *Journal of Geography in Higher Education*, Vol. 33, No. 2, pp. 169–182.

Howe R. W. and Warren C. R. (1989). *Teaching Critical Thinking through Environmental Education*, ERIC Clearinghouse for Science Mathematics and Environmental Education, Columbus OH.

Huckle J. (2004). "Critical realism: Aphilosophical framework for higher education for sustainability", Chap. 4, in: Corcoran, Peter Blaze, Wals, Arien E. J. (Eds.), *Higher Education and the Challenge for Sustainability: Problematics, Promise, and Practice*, Kluwer Academic Publishers, pp. 1–6.

Jensen B. and Schnack K. (2006). "The action competence approach in environmental education", *Environmental Education Research*, Vol. 12, No. 3/4, pp. 471–486.

Jensen B. B. and Schnack K. (1997). "The action competence approach in environmental education", *Environmental Education Research*, Vol. 3, No. 2, pp. 163–178.

Jensen B. B. (2002). "Knowledge, action and pro-environmental behavior", *Environmental Education Research*, Vol. 8, No. 3, pp. 325–334

Keating D. (1988). *Adolescents' Ability to Engage in Critical Thinking*, Madison, WI: National Center for Effective Secondary Schools.

Marcinkowski T. (1998). "Assessment in environmental education", in: H. Hungerford, W. Bluhm, T. Volk & J. Ramsey (Eds.), *Essential Readings in Environmental Education*, Champaign, IL: Stipes, pp. 179–216.

Moore C. J. and Huber R. A. (2001). "Support for EE from the national science education standards and the internet", *The Journal of Environmental Education*, Vol. 32, No. 3, pp. 21–25.

Papavasileiou V. (2015). *Sustainable Development and Education: A Multidimensional Relationship*, Athens: Diadrasi. (in Greek)

Pozzi F., Manca S., Persico D. and Sarti L. (2007). "A general framework for tracking and analyzing learning processes in computer-supported collaborative learning environments", *Innovations in Education and Teaching International*, Vol. 44, No. 2, pp. 169–179.

Schnack K. (1998). "Why focus on conflicting interests in environmental education", in: Ahlber M. and Fihlo W. (Eds.), *Environmental Education for Sustainability: Good Environment, Good Life*, Frankfurt: Peter Lang, pp. 83–96.

Scoones I. (1999). "New ecology and the social sciences: What prospects for a fruitful engagement?", *Annual Review of Anthropology*, Vol. 28, pp. 479–507.

Scoullos M. and Malotidi V. (2004). *Handbook on Methods Used in Environmental Education and Education for Sustainable Development*, MIO-ECSDE, Athens.

Sosa N. (1996). "The ethics of dialogue and the environment: Solidarity as a foundation for environmental ethics", in: Callicott J. B. & Da Rocha F. J. (Eds.), *Earth Summit Ethics: Toward a Reconstructive Postmodern Philosophy of Environmental Education*, Albany: State University of New York, pp. 47–70.

Sterling S. (2004). "Higher education, sustainability and the role of systemic learning", in: *Higher Education and the Challenge of Sustainability*, pp. 49–70.

Tilbury D. (2011). *Education for Sustainable Development: An Expert Review of Processes and Learning*, Paris: UNESCO.

Tilbury D. and Mulà I. (2009). *Review of Education for Sustainable Development Policies from a Cultural Diversity and Intercultural Dialogue: Gaps and Opportunities for Future Action*, Paris: UNESCO.

UNESCO (2005). "UN decade of education for sustainable development 2005–2014", *International Implementation Scheme*, Draft, Paris: UNESCO.

Volk T. (1998). *Integration and Curriculum Design*, in: H. R. Hungerford, W. J. Bluhm, T. L. Volk, & J. M. Ramsey (Eds.), *Essential Readings in Environmental Education Essential Readings in Environmental Education*, Champaign, IL: Stipes Publishing, pp. 125–144.

Watson D. M. (2001). "Pedagogy before technology: Re-thinking the relationship between ICT and Teaching", *Education and Information Technologies*, Vol. 6, No. 4, pp. 251–266.

Xanthacou Y. and Kaila M. (2012). *Creative Problem Solving*, New York: Nova Science Publishers Inc.