Research Paper: Relationship between Environmental Awareness, Information Seeking Behaviour, and Attitude of Students

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ABSTRACT

Purpose: This study aimed to conduct a path analysis of the relationship between environmental awareness, -seeking behavior, and the attitude undertaken by the survey method. The target population consisted of M.Sc. and PhD students of two colleges at Tehran university, including the agriculture and natural resources college and environmental science college in 2017-2018 (N=1342).

Methods: Using the Cochran formula, the sample size was determined as 150 people, and stratified proportional methods were applied as a sampling method. The research instrument was a questionnaire whose content validity was confirmed by a panel of experts, and Cronbach's alpha coefficient approved its reliability.

Results: The results showed that students had moderate attitudes toward the environment. It was also found that the perspectives of participants were not significantly different regarding gender, place of living, and educational level, but in terms of the college of education, the students of environment college significantly had a more favorable attitude toward the environment. The result of the correlation analysis indicated that attitude toward the environment had a significant relationship with information-seeking behavior and students' environmental awareness.

Conclusion: The finding of path analysis showed that two variables of information-seeking behavior and ecological awareness explained 82 percent of attitudes toward the environment. So, increasing people's knowledge and awareness is essential for changing their behavior and participation in environmental protection. Besides, students' most important information resource about the environment was the Internet.

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1. Introduction

Based on numerous definitions, the environment is the objective, and extrinsic conditions that surround the biotic organism can be classified as natural, manmade, and cultural (FazeliandJafar Salehi, 2012).The environment is the place of life, provides the most necessary human needs, and is the phenomenon that becomes important every day. Unfortunately, during the period of human dominance over this planet, people used natural resources without any planning and destroyed the environment (Adhami, 2016). Nowadays, environmental disasters threaten human peace, security, and life. Therefore, in the scientific and political sessions, the environmental debate is one of the most serious issues)Movahedi et al., 2017).Iran faces numerous environmental issues. In other word, the environmental situation is extremely worrying in Iran. Some of the most important environmental difficulties in Iran consists of: unhealthy disposal of garbage, increasing urban and industrial wastes, destruction of forests and pastures, air pollution (HamzehKalkenari et al., 2015). According to report of environmental performance index rank of Iran in years 2006, 2008, 2010 and 2012 were respectively 53, 68, 78 and 114 (Ramezani Ghavam Abadi, 2012). The mentioned numbers clearly indicated that the environmental situation in Iran has worsened. Some studies on environmental issues in Iran show that environment in Iran face many challenges such as :lack of organizational competencies and weakness in cooperation system among related organizations. Inefficiency of education (in a current manner) (Abolhasani, et al, 2019) corruption (Asghari et al, 2014 and Arabmazaryazdi et al., 2017)grouth of population and lack of policy and assessment of urban different activities(Mirzaei et al., 2014)lack of awareness and knowledge among all layers of society(Ramezani Ghavam Abadi, 2012;Shobeiri et al., 2013; Tahbaz, 2016; Baghapour et al.,2017;Najafloo and Yaghoubi, 2019). Among all items above one of the most important problems and obstacles in the field of environmental protection in Iran is the lack of awareness and knowledge among all the people in the society. Making awareness among the masses of people will change their view on the environment and improve their relationship with the environment (Macdiarmid et al., 2016; Shelest et al. 2017). Generally, developing and spreading environmental knowledge and awareness is one of the best ways to cope with environmental challenges and achieve sustainable environmental development (Wu et al., 2018). In fact, the goal is to train and educate people and take an environmental attitude to achieve sustainable development (Biasutti and Frate, 2017; AzadKhani et al., 2018). Environmental education is the most fundamental way of protecting the environment, which is the basis for promoting environmental awareness at the community level (Williams and Chawla, 2016). Environmental education at different educational levels can play an important role in mobilizing public opinion and their readiness to protect the environment (Ramezani Ghavam Abadi, 2012; Altuntaş and Turan, 2018). Obtaining knowledge about the attitudes of individuals can help to change the processes of thinking and action (Shaukat, 2016). Attitude is one of the most significant aspects of behavior and is important in its formation, and the attitude of an individual on a subject influence his behavior towards that subject (Carrand Sequeira, 2007; Han, 2015; Zareie and Navimipour,2016). Therefore, it is imperative that humans revisit their environmental behaviors in such ways that these behaviors are aimed at protecting the environment and preventing contamination (Burton, 2014;. Environmental awareness is a prerequisite for an individual to deal with specific issues (Schalteggerand Burritt, 2017). Therefore, knowledge is considered to be a necessity for the successful pursuit of activities and is also required at higher levels. Consequently, the greater the level of knowledge and information will be a fundamental to positive environmental behaviors (Braito et al., 2017). Finally, considering the importance and impact of students in the community and the fact that they are future prospects of the country, they will make a major contribution to decision-making in the future management system (Lozano et al., 2015).

