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The Role of Scaffolding in Nature School to Promote Sustainable Development in Education

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Abstract

Purpose: The overall purpose of this study was to investigate the role of Scaffolding in nature school in order to promote sustainable development in education. This research was practical in terms of purpose and survey in terms of descriptive method.

Methodology: the present study was practical in terms of purpose and survey in terms of descriptive method. This statistical population consisted of 75 principals, deputies and teachers of the nature school in Mazandaran province. According to Cochran's formula, 63 people were selected as a sample using simple random sampling method. Scaffolding questionnaire with 60 questions and sustainable development questionnaire with 25 questions were used to collect data. The face and content validity of the tools were confirmed by experts and their reliability was calculated using Cronbach's alpha coefficient for Scaffolding questionnaire 0.92 and sustainable development 0.89. Structural equation test was used to analyze the data.

Findings: The results showed that; The role of Scaffolding in nature school on sustainable development in education is positive and significant and the proposed model has a good fit.

Conclusion: Scaffolding is an important concept in teaching and learning in which teachers and students create meaningful relationships between teachers 'cultural knowledge and students' daily experience.

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1. Introduction

Nowadays, new approaches to knowledge transfer through teachers and books and memory-based learning have given way to making knowledge through learning meaningful. This transformation has taken place from the perspective of behaviorism to the perspective of epistemology and has been formed as part of the contemporary cognitive movement due to dissatisfaction with traditional education (Nazari, Sheikhi, 2016). One of the effective strategies in this field is Scaffolding technique. In the Scaffolding approach, the teacher who assists the learner first assumes a major share of the responsibility, but as the learning progresses, the responsibility is transferred to the learner. Scaffolding is an important concept in teaching and learning in which teachers and students create meaningful relationships between teachers 'cultural knowledge and students' daily experience (Jozaei, Saadipour, 2013). In this method, the teacher uses a variety of methods to provide a safe environment for learners to encourage them to engage in learning by interacting with classmates and their teacher (Smith et al., 2018). Therefore, this method has a decisive role in the academic achievement of students. As a result, the Scaffolding approach can play a role in the sustainable growth and development of education.

The new idea of education based on the Scaffolding approach is generally three cases of education, learning and learner-teacher participation (Haataja, et al, 2019). Education experts consider the concept of Scaffolding to be the active involvement of individuals in cultural and social learning and problem-solving activities with participation and collaboration. This paradigm is active collaboration in the educational environment to increase the approximate scope of growth. The idea of Scaffolding verbal communication in the educational environment

It is that by providing platforms including signs and questions and answers, it promotes education. Royanto (2012) research on the Scaffolding model in schools suggests that through Scaffolding the teacher can assist students in issues and experiences that require a causal system. The teacher can also use Scaffolding to help students in areas where they lack basic knowledge (Royanto, 2012). One of the most important benefits of the Scaffolding method is that it engages the learner in the learning process. The learner does not passively listen to the information provided, but forms his new knowledge with the teacher's guidance based on previous knowledge. At first glance, in the short term, the difficulties of the content seem to be added, but in the end, it creates productive learning for the learner (Samiei Refarghandi, Irvani Manesh, 2017).

The idea of platform construction was first introduced by Vigotsky in historical, social and cultural theory, and Brunner called it pillar construction. The Scaffolding method, which is based on teacher-student dialogue, is a supportive method borrowed from the construction profession (Wilson, 2016). The framework or platform in teacher education to support the student in the learning process is based on the concept of approximate growth area (Safari et al., 2016). In the area-based approach, the growth of education is not one-way or one-way. Rather, students actively collaborate with adults in learning and somehow invite them to participate. Adults also align their level of guidance and mentor participation with student responses, and in this way teachers facilitate learning (Haji Arbabi, 2015). In Scaffolding, the teacher first assumes a major share of the responsibility, but as the learning progresses, the responsibility is transferred to the student. In fact, Scaffolding is a method in which students answer questions using guiding questions or indirect guides (Snowman, et al, 2009).

