RESEARCH ARTICLE

Development of an Ecoliteracy Scale Intended for Adults and Testing an Alternative Model by Structural Equation Modelling

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Abstract

Ecoliteracy is to understand and internalise sustainable ecological relationship in the nature and to transfer this sustainable lifestyle to daily life despite the fact that ecoliteracy does not have only one and unique definition. However, it is difficult to measure ecoliteracy due to it being a complex concept. There are many subsets of ecoliteracy. One of the the aim of this study is therefore to develop an ecoliteracy scale intended for adults which is based on ecological intelligence, social intelligence, emotional intelligence, economy and green consumer behaviour. The other aim of the study is to test an alternative model among these subsets. According to this model economy, emotional and social intelligences are subsets of ecological intelligence. Ecological intelligence has directly link to green consumer behaviours at the second stage of the model. All the goodness of fit values are at an acceptable level according to the explanatory and confirmatory factor analysis. The results are Cronbach alpha: 0.78; KMO: 0.830; X^2/df: 4.09; RMSEA: 0.087; SRMR: 0.0783; GFI, AGFI, IFI, and CFI ≥ 0.80. There are 20 items within the scale.

Keywords: Ecoliteracy, ecological intelligence, emotional intelligence, economy, social intelligence, green consumer behaviour, explanatory factor analysis, confirmatory factor analysis

Introduction

When I was a child, my grandmother wanted me to pick 'gundelia' (The local name at Mediterranean Mountains is 'kenger'; the Latin name is *Gundelia tournefortii)*' and 'purslane' (The local name at Mediterranean Mountains is 'tokmakan'; the Latin name is *Portulaca oleracea)* up from the mountains in order to make coffee and cook. We were living in a rural area and it was difficult to find any stuff easily. Later I learned that if there was a scarcity, people were using 'gundelia' as a kind of coffee and 'purslane' as a food resource. We were going to the mountains as a group of children and picking up what and how much we needed to gundelia and purslane therefore we knew that we could pick them up next seasons. These were informal sustainability learnings for me because I was 6 or 7 years-old at that time however I can still remember that gundelia and purslane are used in order to make coffee and food.

I have nomadic ancestors and we have learnt some of the knowledge by intergenerational oral and experiential transfers. Nevertheless, Shipibo indigenous people from Peru (Roberst& Dev, 2015) or Ubuntu philosophy from Africa (Shumba, 2011) have similar environmental and sustainable transfers in order to survive such as cooking, healing, appreciation, celebration. Shumba (2011) determines this kind of ethical and sustainable environmental issues as ecological intelligence.

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Moreover, Goleman (2006, 2009) and McCallum (2005) also enrich ecological intelligence concept with social intelligence, emotional intelligence and economy. Both researchers evaluate ecological intelligence in terms of Western perspective by economy. Similarly Esposito (2009) and Kapogianni (2015) evaluate ecoliteracy within environment-economy relationship however these experimental studies are not enough to determine ecoliteracy.

Ecoliteracy

According to the literature, ecoliteracy is to understand and internalise sustainable ecological relationship in the nature and to transfer this sustainable lifestyle to daily life despite the fact that ecoliteracy does not have only one and unique definition (Öhman, 2016; ESD, 2015; Kapogianni, 2015; Lira, Steinicke & Garcia, 2015; Tursi, 2015; McBride, Brewer, Berkowitz and Borrie, 2013; Esposito, 2009).
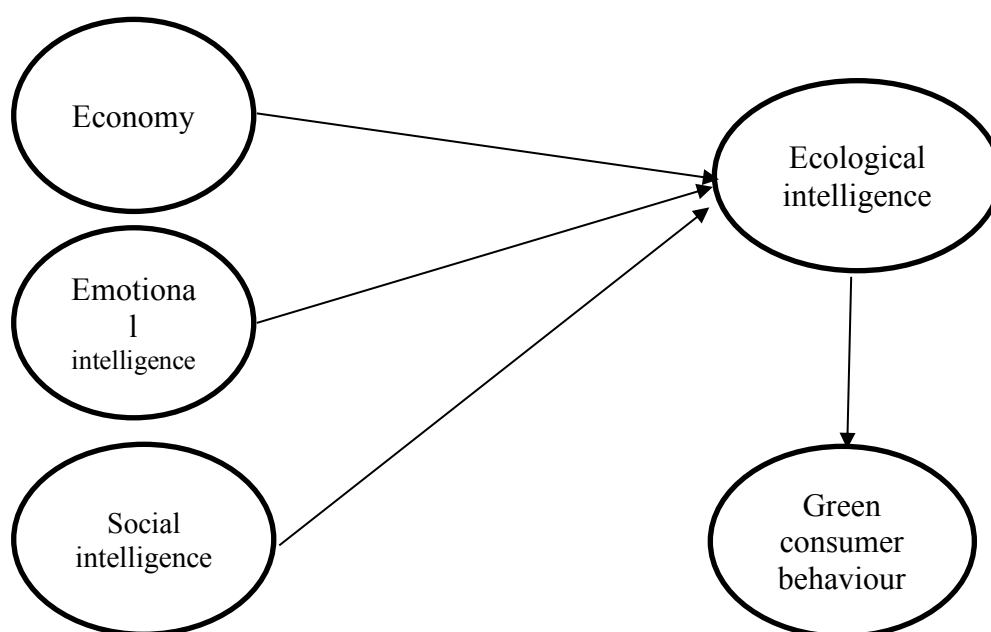

Figure 1. Alternative model of ecoliteracy

The core subject of ecoliteracy is sustainability (Orr, 1992; Öhman, 2016) and ESD Report (2015, p.38) especially emphasizes that everybody who works and studies on sustainable development should design indicators and metrics in order to evaluate ecoliteracy. The aim of this study, therefore, is to develop an ecoliteracy scale intended for adults and to test an alternative ecoliteracy model (Figure 1). There has not been found yet any ecoliteracy scale or alternative model according to the literature review.