The purpose of this study is to analyze the relationship between knowledge, information seeking behavior, and environmental attitudes of M.Sc. and Ph.D. students in two colleges at Tehran University including: 1- agricultural and Natural Resources College and 2- Environmental science college. The main cause for the selection of above students was that students of these two colleges (among all colleges of Tehran university) have the most relationship with the environment.

Theoretical Framework

According to importance of three variables information seeking behavior, environmental awareness, and attitudes towards environmental perception theoretical framework of the study was designed (Fig. 1). In the study there are three assumption including:

H1: There is a relationship between the level of information behavior and the student's attitude towards environmental perception.

H2: There is a relationship between the level of information seeking behavior and the environmental awareness of students.

H3: There is a relationship between student's awareness and their attitude towards environmental perception.

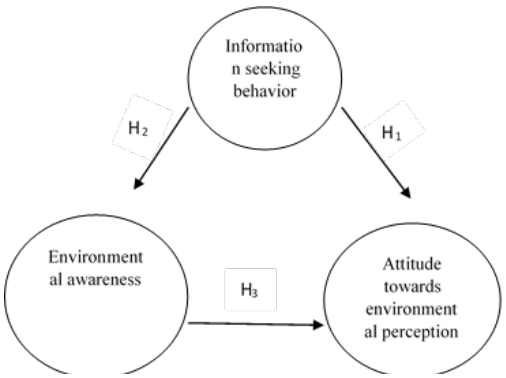

Figure 1. Theoretical framework of the study

2. Literature Review

Environmental studies have concluded different results, some of which are referred to as follow:

Moradi (2017) in his research entitled "Assessing Students' Knowledge, Attitude, and Responsible Behavior toward the Environment" (case study: students of the Payame Noor University) showed that students' attitudes in terms of strength and ability to influence behavior are moderate or higher, and their positive attitude tends toward biocentrism thinking. Their environmental skills or behavior have also been evaluated positively in this research. Sabzehei et al. (2016) investigated the relationship between the knowledge, attitude, and behavior of the environmental support of female students at the University of Qom. The results of this study showed that there is a significant relationship between environmental awareness, environmental attitudes, and environmental behaviors. Salehi et al. (2015) evaluated students' attitudes and responsibilities toward the environment (case study: students at Mazandaran Province).It was found that the attitude and behavior of students are relatively low and vary according to gender. The environmental attitude variable isalso the same according to the place of residence and faculty. On the other hand, the environmental behavior variable varies according to the location of the residence and the faculty. Mohammadian and Bakhshandeh (2014)studied the factors affecting the attitude and intention of consumers to buy green products and showed that the variables such as "environmental attitudes", "attention to health", "environmental knowledge", "willingness to collectivism", and "attitude towards green products" had a positive and significant effect, while the effect of "interpersonal effects" on the attitude of green products was not significant. Motamedinia et al. (2014) studied the environmental factors affecting the behavior of owners and managers of agricultural SMEs in Kermanshah and Ilam provinces. The results of their study showed that the level of education of respondents has a positive relationship with their environmental attitudes. On the other hand, the presence of literate people in their families had a positive effect on their environmental attitudes and had a two-way relationship with the amount of urbanization. Azizi et al. (2013), in a study entitled "Analyzing the Attitude of High School Students in Hamedan City to Protect the Environment", found that most students did not have a favorable attitude toward environmental protection. Correlation analysis also showed that there is a positive and significant relationship between their attitude towards protecting the environment and the use of the Internet and the father's occupation at a1% level. Menatizadeh and Zamani (2012) in the study of effective structures on environmental attitudes of farmers in Shiraz to maintain soil and water resources found that environmental knowledge has the most impact on environmental attitudes. Ahmadvand and Nooripoor (2010), in a study on the environmental attitudes of agricultural students at Yasouj University with gender analysis, found that both male and female agriculture students had a moderate and positive environmental attitude. Moreover, the results showed that there was no significant difference in environmental attitudes between male and female students as well as the first and fourth years students. Rostami (2010) evaluated the relationship between the level of knowledge and environmental attitudes of high school students with demographic variables in Kuh-e Dasht city and concluded that there is a significant relationship between independent variables of academic base, grade, parents' literacy level, student population and dependent variables of awareness and environmental attitudes of students. On the other hand, there is no significant relationship between income amount of the students' family, level of their knowledge, and environmental attitudes. Furthermore, there is a significant positive correlation

between environmental awareness and environmental attitudes.