On the other hand, today the school is like a factory where children are considered a number of products and little free time of children are stolen by tablets, televisions and computers. Therefore, for cognitive, emotional, and emotional development, the value of nature school was suggested by Stephen Claret (2012). The physical space of the nature school includes an orchard and a variety of pets. Most of its activities are performed in the natural bed. Children go to nature schools for several hours in workshops and engage in spontaneous and unstructured activities. Cultivating one's talents in many areas, including creativity, problem-solving ability, grammatical power, imagination, and cultivating the five senses,

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depends on a continuous, tangible, real (rather than virtual) and diverse interaction with nature in a sensitive childhood period (Wahabzadeh and Hosseinian, 2014). On the other hand, growth and development in different countries depend on sustainable development. Achieving sustainable development requires planning at every economic, political, social, cultural and human level. Human beings, as one of the components of sustainable development, are in the center of attention and need education. And that education is one of the components of sustainable development, so education in general and education in particular can play an effective role in sustainable development. In fact, education as the most fundamental institution in society is the main and undoubted condition for the comprehensive development of the country (Yousefi, 2014).

Samiei Refarghandi, Irvani Manesh (2017) in a study entitled "Study of the use of educational scaffolding strategies (Scaffolding) and its impact on student learning and retention" showed that; The use of educational scaffolding strategies in teaching mathematics increased students' learning and learning; Safari et al. (2016), in a study entitled "The effectiveness of education based on the Scaffolding technique on improving the level of self-efficacy of students in English and Arabic language courses" showed that; Scaffolding-based training has a significant effect on improving students' self-efficacy; Rahimi Doust, Norouzi (2014), in a study entitled "Strategies for building educational support in problem-solving learning environments" showed that; Developing optimal support strategies is essential in designing learning environments. Experts gave a positive assessment of the proposed framework.

Parvin, et al (2014), in a study entitled "Presenting a conceptual model of the relationship between output quality of higher education and sustainable development based on a systemic approach" showed that; To achieve sustainable development, the education system is one of the elements that can pave the way to achieve development and lead the way to smooth development, but an important issue that stands out in education is the quality of products and outputs of the education system. Könings, et al (2019) in a study entitled "Platforming Peer Assessment Skills: Intervention in Learning Specific Skills" showed that; Scaffolding approach improves the range of accuracy in students and reduces the time for work and perceived mental effort. Also, the Scaffolding approach of the peer evaluation type increased the accuracy and mental focus during the students' learning; Brownfield, Wilkinson (2018) in a study entitled "Investigating the effect of Scaffolding on student literacy learning" showed that; Scaffolding method has a positive and significant effect on students 'literacy learning and improves students' learning; Ryan-Fogarty et al. (2016) in a study entitled "A Study of Green Program Development in the Environment and the Role of Education for Sustainable Development in Irish Schools" showed that; More than half of the schools have been successful in their work in environmentally friendly, technology-based subjects. The education system is also involved in sustainable development. Royanto (2012), in a study entitled "The Impact of a Scaffolding-Based Intervention Program to Improve Reading Metacognition Strategies in Third-Year Elementary Students in Jakarta" showed that; the curriculum based on the Scaffolding approach has a significant effect on improving students' metacognitive reading strategies. The teacher can also use Skosolding to help students in areas where they lack basic knowledge. Normore, Anthony (2010) in a study entitled "Scaffolding, problem solving in learning-based learning environments on technology "showed that; The platforming method plays an important role in students 'learning and this method improves students' basic knowledge in various fields. Although research has been done on the effectiveness of the Scaffolding approach in teaching and learning, no design has been developed to use this method in the school of nature, nor has a model been developed that can provide a bridge between theoretical design and its application. Therefore, the main issue of the present study is: "What model can be proposed for Scaffolding in the school of nature in order to promote sustainable development in education?"

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2. Methodology

The present study was practical in terms of purpose and survey in terms of descriptive method. The statistical population is all principals, deputies and teachers of nature school in Mazandaran province (Kuhyar Behshahr nature school, Derna Behshahr nature school, Behshahr spring nature school, Reyhaneh Ghaemshahr nature school, Roish Sari nature school, Noj Sari nature school, Kati Babol nature school Rona Babolsar Mobile Nature School, Tali Kak Amol Nature School, Vaio Abbas Abad Nature School and Vishe Noor Nature School (75 people). According to Cochran's formula at 95% confidence level and measurement error of $\alpha = 5\%$, 63 people were selected as a statistical sample by simple random sampling method.

The following questionnaires were used to collect data in this study: Scaffolding Questionnaire: This questionnaire has 60 questions and 5 dimensions "cognitive, metacognitive, emotional, process and structural" and in the range 5 Likert options (very low, low, medium, high and very high) are designed and adjusted and scored from 1 to 5, respectively. Sustainable Development Questionnaire: This questionnaire has 25 questions and 4 dimensions "cultural, economic, social and human" and is designed and arranged in a range of 5 Likert options (very low, low, medium, high and very high), And is scored from 1 to 5, respectively. The face and content validity of the tools were confirmed by experts and their reliability was calculated using Cronbach's alpha coefficient for Scaffolding questionnaire 0.92 and sustainable development questionnaire 0.89 which are confirmed. Structural equation test using SPSS20 and PLS software was used to analyze the data.