The common points of ecoliteracy are to have sustainable, affective, cognitive, behavioural roots (Goleman et al., 2012; McBride et al, 2013; Pilgrim, Smith & Pretty, 2007; Orr, 1992).These roots refer to some subcomponents such as ecological intelligence, social intelligence, emotional intelligence, economy and green consumer behaviour. I designed an ecoliteracy model with these subcomponents according to the literature (Figure 1). According to this model economy, emotional and social intelligences are subsets of ecological intelligence. Ecological intelligence has directly link to green consumer behaviours at the second stage of the model.

Ecological intelligence

One of the main subsets of ecoliteracy is ecological intelligence because this concept is related to either holistic perspective or sustainability. The main aims of ecological intelligence are to develop social and environmental responsibility (Shumba, 2011; Sterling, 2009) and awareness, to think critically (Bowers, 2010), to pursue cooperative learning (Sterling, 2009), and to bring about behavioural change in the long-term (ESD, 2015; Bowers, 2010; Sterling, 2009). Ecological intelligence is related to the cognitive and affective areas of the brain (Shumba, 2011; Sterling, 2009); therefore both side of learners' brains should be supported. Ecological intelligence does not also ignore individual differences because individual background have an impact on social community (Shumba, 2011; Bowers, 2010; Sterling, 2009).

The other important point of ecological intelligence is to have holistic perspective because there are seen and unseen webs among biotic and abiotic factors in the world. Each behaviour, related to consumption or not, might have an impact directly or indirectly on the environment. People therefore should take responsibility for their each behaviour to their environments and social communities (Goleman 2006, 2009; McCallum, 2005). Individualism is unfortunately in the foreground due to capitalist perspective. However the human being is a social creature and s/he should not isolate herself/himself from the social area because ecological intelligence is a social and collective process. Each environmental acquisition is transferred by intergenerational communication such as language; therefore environmentally responsible behaviour also needs to involve responsible social and economic behaviours. (Bowers, 2008, 2009, 2010; Goleman 2006, 2009; McCallum, 2005; Shumba, 2011; Sterling, 2009)

Social intelligence

The other important subset of ecoliteracy is social intelligence and social intelligence refers to social responsibilities of people in terms of sustainability. For instance, people should be able to think about how a stuff is produced or whether there is any environmental or social/human exploitation in this production process (Goleman 2006, 2009; McCallum, 2005; Orr, 2002). However the improvement of social intelligence is not easy due to migration because there are two sides of the migration; migrants and host cities/countries. Migrants are cheap labour sources for host cities/countries and this is named as brown revolution (Economist, 2002; FAO, 2003).

The migrant population settles urban area and this massive population also stresses on urban life especially in Asia, Sub-Sahran Africa, Latin America (FAO, 2015). The rural population is also exposed to nonadaptation in urban social life and a gap is become between expectation and reality in terms of social and economic lives. On the one hand the Economist (2002) says that the brown revolution is unstoppable. On the other hand, the stopping the brown revolution is not desirable in terms of economic perspective; however it might be slowed (FAO, 2003). FAO 2015 Report utters that governments should support the rural population life with internal and external policies. The Economist (2002) emphasizes the revival of rural population as 'green revolution' because ecologic development of rural area related to the economy (FAO Report, 2003)

Economy

One other subset of ecoliteracy is economy. McCallum (2005) and Orr (2002) recall that the history of Western science has negatively affected to understand the natural environment; therefore ecology and economy are considered as two different subjects. On the contrary, they should actually be considered as complementing to each other (Goleman, 2009; Kahn, 2010; Orr, 2002) because economy needs environmental and human resources in order to continue the development (Kumar & Budin, 2006). Kahn (2010) and Orr (2002) especially emphasize that economy should be based on

sustainable development instead of exploitation of environmental and human resources such as brown revolution. People should be able to think that all their needs they bought such as foods, clothes, shelters are based on the natural resources; therefore we have to think and sense about our effects on the environment. The sense of environment refers to emotional intelligence.

Emotional intelligence

Emotional intelligence is one of the important subset ecoliteracy and Goleman, Bennett and Barlow (2012) merge ecological, social and emotional intelligences under ecoliteracy. In terms of emotional intelligence, people should be able to sense what their negative impacts are on other people, natural environment and the other living organisms. McBride et al. (2013, p. 14) determine also this kind of ecologic, affective, and cognitive relationship within ecoliteracy as "head, heart, hands and spirit" connections.

Emotional intelligence is the affective side of ecoliteracy and it is related to human senses (Schutte, Malouff, Hall, Haggerty, Cooper, Golden, & Dornheim, 1998). People have feelings and emotions however they might not be aware of them or know how to express them. In terms of environmental subjects, if people feel (such as pain, hurt, anxiety, fear, empathy) the natural environment, then they might have a connection with the environment (Haskell, 2000; Lazarus & Cohen, 1977; Martin, 2004; Ozdemir, 2010; Reis & Roth, 2009). The main subject here is if human activities disturb lives of other living things what s/he feels and whether they have empathy. Ringness (1975) also points out that adults are not very open to change, explore and express their feelings like children; therefore affective domains of adults should be developed in order to be able to deal with the social and consumption problems.