Carvalho Maffia et al. (2011) conducted a study about the environment and environmental awareness. In their study, it was shown how university students in the state of Minas Gerais, Brazilthought and acted about the environment. It was found that students of natural science, compared with students of humanities and mathematics, are more aware of environmental issues. Akomolafe (2011) assessed the impact of individual factors on environmental education at high educational institutions in the state of Ekity, Nigeria. It was shown that gender, parents' education, and type of educational institution do not affect the students' environmental awareness and attitude, but according to the findings, there is a positive and significant relationship between the students' environmental awareness and their attitude. Aminrad et al. (2010) studied the environmental knowledge and attitudes among Iranian students at Malaysian universities. It was found that environmental awareness was moderate, while the environmental perception was high. Furthermore, the results of environmental awareness showed that there is no significant difference between sexes, but there is a significant difference between different educational levels. Oğuzand Kavas (2010) examined the literacy, attitudes, and environmental behaviors of students at the faculty of chemistry before and after environmental education in Turkey. The results of their study showed that there were significant differences in knowledge, attitude, and environmental behavior of students. Wallner et al. (2003) assessed the general attitude towards environmental and natural sciences and found that someone supports environmental policies who has enough information about environmental issues. However, it was not true about individuals who oppose environmental policies. Sudarmadi et al. (2001) conducted a study on the perception, knowledge, awareness, and attitude of two different social groups on environmental issues in Jakarta, Indonesia. It was clear that people with higher education, in comparison with other people in the community, have a better understanding of environmental issues. Furthermore, there is a significant difference in the attitude of these two groups towards environmental issues.

3. Methodology

The method used in this study was a surveying method and type of study was a descriptive correlation one. The statistical population of the study was M.Sc. and Ph.D. students in two colleges of Tehran university including agriculture and natural resources college (N= 700) and environmental science college (N= 642) in year 2017-2018 (N= 1342). The sample size was estimated using the Cochran formula (n=150), and samples were collected using a stratified sampling method. The research tool was a researcher made questionnaire which its reliability was confirmed by a panel of experts. To determine the reliability of the research tool, 30 questionnaires were distributed randomly among the students. Cronbach's alpha coefficient was calculated for different scales and indicated that the research instrument has acceptable reliability (Table 1). The research tool consisted of four sections as follows: individual characteristics including nine questions, students' awareness about the environment including nine items, students' attitudes towards the environment including nine items, and information seeking behavior about the environment including six items by using Likert scale with five options from one to five for positive items. In the present study, the standard deviation method was used to divide people according to their attitude.

A< Mean–Sd= Very weak

Mean - Sd< B< Mean = weak

Mean < C < Mean + Sd= moderate

Mean + Sd< D= good

Data analysis was performed using SPSSv22 and LISREL8.80 software. In the descriptive section, mean, standard deviation, frequency, and coefficient of variation were used. Furthermore in the inferential part, mean comparison tests, correlation, and structural equations were used.

Table 1. Reliability coefficients of the research tool

Variable	Number of items	Cronbach's alpha
Awareness	9	0.87
Attitude	9	0.80
Information seeking behavior	6	0.81

4. Findings

The average age of the students was equal to 28 years old. 33.3% of the students were female, and 66.7% were males. The percentage of master students was 78, and Ph.D. students were 22%. According to the field of study, 14.7% were students of agronomy and plant breeding, 18.6% were students of animal science, 10% were students of horticultural science, 8.7% were students of plant protection, 23.5% were students of planning, management, and environmental education, 6.7% were students of environment designing, and 17.8% were students of environment engineering.98% of the students were resident in the city, and only 2% were in the villages. According to the results, 11.2% of the respondents' father were illiterate, 22.2% did not have a diploma, 34.6% had a diploma, 6.7% had an associated degree, and 25.3% had a bachelor or post graduate degree. The monthly income of the respondents' family showed that 12.7% of them earned less than one million, 30.7% of them earned between one million and two million, and 56.6% of them earned more than two million tomans per month.

In this section, we use the mean value to prioritize environmental perception items. Based on the results (Table 2), the highest priority belongs to the following item: "Environmental protection is the responsibility of every human being." On the other hand, the lowest priority belongs to this item: "Almost all human activities are harmful to the environment."