3. Findings

Demographic findings showed that 10% of the statistical sample was in the age group under 40 years, 50% in the age group 40 to 50 years and 40% in the age group over 50 years. Table 1 presents the mean and standard deviation of the research variables.

Table1. Descriptive study of research variables

Variable	Variable code	Number	Average	Standard deviation
Scaffolding	S1	63	3/549	0/751
Cognitive	AA	63	3/532	0/780
Metacognitive	AB	63	3/634	0/771
Emotional	AC	63	3/557	0/789
Process	AD	63	3/495	0/799
Structural	AE	63	3/529	0/801
Sustainable Development	S2	63	3/631	0/826
Cultural	BA	63	3/568	0/850
Economic	BB	63	3/669	0/838
social	BC	63	3/609	0/873
human	BD	63	3/676	0/971

The results of Table 1 show that; the mean and standard deviation of Scaffolding (3.549 ± 0.751) is the highest mean of metacognitive dimension (3.634 77 0.771) and the lowest mean of process dimension (3.495 ± 0.799) Is. The mean and standard deviation of sustainable development is (3.631 ± 0.826), of which the highest mean is related to the human dimension (3.676 ± 0.730) and the lowest mean is related to the cultural dimension (3.568 ± 0.730) is.

In order to evaluate the dimensions of Scaffolding in nature school in order to promote sustainable development in education, a Scaffolding researcher-made questionnaire was used to discover their dimensions and rankings. Kaiser-Meyer-Alkin and Bartlett fitness tests were used to determine the adequacy and requirements of the data for factor analysis. KMO statistic is an indicator of the adequacy of variables and a value higher than 0.7 is suitable for performing factor analysis. The Bartlett test is also one of the methods for determining the appropriateness of data, and for a factor analysis model to be useful and

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meaningful, its variables need to be correlated. Therefore, the statistical hypothesis related to Bartlett test showed that at the level of 95% confidence and measurement error α = 5%, because the value of KMO statistic was calculated more than 0.7, also the result of Bartlett test showed that the significance level was 0.05. 0> Sig is calculated, so there is not enough evidence to confirm the null hypothesis and the research hypothesis is confirmed and the data are correlated. Therefore, the data have the necessary adequacy and correlation to perform heuristic factor analysis. The percentage of variance explained shows that 84.826% of the changes in the questions can be explained by the extracted factors. Then, in Table 2, exploratory factor analysis was performed and the factor load of each dimension was determined.

Table2. Results of exploratory factor analysis test and determination of factor load

Number	Question code	Subscription ratio	The first factor load	The second factor	The third factor load	The fourth factor load	The Fifth factor load
1	AA1	0/795	0/273	0/523	0/387	0/231	0/415
2	AA2	0/850	0/231	0/525	0/369	0/247	0/365
3	AA3	0/778	0/228	0/607	0/227	0/255	0/339
4	AA4	0/841	0/183	0/553	0/417	0/288	0/354
5	AA5	0/847	0/235	0/666	0/125	0/230	0/331
6	AA6	0/841	0/260	0/665	0/333	0/183	0/267
7	AA7	0/845	0/341	0/548	0/216	0/226	0/114
8	AA8	0/867	0/340	0/541	0/203	0/255	0/112
9	AA9	0/849	0/234	0/618	0/242	0/206	0/208
10	AA10	0/864	0/332	0/552	0/192	0/240	0/159
11	AA11	0/885	0/300	0/622	0/141	0/285	0/181
12	AA12	0/875	0/255	0/676	0/247	0/202	0/222
13	AA13	0/843	0/251	0/693	0/320	0/207	0/303
14	AA14	0/904	0/270	0/723	0/309	0/201	0/331
15	AA15	0/831	0/233	0/657	0/283	0/350	0/327
16	AA16	0/823	0/260	0/628	0/372	0/265	0/323
17	AA17	0/902	0/297	0/689	0/322	0/239	0/357
18	AA18	0/857	0/253	0/635	0/248	0/405	0/259
19	AB1	0/862	0/184	0/291	0/664	0/173	0/399
20	AB2	0/914	0/246	0/238	0/716	0/286	0/276
21	AB3	0/897	0/249	0/206	0/710	0/255	0/299
22	AB4	0/842	0/235	0/289	0/659	0/181	0/374
23	AB5	0/899	0/202	0/270	0/698	0/237	0/353
24	AB6	0/825	0/212	0/227	0/582	0/336	0/262
25	AB7	0/717	0/349	0/196	0/575	0/342	0/138
26	AB8	0/793	0/395	0/209	0/605	0/320	0/105
27	AB9	0/739	0/261	0/156	0/528	0/418	0/224
28	AB10	0/822	0/265	0/229	0/623	0/302	0/211
29	AB11	0/775	0/305	0/365	0/560	0/406	0/332
30	AC1	0/825	0/529	0/409	0/310	0/316	0/340
31	AC2	0/830	0/517	0/399	0/409	0/289	0/357
32	AC3	0/843	0/501	0/409	0/351	0/362	0/306
33	AC4	0/781	0/523	0/281	0/328	0/318	0/362
34	AC5	0/847	0/708	0/248	0/190	0/284	0/207
35	AC6	0/894	0/738	0/284	0/135	0/207	0/254
36	AC7	0/831	0/707	0/267	0/147	0/181	0/168
37	AC8	0/804	0/670	0/172	0/179	0/219	0/277
38	AC9	0/861	0/699	0/264	0/178	0/212	0/233
39	AC10	0/868	0/714	0/287	0/141	0/255	0/220
40	AC11	0/794	0/571	0/374	0/243	0/402	0/308
41	AC12	0/846	0/502	0/370	0/198	0/404	0/382
42	AC13	0/832	0/509	0/393	0/308	0/353	0/350