Green consumer behaviour

Due to increasing consumerism, adults tend to spend and consume more regardless of whether they actually need to do so (Aracıoglu & Tatlıdil, 2009; Esposito, 2009). However, they barely think over what raw materials have been used during the making of these goods and commodities and how the nature has been affected by the production process (Goleman, 2009). Goleman (2009) recalls that what needs to be done in order to minimize the damage is to purchase ecological products. It is also stressed that ecological items are more expensive than others (Aracıoğlu & Tatlıdil, 2009).

Goleman (2009) underlines that even though ecological products are more expensive, the producers will market more ecological products if the consumers tend to buy these products, leading to harmonization with the nature. As a result, industrial production will not do any harm to the nature. What needs to be stressed here is collective action; in other words, public awareness on use of ecological products will be of great help. The collective action of green consumers refers to ecoliteracy because environmental responsible behaviours or green consumer behaviours at the visible/observable side of ecoliteracy (Kapogianni, 2015; McBride et al., 2003).

Methodology

The study was approached quantitatively (Yildirim & Simsek, 2006). Explanatory and confirmatory factor analysis were carried out within this approach. The explanatory factor analyses had inductive perspective (Buyukozturk, 2007; Sencan, 2005) while the confirmatory factor analyses had deductive perspective (Simsek, 2007). It is aimed that to have more reliable scale which has strong theoretical background, reliable and validity within these two perspectives.

The study consists of three stages including

a. Literature review, determination of the scale items and development of the ecoliteracy model.

b. Preparation and implementation of the scale

c. Measurement of the reliability and validity.

a. Literature review; determination of the scale items and development of the ecoliteracy model.

The literature was reviewed and 30 items and five themes were determined. Secondly the ecoliteracy model was designed (Figure 1). These items were evaluated as potential indicators of ecological intelligence by an ecology specialist and an environmental education specialist.

b. Preparation and implementation of the scale

The trial scale was designed based on 5 Likert style. Simsek (2007) emphasized that 5 Likert style was a good option in order to test any model and one of the step of this study was to test alternative ecoliteracy model. It was, therefore, decided to use 5 Likert style scale.

The affirmative items were scored as 1- Completely disagree, 2- Partly disagree, 3- Not sure, 4- Partly agree, and 5- Completely agree. A complete reverse scoring was applied to the negative set of items. The scale was completed by 405 adults between 18-65 years of age via Google drive and QR code. Sencan (2005) notes that the sample size was acceptable if it was sufficient to ensure at least five events per entry, therefore a sample size of 405 respondents was satisfactory for this study.

c. Measurement of the reliability and validity

For the analysis of the scale, the verified correlation value between the Cronbach Alpha reliability coefficient and the entries was reviewed by relying on the SPSS 13 software. The scale was evaluated as reliable if the Cronbach Alpha coefficient level was more than 0.70 (Buyukozturk, 2007; Sencan, 2005). Entries with a correlation value below 0.30 were removed from the analysis. The explanatory factor analysis was run in order to locate the validity of the scale and to dimension the entries included in the scale after determination of their factor loads.

Buyukozturk (2007) and Sencan (2005) stressed that the factor load value should be 0.40 or higher when sorting the entries. It was noted that when the principal axis factoring and direct oblimin analysis were used together, they would facilitate formation of factors in the presence of an assumption of correlation within the factor (Hill, 1987; Creed & Machin, 2003). Principal axis factoring and direct oblimin were preferred in this study considering that this was the first work to develop a scale (Simsek, 2007).

In the explanatory factor analysis, the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett test were analysed together. It was noted that a KMO value over 0.60 and a significant Bartlett test ($p < 0.05$) indicated that a factor could be derived from the data (Buyukozturk, 2007; Sencan, 2005).

Subsequent to the explanatory factor analysis, the confirmatory factor analysis was run with LISREL 8.0 (Joreskog and Sorbom, 1993; cited at Simsek, 2007) statistics software. In the review of the confirmatory factor analysis, diagram and goodness of fit criterias and correction recommendations were considered.

In the diagram evaluation, the standardized values and the t value were taken into account. The standardized values were evaluated for the ability of each entry to

represent its variable. The t value was reviewed to check the relevant entry had $p< 0.05$ significance.

With respect to the goodness of fit, the harmony between the relations in the model and the data was considered (Simsek, 2007). Here the ratio between the Chi square and the degree of freedom was evaluated. This ratio was expected to be a maximum 3-4. The other criteria included RMSEA (Root Mean Square of Approximation), CFI (Comparative fit index), IFI (Incremental fit index), standardized RMR (SRMR), GFI (Goodness-of-fit index) and AGFI (Adjusted goodness of fit index). Some researches (Simsek, 2007; Fossati et al., 2003) note that the RMSEA and SRMR may fall below 0.08 and argued that a value below 0.05 could indicate a better fitness. Simsek (2007) noted that CFI and IFI values above 0.80 referred to a better fitness while Doll, Xia and Torkzadeh noted that GFI and AGFI values between 0.80 and 0.89 referred to a reasonable fit.

In the correction recommendations, the ratio between the Chi-square and the degree of freedom was considered. The impact of the correction on the decrease of the Chi-square value indicated an improved model. The factor loads of the dimensioned items were evaluated to develop a five-dimensional scale inclusive of 20 items.

Participants

One of the most important points for the study was to decide the sample group. My aim was to reach adults who had different backgrounds. The sample group of this study included housewives, undergraduate students, in-service teachers, academicians, engineers, health and media employees, the other government employees and laboratory technicians (App 3). The literature did not specify the importance of an individual group. Nevertheless Goleman (2006, 2009) and McCallum (2005) mentioned the importance of adults on the economy, environment and social interactions, therefore data was collected from adults.