Moreover, relying on the standard deviation, students' attitudes towards environmental protection are divided into four classes. Based on the results (Table 3), 16.0% of students had negative attitudes toward environmental protection, 26.0% had relatively negative attitudes, 45.3% were relatively positive, and 12.7% had positive attitudes. Therefore, it can be stated that most agricultural and environmental students had a relatively positive attitude.

Table 2. Prioritization of the items related to the students' environmental attitudes

Items	Mean	Standard Deviation	Rank
Environmental protection is the responsibility of every human being.	3.84	1.08	1
The healthy environment enhances the welfare of humans.	3.79	1.17	2
I would like to work with environmental protection organizations.	3.73	1.13	3
I will protest people who harm the environment.	3.69	1.22	4
Do not pay attention to environmental issues will make the future of the world dark and desperate.	3.67	1.04	5
Environmental problems are not my business. *	3.61	1.14	6
By protecting the environment, we must help the next generations.	3.60	1.16	7
I respect people who protect the environment.	3.59	1.41	8
Almost all human activities are harmful to the environment. *	3.43	1.14	9

* Negative items

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Table 3. Frequency distribution of students' levels of attitudes about environmental protection

Levels of Attitude	Frequency	Percentage
Negative	24	16
Relatively negative	39	26
Relatively positive	68	45.3
Positive	19	12.7
Total	150	100

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Another important variable that influenced the environmental attitudes of students was environmental awareness, whose results of prioritization were shown in Table 4. Results showed that the highest priority was as follows:" Chemicals and minerals are mainly entered the human body by water and may reach dangerous levels through accumulation in the body. On the other hand, The lowest priority belonged to this item: "Plowing agricultural lands frequently leads to carbon dioxide production."

Prioritizing the items of the information seeking behavior related to the environment has been identified by students. Items in terms of "searching environmental content on the Internet" and "listening to environmental radio programs" were the highest and the lowest priorities, respectively. Thus, the Internet is the most important source among students to get the latest news about the environment.

In this part of the study, an independent t-test was used to compare the environmental attitudes of students in different groups. The results shown in Table 6 indicate that the environmental attitudes between male and female students are not significantly different. Furthermore, there were no significant difference in different groups of residence and educational levels. However, according to the results, there was a significant difference between students of agricultural and natural resources college and environmental science college at 95% confident interval. As a result, environmental science students had expressed more positive attitudes.

In this part of the study, the correlation analysis has been used in order to investigate the relationship between research variables and environmental attitudes. The results showed that there is a significant positive correlation between the father's education level and family income with the attitude variable. Moreover, there is a significant positive correlation between family income, information seeking behavior, and students' environmental awareness with students' environmental attitudes at 99% confidence interval.

Table 4. Prioritizing items of the environmental awareness of students

Items	Mean	Standard deviation	Rank
Chemicals and minerals are mainly entered the human body by water and may reach dangerous levels through accumulation in the body.	3.27	1.09	1
Greenhouse gases emissions from burning fossil fuel is a major factor in global warming and melting polar ice.	3.35	1.05	2
Extinction of plant and animal species happens every day in the world, in which the most common reason is the destruction of their habitat by humans.	3.51	0.968	3
Forests produce oxygen and absorb carbon dioxide.	3.45	1.12	4
Using chemicals is one of the factors causing pollution in surface and underground water and soil.	3.63	0.938	5
Increasing the number of livestock will damage the pasture.	3.35	1.18	6
Land-use changes are effective on the emission of greenhouse gases and erosion of soil.	3.31	1.14	7
Preparing compost from wastes is a good way to optimal use of garbage compared with burning and burying.	3.63	1.00	8
Plowing agriculture lands frequently leads to carbon dioxide production.	2.97	1.12	9

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Table 5. Prioritizing information seeking behavior of students about the environment

Information sources	Mean	Standard deviation	Rank
Searching environmental content on the Internet	3.62	1.20	1
Studying scientific papers and conferences about the environment	3.40	1.0	2
Reading the newspaper about the environment	3.35	1.03	3
Watching television programs about the environment	3.32	1.02	4
Read books about the environment	3.27	1.12	5
Listening to environmental radio programs	3.26	0.934	6

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Table 6. Comparing the average of students' environmental attitudes in different groups