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43	AC14	0/762	0/557	0/391	0/191	0/461	0/314
44	AD1	0/863	0/363	0/347	0/245	0/302	0/596
45	AD2	0/868	0/349	0/289	0/253	0/274	0/624
46	AD3	0/900	0/318	0/293	0/184	0/276	0/703
47	AD4	0/910	0/311	0/339	0/183	0/302	0/668
48	AD5	0/903	0/264	0/296	0/144	0/313	0/708
49	AD6	0/915	0/303	0/318	0/156	0/296	0/705
50	AD7	0/899	0/260	0/192	0/260	0/269	0/729
51	AE1	0/909	0/319	0/201	0/260	0/733	0/268
52	AE2	0/897	0/316	0/299	0/335	0/704	0/226
53	AE3	0/806	0/262	0/230	0/251	0/626	0/323
54	AE4	0/914	0/280	0/298	0/289	0/742	0/201
55	AE5	0/852	0/249	0/210	0/322	0/652	0/329
56	AE6	0/900	0/246	0/262	0/136	0/696	0/294
57	AE7	0/870	0/253	0/287	0/178	0/639	0/309
58	AE8	0/772	0/194	0/217	0/324	0/584	0/238
59	AE9	0/794	0/163	0/203	0/331	0/655	0/286
60	AE10	0/923	0/236	0/314	0/151	0/688	0/282

Based on the results of Table 2, it was determined that;

The platform construction variable has 5 dimensions "cognitive, metacognitive, emotional, process and structural" that the highest factor load of 0.742 is related to question 54 and the lowest factor load of 0.501 is related to question 32.

The first factor load is related to the (emotional) dimension, which includes questions 30 to 43, in this dimension, the highest factor load of 0.738 is related to question 35 and the lowest factor load of 0.501 is related to question 32.

The second factor load is related to the (cognitive) dimension, which includes questions 1 to 18, in this dimension, the highest factor load of 0.723 is related to question 14 and the lowest factor load of 0.523 is related to question 1.

The third factor load is related to the (metacognitive) dimension, which includes questions 19 to 29, in this dimension, the highest factor load of 0.716 is related to question 20 and the lowest factor load of 0.528 is related to question 27.

The fourth factor load is related to the dimension (structure) which includes questions 51 to 60, in this dimension, the highest factor load of 0.742 is related to question 54 and the lowest factor load of 0.584 is related to question 58.

The fifth factor load is related to the dimension (process) which includes questions 44 to 50, in this dimension the highest factor load of 0.729 is related to question 50 and the lowest factor load of 0.596 is related to question 44.

In order to investigate the dimensions of Scaffolding in nature school in order to promote sustainable development in education, confirmatory factor analysis was used and the results are presented in Table 3.