Findings

According to Cronbach Alpha reliability analysis and factor analysis, 10 items had low correlation values and factor loads were under 0.40, so were removed from the scale. These 20 items were run by the confirmatory factor analysis. The 14th item which's factor load was under 0.40 was only kept in the analysis due to the decision of the environmental education specialist. All goodness of fit values can be seen at Table 1.

Table 1.

The goodness of fit results of explanatory and confirmatory factor analysis

	Goodness of fit values	Recommended values	The values of ecoliteracy scale	The values of alternative model
Explanatory factor analysis	Item number		20	
	Theme number		5	
	Cronbach alpha	≥ 0.70	0.78	
	KMO	≥ 0.60	0.830	
	Bartlett test	< 0.05	0.000	
Confirmatory factor analysis	X^2/df	3-5	4.09	4.06
	p-değeri	<0.05	0.000	0.000
	RMSEA	≤ 0.08	0.087	0.087
	SRMR	≤ 0.08	0.0783	0.08
	GFI	≥ 0.85	0.854	0.856
	AGFI	≥ 0.80	0.807	0.812
	IFI	≥ 0.80	0.830	0.829
	CFI	≥ 0.80	0.828	0.827

As can be seen from Table 1, KMO was greater than 0.60, indicating the presence of themes in this scale. The Bartlett test was less than 0.05 and it showed that the sample size was sufficient to determine the themes. The scree plot graph (Figure 2) showed five sharp drops, indicating the presence five themes.
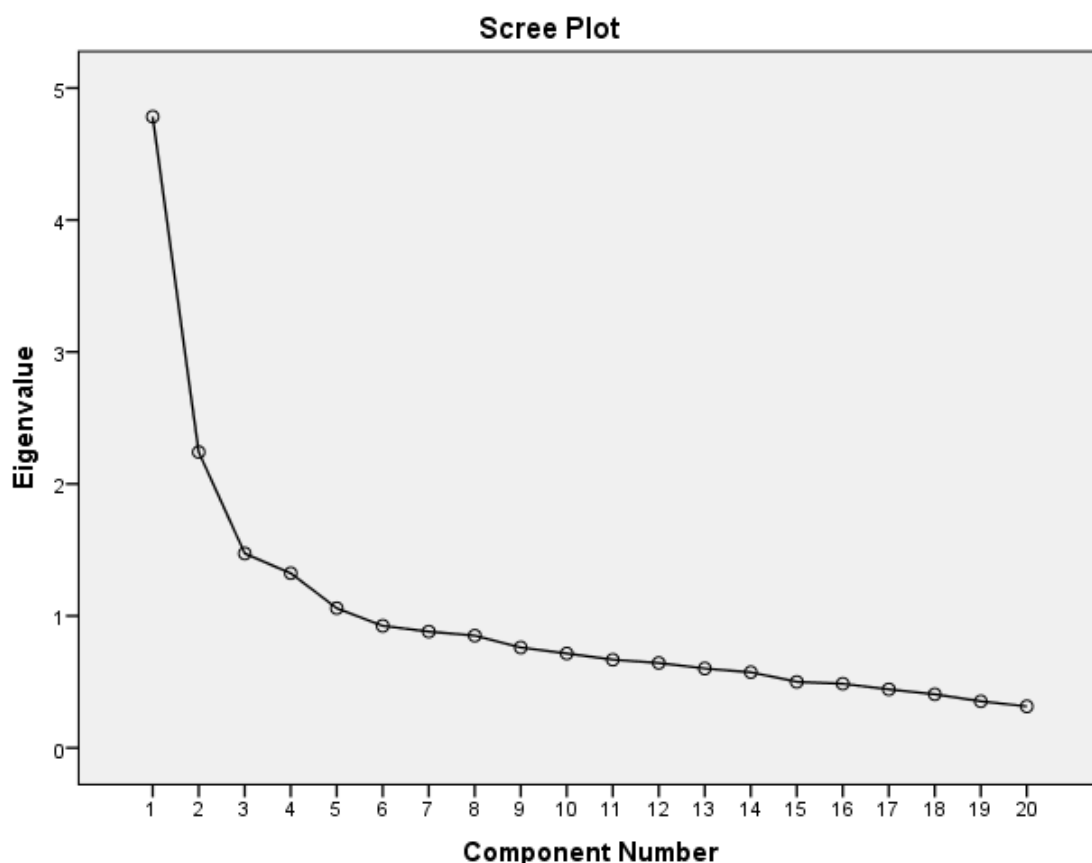
Figure 2. Scree plot- eigenvalue graph

The first theme as indicated sharp drop had a percentage variance related to eigenvalue of 23.914. The second theme's percentage of variance was 11.206; the third theme's percentage of variance was 7.366; the fourth theme's percentage of variance was 6.617 while the fifth theme's percentage of variance was 5.292 according to explanatory factor analysis. The other drops were very close to each other. According to the results, it was decided that the ecoliteracy scale had five themes: ecological intelligence, social intelligence, emotional intelligence, economy and green consumer behaviour (App 2) and these five themes have also respectable Cronbach alpha values either for each theme or for the whole scale (Table 2).