Dependent variable	Grouping variable	Classes	Frequency	Mean	Standard Deviation	t	Significance
Attitude	Sex	Male	100	33.46	6.78	1.28	0.483
		Female	50	31.98	6.31	-	-
	Residence	City	147	32.96	6.66	-0.096	0.923
		Village	3	33.33	6.80	-	-
	Degree	Ph.D.	117	33.48	6.50	-	-
		M.Sc	33	31.15	6.90	1.79	0.991
	College	Env. Sci.	72	34.13	5.99	2.07	0.040*
		Agr.&Nat. Res.	78	31.90	7.05	-	-

*Significant at95% confidence interval

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Table 7. Correlation between the environmental attitude and research independent variables

Independent variable	Value of statistic	Type of correlation	Significance level
Age	-0.21		0.798
Father's education level	0.195*		0.017
Family income	0.204*		0.012
Information seeking behavior	0.765**		0.00
Awareness	0.721**		0.00

** Significant at 99% confidence interval * Significant at 95% confidence interval

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Finally, in this study, structural equation modeling was used to identify the relationship between the amount of information seeking behavior, environmental awareness, and students' environmental attitude. Structural equation modeling is a method to illustrate, estimate, and test hypothesis between obvious and hidden variables. Various statistics and indexes were used to fit the model. Since each indicator reflects a particular aspect of fitting model, it is often necessary to use several indicators for fitting the model, e.g., Klein (2005) statistics and indicators, second root of chi-square of estimating approximation error variance, comparative fit index ,and the second root of average square standardized residual. Sun (2005) also suggests the following indicators for fitting the model: The second root of estimation of the approximation error variance, the Tucker-Lewis index or the softened fit index, the adaptive fit index, the McDonald's (MC) central index, and the second root mean square of standardized retentions. In the present study, Klein (2005) and Sun (2005) indicators were used to measure the fitness of the model, except the X2, which is very sensitive to sample size and deviation from the normality of the multivariate and the McDonald's central index.

In Table 8, fitness indicators have been shown, and it can be concluded from their rate that all fitting indices are at the optimum level, and the tested model has a suitable fit with the collected data.

By using path analysis, direct and indirect effects, as well as the effect of each independent variable on dependent variables, were measured. Based on Table 9, direct effect, indirect effect, and total effects of independent variables on dependent variables as well as the determination coefficient R2 of dependent variables are determined by independent variables.

Findings of Table 9 showed that the effect of information seeking behavior on environmental attitudes (hypothesis number 1) is estimated to be 52%, and a statistic value of 3.99 at one percent level was positive and significant; therefore, the first hypothesis of the research is confirmed, and it can be said that whenever the information seeking behavior of the students becomes greater, their environmental attitudes increase as a linear function.

The results of the second hypothesis indicated that the effect of information seeking behavior compared with environmental awareness was direct, and it was estimated at0.74. In addition, the statistic value was 7.46 with a 5% significance interval; therefore, the second hypothesis of the research was approved. Regarding the coef-

ficient of the relationship, it can be said that as the level of information seeking behavior increases, the environmental awareness increases as a linear function.

The results of the third hypothesis of the study showed that the direct effect of knowledge and environmental attitudes was 0.45 with statistic value of 3.57 which was significant at one percent confidence interval level; therefore, the third hypothesis was confirmed, and it can be claimed that as students become aware of the environment issues, their environmental attitude will become better.

The indirect effect of the knowledge of respondents on students' environmental attitude with the role of information seeking behavior was estimated with a coefficient of 0.23. Based on the results of the fitted model in the sample, the structural equation model will be described in Figure 2. It was concluded that the most important variables affecting environmental attitude among respondents were the variables information seeking behavior and environmental awareness. In other words, in order to achieve the desired level of environmental attitudes, we need to focus on these two variables. Accordingly, it is clear that these two variables can estimate a total of 82% of the changes of environmental attitudes. The results also showed that the amount of information seeking behavior explained 54% of the environmental awareness of students.