Table3. Results of confirmatory factor analysis findings

Variable	dimension	dimension code	t-value	Standard coefficient	R2
Scaffolding	Cognitive	AA	214/311	0/970	0/940
	Metacognitive	AB	131/125	0/955	0/913
	Emotional	AC	220/314	0/971	0/943
	Process	AD	65/741	0/917	0/840
	Structural	AE	120/079	0/950	0/902

The results of confirmatory factor analysis listed in Table 3 show that at the 99% confidence level the t-value values for all scaffolding dimensions are out of range (2.58, -5.58). The highest standard coefficient (0.971) is related to the emotional dimension and the lowest standard coefficient (0.917) is related to the

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process dimension. Also, the value of R2 was higher than strong for all dimensions. Therefore, there is a positive and significant relationship between the platform construction variable and its dimensions. Based on the results of exploratory factor analysis and confirmatory factor analysis, Scaffolding variable has 5 dimensions: "cognitive, metacognitive, emotional, process and structural".

To evaluate the effectiveness of Scaffolding in nature school in order to promote sustainable development along with providing an integrated and balanced model based on the relationships between variables, pls software was used, the results of which are presented in Figures 1 and 2 and Table 2.

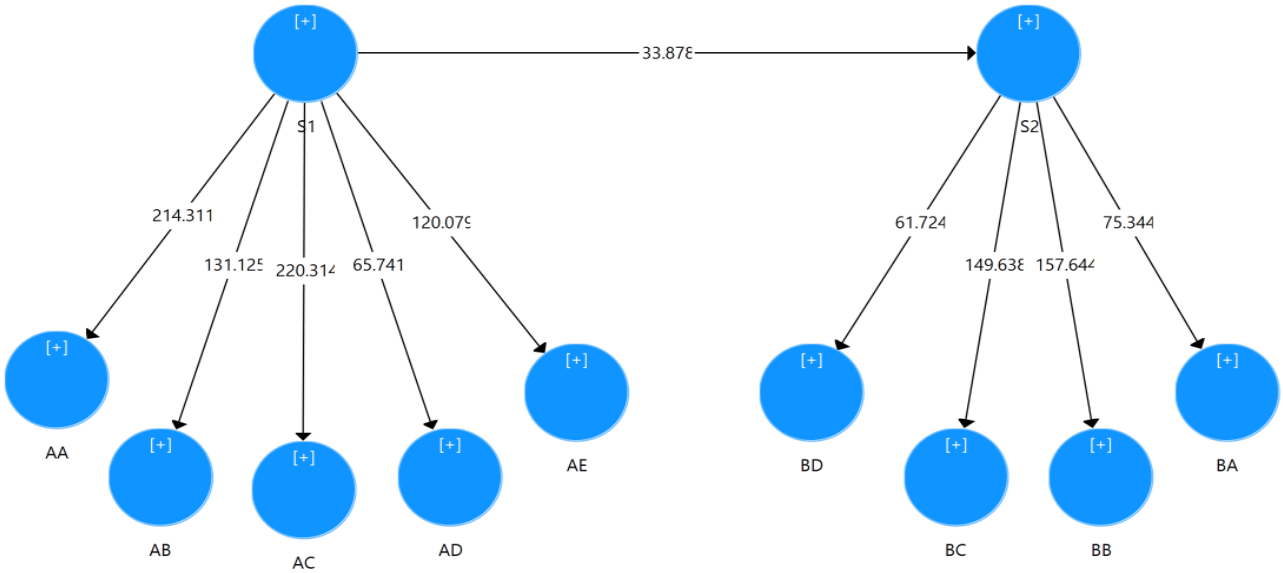

Figure1. Structural model in standard estimation of path coefficients

Table4. Results of path analysis findings

Variables	Amara t	Standard coefficient
The role of Scaffolding in promoting sustainable development in education	33/878	0/807

Figures 1 and 2 and the results of the path analysis shown in Table 3 show that, between the latent variable of exogenous (Scaffolding) with the latent variable endogenous (sustainable development), based on the path coefficient of the load factor is 0.807, also considering At the value of t-value (33.878) which is outside the range (2.58 and -5.58) at the level of 99% confidence, the impact of platform construction on sustainable development is significant. Therefore, it can be concluded that; the role of Scaffolding in the school of nature on sustainable development in education is positive and significant. The GOF index was used to determine the degree of appropriateness of the Scaffolding role model in the school of nature in order to promote sustainable development in education. This index is compared with three values of 0.01 (weak), 0.15 (medium) and 0.35 (strong). The value of GOF index was calculated to be 0.837. Due to the fact that this value was calculated above 0.15, so the model has a suitable fit.