Table 2. *Themes and factor loads of the ecoliteracy scale*

	Themes and factor loads				
Scale items	I (Economy)	II (Emotional intelligence)	III (Social Intelligence)	IV (Ecological Intelligence)	V (Green Consumer)
6	0.799				
7	0.791				
8	0.720				
1	0.620				
23		0.667			
4		0.665			
5		0.528			
18		0.522			
3			0.859		
2			0.836		
17			0.672		
14			0.357		
28				0.677	
13				0.515	
12				0.498	
16				0.439	
11					0.729
10					0.684
15					0.679
9					0.560
Cronbach alpha coefficient values of each theme	0.654	0.562	0.715	0.632	0.624
Cronbach alpha coefficient value of whole scale	0.781				

As can be seen from Table 2, the Cronbach Alpha reliability coefficient value of whole scale was 0.781 while the coefficient values for economy, emotional intelligence, social

intelligence, ecological intelligence and green consumer behaviour were respectively 0.654, 0.562, 0.715, 0.632, and 0.624. These results indicated that the reliability scores were at a satisfactory level. The factor loads were more than 0.40 except the 14th item. The 14th item factor load was under 0.40 however the environmental education specialist suggested that this item represented the social intelligence theme very well. This meant that each item represented that theme very well.
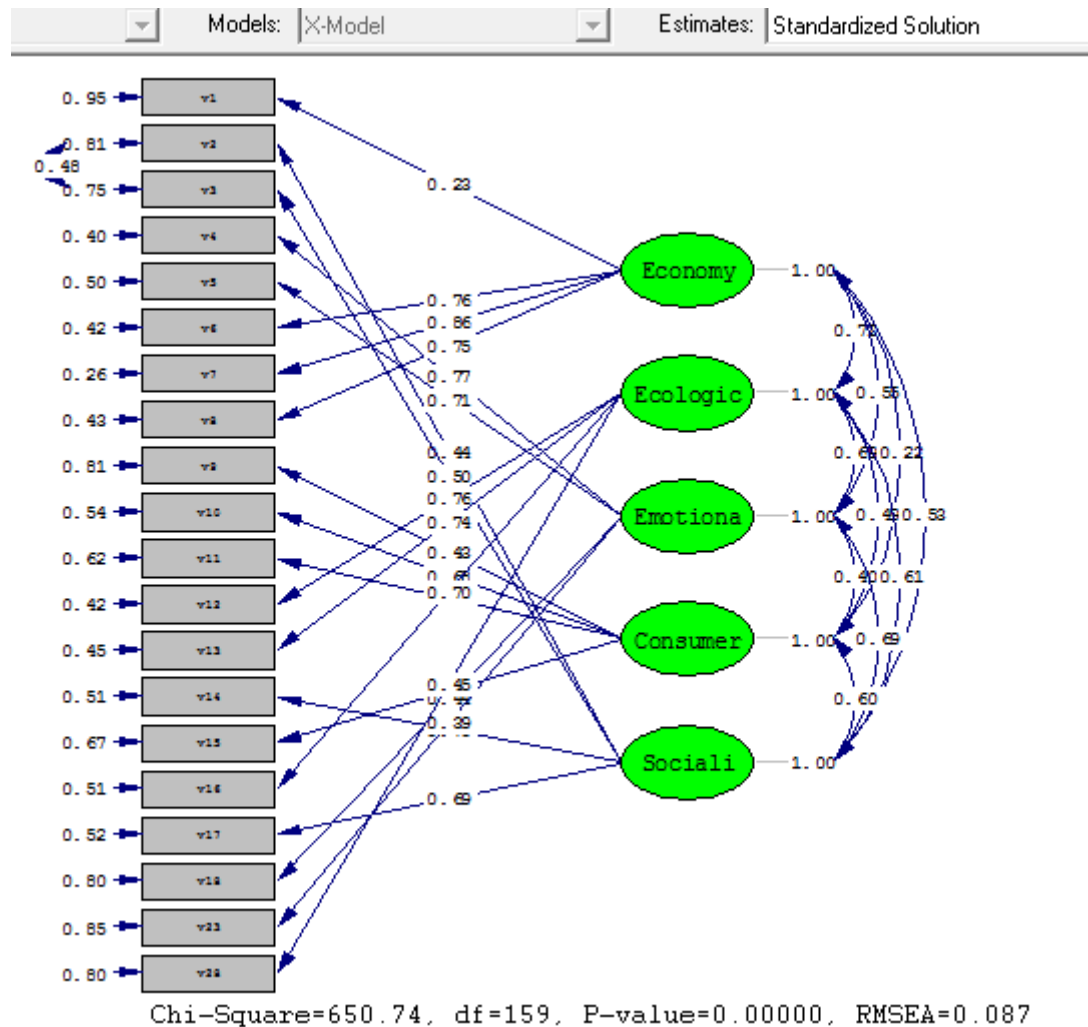

Chi-Square=650.74, df=159, P-value=0.00000, RMSEA=0.087

Figure 3. Path graph based on standardised solution of the ecoliteracy scale

Table 1 and Figure 3 showed that the ecoliteracy scale had goodness of fit values. All the results were confirmed by recommended values. According to Figure 3, each item represented a theme very well due to of standardised solutions being greater than 0.40 and t results less than 0.05 (App 1). The scale was reliable, had validity and strong theoretical background.