Table 8. Fit indices of the research structural model

Index	Optimum value	Reported value
Chi-square ratio to degree of freedom	Under3	1.52
Smooth Index of Fitness	Up to and 0.9	0.94
Not Smooth index of fitness	Up to and 0.9	0.97
Increasing Coherence Index	Up to and 0.9	0.97
Adaptive maturity index	Up to and 0.9	0.97
Goodness of Fitness	Up to and 0.8	0.83
Adjusted Goodness Fit Index	Up to and 0.8	0.80
Average square residual standardized	Under 0.10	0.056
The second root estimate of the approximation error variance	Under 0.08	0.059

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Table 9. The direct and indirect effects of students' attitude and awareness

Independent variable	Dependent variable	Direct effect	T value	Indirect value	Total effect	R^2
Awareness	Information sources	0.74	7.46**	-	0.74	0.54
	Awareness	0.45	3.57**	0.24	0.69	0.82
Attitude	Information seeking behavior	0.52	3.99**	0.42	0.52	0.82

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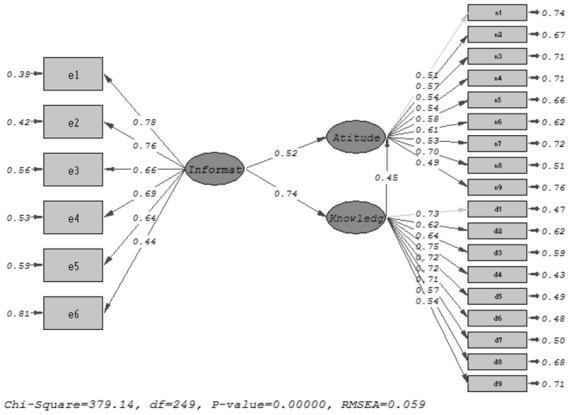

Figure 2. Structural model of the relationship between information seeking behavior, environmental awareness, and environmental attitude of students

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5. Discussion

The results of the study showed that 58% of respondents had a positive attitude toward environmental protection. The results of the study by Ahmadvand and Nooripoor (2010) were similar to the results of the present research, but the research by Aminrad et al. (2010), Azizi et al. (2013), and Salehi et al. (2015) were contrary to the present study. According to the results of the study, there was no significant difference in the environmental attitude between male and female students, which is similar to the results of Aminrad et al. (2010; Akomolafe, 2011). While ,several studies concluded that there was a difference in the environmental attitudes of gender groups, so that women and girls had a positive and more favorable attitude toward the environment compared with men and boys (Ahmadvand and Nooripoor, 2010; Salehi et al., 2015). According to the results of this study, there was no significant difference between environmental attitude of respondents in two levels of M.Sc. and Ph.D. students. which was consistent with the findings of Rostami (2010), but it was not matched with the findings of Aminrad et al. (2010) and Motamedinia et al.(2014). In this study, the students of the environmental science faculty had a better environmental attitude, compared with students of the agriculture and Natural resource faculty significantly. This finding is similar to the findings of a study by CarvalhoMaffia et al. (2011), but in contrary to findings of Akomolafe (2011) and Salehi et al. (2015). The results showed that there was no significant difference between environmental attitude of respondents in two places of residence (city and village)which is similar to the results of the research by Salehi et al. (2015). In the present study, there is a significant relationship between the families' income and their attitude toward environmental protection which was matched with other studies (Ahmadvand and Nooripoor, 2010), but the result was contrary to the findings of a study by Rostami (2010). According to the findings of this research, there is a significant relationship between fathers′educational level of the respondents and the students' environmental attitudes towards environmental protection, which is like the results of other studies (Rostami, 2010; Motamedinia et al., 2014), but in conflict with the study by Akomolafe (2011). Another finding of the study indicated that there is a significant relationship between students' environmental awareness and their attitude toward environmental protection, which is approved by the results of the studies by other researchers (Rostami, 2010; Akomolafe, 2011; Mohammadian and Bakhshandeh, 2014; Sabzehei et al., 2016). The findings of this study showed that the most important information resource of students on the environment was the Internet. This finding is consistent with the findings of (Azizi et al., 2013).

Two variables consisted of environmental awareness and information seeking behavior had both significant and positive relationship with variable attitude towards environment and could explain 82 percent of changes of dependent variable. This result is verified by Findings of study of Maleki and Alipoor (2015) that indicated that three variables including environmental awareness, religiosity and participation explain 82 percent of the variance of women's environmentalism in Iran.

According to the results of the study recommendation below are suggested:

Incorporating environmental concepts into the course heading of agricultural and natural resources students and students of other colleges (except environmental science).

Organizing workshops, seminars, and contacts with information sources in order to improve students' attitudes towards protecting the environment.

Improving the students' environmental attitudes by Internet-based and cyber security-based approaches, such as providing virtual courses and environmental advertisement on the Internet.

Adopting the necessary policies and decisions in order to improve families′ income specially poor and families.

Promoting educational level of all persons in a family, specially fathers.

Evaluating level of environmental awareness, information seeking behavior, and environmental attitude among students of other colleges and universities.

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Conflict of Interest

The authors declared no conflicts of interest.

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