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4. Discussion

The overall purpose of this study was to investigate the role of Scaffolding in nature school in order to promote sustainable development in education. The results of exploratory factor analysis showed; Scaffolding had five dimensions: "cognitive, metacognitive, emotional, process and structural". Also, the emotional dimension with a factor load of 0.971 had the first rank and the process dimension with a factor load of 0.917 had the last rank, which was in line with the findings of researchers such as Ashouri, Saffarian (2014) Jozaei, Saadipour (2013). In explaining this finding, it can be said that; Provide challenging questions and incomplete sentences, simplify tasks according to the learner's ability, engage learners in learning problems, identify relationships between concepts and organize information for learning, apply concept maps to organize learners' conceptual knowledge, solve problems using questions Guide, comprehensive support in the learning process, application of what has been learned in different situations, exposing the learner to important ideas and processes, controlling and managing the learning process, helping the learner to regulate his behaviors, using educational software Having a clear schedule, experienced teachers, appropriate learning environment, helping the learner to exchange knowledge and solve problems, applying learning strategies to do homework, emphasizing how to do homework, using rewards to enhance learners' abilities and talents , Formulation of educational goals based on learners' abilities, attracting the learner's interest in the learning task, helping the learner to recognize the abilities and value of his / her work, helping the learner to recognize the interests, encouraging the learner to interact and cooperate with his classmates, t Continuous emotional stimuli to enhance learners' performance, informational and warning notes, foundation of common goal, and incomplete exercises provided by the teacher are among the cognitive, metacognitive, emotional, process, and structural factors that influence Scaffolding. .

Scaffolding is an important concept in teaching and learning in which teachers and students create meaningful relationships between teachers 'cultural knowledge and students' daily experience. In this method, the teacher uses a variety of methods to provide a safe environment for learners to encourage them to engage in learning by interacting with classmates and their teacher. Therefore, this method has a decisive role in the academic achievement of students. Therefore, in this study, the role of Scaffolding in nature school in order to promote sustainable development in education was investigated. The results of this study showed that; Scaffolding has 5 dimensions "cognitive, metacognitive, emotional, process and structural" and the emotional dimension is in the first place and the process dimension is in the last place. Also, the role of Scaffolding in the school of nature on sustainable development in education is positive and significant and the proposed model has a good fit. This finding is in line with the results of Ashouri and Saffarian (2014) studies, which showed that the Sequosification method has significantly increased students' academic achievement; Purjamshidi et al. (2014), who showed that cognitive and metacognitive dimensions are the dimensions of educational reliance; Jozaei, Saadipour (2013) who showed that Scaffolding teaching method has a positive and significant effect on students' academic motivation and Könings, et al (2019) who showed that Scaffolding approach improves the accuracy of students and Normore, Anthony (2010), which showed that the platforming method plays an important role in students' learning, is in the same direction. Therefore, education officials and principals are advised to work with scientific and coherent planning to promote the Scaffolding method in nature schools in order to lead to sustainable development in education.

The results of this study showed that; the role of Scaffolding in the school of nature on sustainable development in education is positive and significant and the proposed model has a good fit. Ashouri, Saffarian (2014) in a study showed that; sequencing method is effective on students' academic achievement. Also, the results of Jozaei, Saadipour (2013) showed that Scaffolding teaching method has a significant effect on students' academic motivation. These findings are in line with the results of the present study, because academic achievement and academic motivation play a role in sustainable development. In explaining this finding, it can be said that; Scaffolding is considered as temporary support in order to develop the learner's ability to think and learn independently

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It is a method in which students answer questions using guiding questions or indirect guides. According to Bradley and Bradley (2004), the Scaffolding method simplifies the learning task, makes the learner interested in learning, pursues learning goals, identifies the main features of the problem, provides clues to deepen and consolidate learning, and controls emotion. Frustration is the reduction of failures during problem solving, the provision of clear strategies for learning and the increase of self-efficacy and self-regulation in students. Therefore, this method plays an important role in students' learning and performance. Therefore, the positive and significant role of Scaffolding on sustainable development in education was not unexpected. The difficulty of communicating with some university professors and determining the time required for interviews and the poor cooperation of some subjects was one of the limitations of the present study. Finally, according to the research findings, it is suggested that; Managers and education officials hold training courses to familiarize teachers with the Scaffolding method; School teachers should use the Scaffolding method in the classroom according to their curriculum and time; Textbook designers and authors should design textbooks in such a way that they need a variety of teaching methods, especially scoring, and teachers should use this method to promote academic achievement. School principals should also use experienced teachers to teach in the classroom.

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