Testing of an alternative ecoliteracy model

According to the literature review, I thought that the main item of ecoliteracy was ecological intelligence. Ecological intelligence had three subsets (economy, emotional and social intelligences) and if ecological intelligence was improved then it would effect on the green consumer behaviour (Figure 1). I tested Figure 1 on confirmatory factor analysis one more time and Figure 4 occurred.
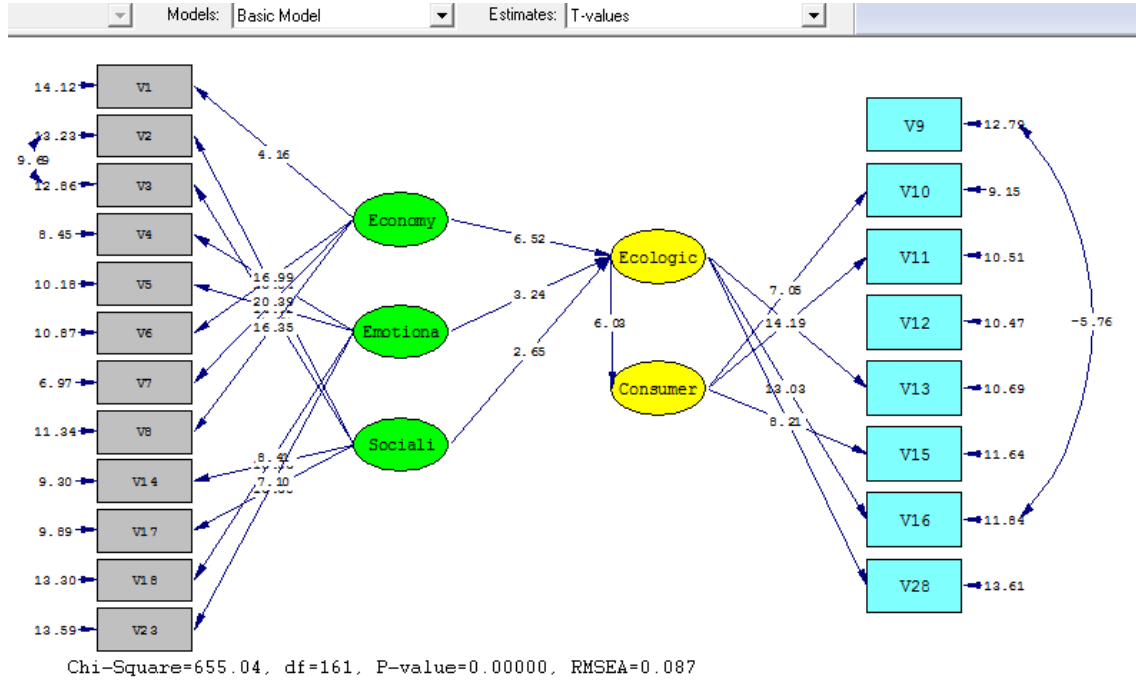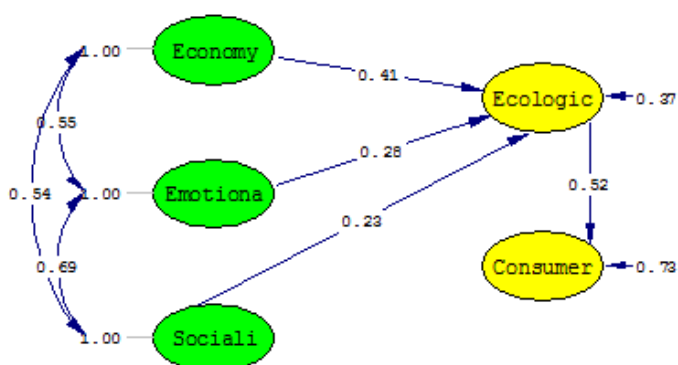
Chi-Square=655.04, df=161, P-value=0.00000, RMSEA=0.087

Figure 4. Path graph based on t values of the ecoliteracy model

As can be seen Figure 4, the model did not give any red signal and it meant that the significant levels among observable variables and latent variables were less than 0.05. The model only gave two correction warnings between the second- the third items and the ninth- the sixteenth items (Figure 4). The first warning between the second- the third items also happened at the first stage of the scale analysis (Figure 3). The second warning happened at the alternative model analysis. As can be seen from Table 1, goodness of fit values of ecoliteracy model were at a satisfactory level and very close to ecoliteracy scale's values after the correction analysis.

Chi-Square=655.04, df=161, P-value=0.00000, RMSEA=0.087

Figure 5. Path graph based on standardised solution of the alternative model

When it was compared Figure 1 and Figure 5, it could be clearly seen that both model overlapped. In terms of inductive and deductive perspective, this study showed that ecoliteracy scale and alternative model had strong theoretical background.

Discussion

According to the literature in introduction, five themes are determined for an ecoliteracy scale: ecological intelligence, social intelligence, emotional intelligence, economy and green consumer behaviour. At the first stage of the study, these five themes are confirmed as a subset of ecoliteracy (Table 1 and Figure 3). All the analysis results are at a satisfactory level (Table 1, 2 and Figure 3). At the second stage of the study, an alternative ecoliteracy model is tested (Figure 1). According to this model economy, emotional and social intelligences are subsets of ecological intelligence. Ecological intelligence has directly link to green consumer behaviours. Figure 4 and 5 confirm that ecoliteracy model has a satisfactory level and strong theoretical background. As can be seen at Figure 3 and 4, there are two corrections on the models.

Ideally, there should not be any correction on the scale development process and if there were many correction warnings, it meant that the model had very weak theoretical background (Simsek, 2007). However there were only two corrections on the alternative ecoliteracy model. Nevertheless, there is a gap between theoretical and experimental research on ecoliteracy (ESD, 2015); this study, therefore, might be an important starting point for experimental ecoliteracy studies.

Ecoliteracy is not a new concept. Researchers have begun to discuss about this concept for the last two decades. The main problem here is that ecoliteracy does not have a common definition (ESD, 2015; Kapogianni, 2015; Lira et al., 2015; Tursi, 2015; McBride et al, 2013; Esposito, 2009). Experimental studies related to ecoliteracy are very limited (Kapogianni, 2015; Tursi, 2015; Esposito, 2009) and they are mostly based on economy-

ecoliteracy relationship (Kapogianni, 2015; Tursi, 2015). These studies are used some surveys however ecoliteracy is only a subset of these surveys. It is obvious that the studies related to ecoliteracy have started to increase however there is a problem how to measure ecoliteracy (ESD, 2015). This study, therefore, refers to fill an important gap between theory and practice in terms of ecoliteracy.

Despite the fact that it is determined five subsets for ecoliteracy, the main aim of these subsets and ecoliteracy is sustainability (Goleman, 2006). Goleman (2006) also names ecolitearcy as sustainability literacy. The most popular definition of ecoliteracy is to use existing natural resources while considering next generations (UN Brundtland Declaration, 1987). This definition has been enriched with 'global citizenship' concept recently (Öhman, 2016). Many research mention theoretical background of ecoliteracy such as environmental knowledge, attitude, awareness, consciousness (ESD, 2015; Kapogianni, 2015; Lira, Steinicke & Garcia, 2015; Tursi, 2015; McBride, Brewer, Berkowitz and Borrie, 2013; Esposito, 2009; Orr, 1992, 2002). However it is not clear how to achieve sustainability learning and to transfer sustainability applications to the real life. It is clear that formal education is not enough to improve sustainability learning.

As can be seen from my case study at the beginning of the paper, informal learning and local culture are also very important in order to achieve sustainability and global citizenship. My grandmother, I and my friends did not know the meanings of sustainability or global citizenship but our behaviours were very coherent with sustainability. On the one hand the main subject here is to behave according to the local environment and local culture. This scale might be enriched with local cultures and information because one size does not fit all. I cannot say that this scale might work at research of all countries. It should be tested and improved. On the other hand there was an intergenerational transfer between my grandmother and grandchildren. In terms of local culture intergenerational transfers should not ignored because these transfers include collective acquisitions and systemic thinking (Shumba, 2011; Sterling, 2009). Intergenerational transfers refer to informal learning and informal learning might be main subject and methodology in terms of education programme development.

Research usually goes to from theory (literature review) to praxis (experimental/experiential applications). In terms of ecoliteracy, this way might be thought from opposite side. Researchers might go to from praxis to theory. For example, there are many people like my grandmother in rural areas or indigenous people. Researcher might observe these people and learn how they transfer local acquisitions to next generations. This might a new learning model for ecoliteracy and sustainability education.

As a conclusion, ecoliteracy has five subsets: ecological intelligence, social intelligence, emotional intelligence, economy and green consumer behaviour. Social intelligence, emotional intelligence and economy has connection with ecological intelligence while ecological intelligence has relationship with green consumer behaviour. If social intelligence, emotional intelligence or economy subjects are improved then they might affect on the development of ecological intelligence and thereby they might be effective on green consumer behaviour according to the alternative ecoliteracy model.

Implications

- This scale is not a perfect scale however it might be an important starting point for the other researchers. Researchers might try to develop another ecoliteracy scales with different subsets.

- This scale should be tested by other researchers. According to the results, the scale has very goodness of fit values however it is not clear whether it might work at different studies.

- Local cultural information is very important in terms of ecoliteracy and sustainability. Other researchers might develop different ecoliteracy scales based on local cultures.

- The main group of this study was adults. Future research could investigate different subsets of ecological intelligence among various demographics of backgrounds.

The scale could be adapted for different age groups and various demographic backgrounds. Researchers could also develop new ecoliteracy scales for different age groups and various demographic backgrounds.
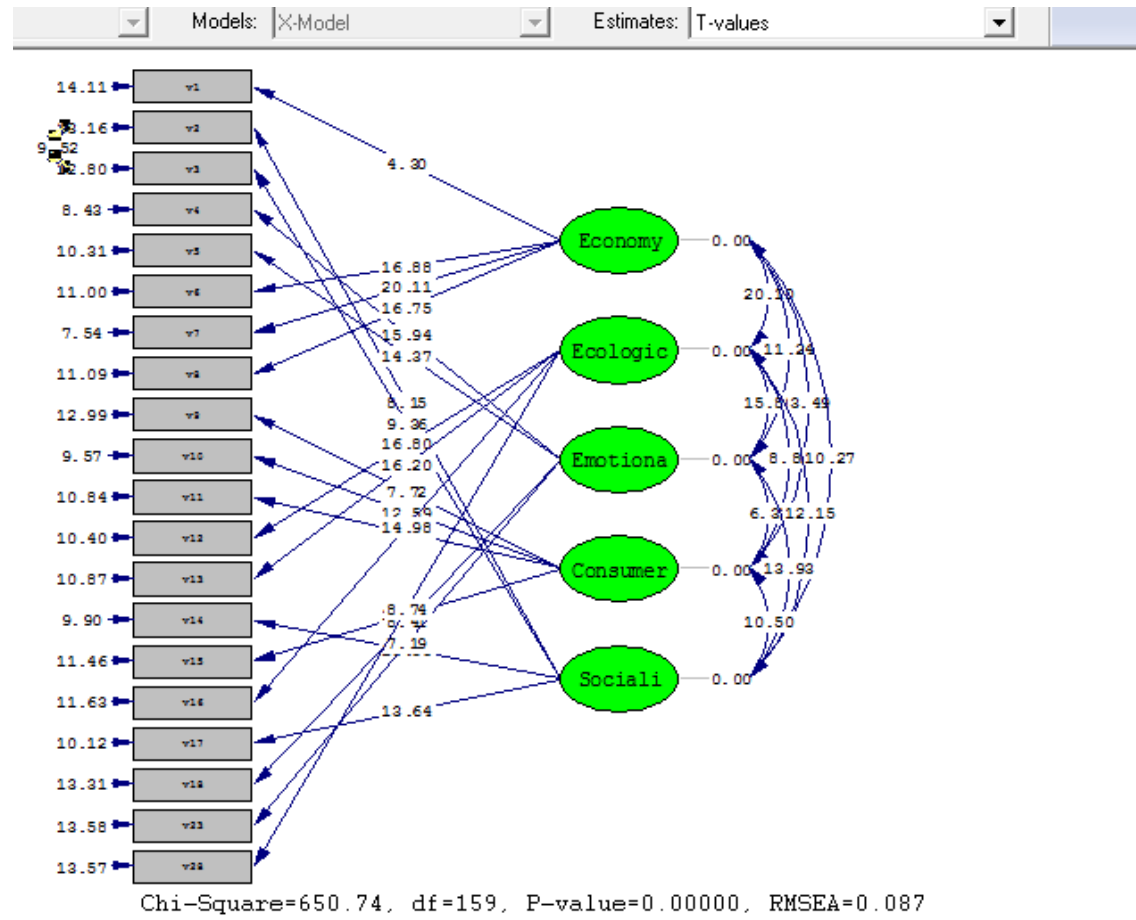
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Appendix 1. Path graph based on t values of the ecoliteracy scale

Chi-Square=650.74, df=159, P-value=0.00000, RMSEA=0.087

Appendix 2. Final version of the ecoliteracy scale

Themes	Items	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
Economy	1. I cannot afford sustainably produced goods.					
	6. Global companies flourish at the expense of local businesses.					
	7. Local businesses lay off workers when trying to compete with global companies, which is one of the reasons for migration to urban centres.					
	8. Immigration serves as a source of cheap labour for global companies.					
Social intelligence	2. I avoid cheap goods from overseas if I am aware that their production involves unjust labour conditions.					
	3. I avoid cheap goods from overseas if I am aware that their production involves the use of child labour.					
	14. I prefer to buy local produced vegetables and fruits.					
	17. I don't feel good when I learn that the production of a good I bought involved unjust labour conditions.					
Emotional intelligence	4. I try to emulate individuals who live sustainably.					
	5. I believe that environmental education is one of the ways to combat obesity.					
	18. I feel bad when I notice that nature has the power to defeat human progress.					
	23. I would be a much more laid-back person if I knew nothing about environmental issues.					
Green consumer	9. I try to reuse plastic bags.					
	10. I try to avoid using plastic bags when I go shopping.					
	11. I have my own water bottle with me at all times.					
	15. I try to extend the life of my clothes by sewing and patching them.					
Ecological intelligence	12. Environmental disasters can unfold in several parts of the world simultaneously.					
	13. The effects of an environmental disaster are not limited to the area where it took place.					
	16. I worry when I learn about increase in incidents of cancer among people living in industrial areas					

Appendix 3. Number and percentage of participants

Participants	N	%
Undergraduate students	132	32.6
In-service teacher	97	24.0
Civil servant	48	11.9
Housewife	46	11.4
Academician	37	9.1
Health sector employee	16	4.0
Media sector employee	11	2.7
Engineer	9	2.2
Laboratory technician	9	2.2
Total	405	100

Yetişkinlere Yönelik Ekolojik-Zeka Ölçeğinin Geliştirilmesi ve Alternatif Bir Modelin Doğrulaycı Faktör Analizi ile Test Edilmesi

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Özet

Ekolojik okur-yazarlığın tek bir tanımlaması olmamasına rağmen ekolojik okur-yazarlık, doğadaki sürdürülebilir ekolojik ilişkilerin anlaşılması, içselleştirilmesi ve bu sürdürülebilir yaşam şeklinin, günlük hayata aktarılabilmesi olarak tanımlanabilir. Bununla beraber karmaşık yapısı nedeniyle, ekolojik okur-yazarlığı ölçmek de zordur. Ekolojik okur-yazarlığın pekçok alt bileşeni vardır. Bu nedenle bu çalışmanın bir amacı, alt bileşenleri ekolojik zeka, sosyal zeka, duygusal zeka, ekonomi ve yeşil tüketici davranışı olan yetişkinlere yönelik bir ekolojik okur-tazarlık ölçeği geliştirmektir. Çalışmanın bir diğer amacı, bu alt bişenler arasındaki ilişkiyi gösteren bir modeli test etmektir. Bu modele göre ekonomi, duygusal ve sosyal zeka ekolojik zekanın alt bileşenleridir. Modelin ikinci aşamasında ise ekolojik zeka, doğrudan yeşil tüketici davranışı ile bağlantılıdır. Doğrulaycı ve açıklayıcı faktör analizine göre uyum iyiliği değerleri, kabul edilebilir düzeydedir. Bu değerler Cronbach alpha: 0.78; KMO: 0.830; X^2/df: 4.09; RMSEA: 0.087; SRMR: 0.0783; GFI, AGFI, IFI, ve CFI ≥ 0.80 şeklindedir. Ölçekte 20 madde bulunmaktadır.

Anahtar Kelimeler: Ekolojik okur-yazarlık, ekolojik zeka, duygusal zeka, sosyal zeka, ekonomi, yeşil tüketici davranışı, doğrulaycı faktör analizi, açıklayıcı faktör analizi