

A new model for assessing the impact of environmental psychology, e-learning, learning style and school design on the behavior of elementary students

Behavior of
elementary
students

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Received 1 September 2019
Revised 2 December 2019
7 January 2020
Accepted 22 January 2020

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Abstract

Purpose – The purpose of this paper is to investigate the literature on the treatment of primary pupils and inspecting the role of environmental psychology, e-learning, learning style and school design on the behavior of students in elementary schools.

Design/methodology/approach – A questionnaire was designed to evaluate the components of the model. Experts with significant experiences in the field of students' behavior revised the surveys. Data were collected from 400 teachers of the elementary schools in Iran. The SMART-PLS 3.2 and SPSS 22 software package were used in the field of questionnaires' statistical analysis.

Findings – Findings confirmed the suggested model's validity for elementary students' behavior assessment. The consequences of this research illustrated the effect of environmental psychology on the behavior of elementary students. In addition, the authors were concluded that intention to e-learning has a significant role in developing the action and behavior of the elementary students. Moreover, the learning style has an affirmative and considerable impact on the behavior of elementary students. Finally, school design has an affirmative and significant effect on the manner of the elementary students.

Practical implications – The consequences of this research have provided some traces about the basic perspectives, which have to be in the center of attention of administrators. For instance, school design and learning style sound to be a decisive mechanism for improving action and learning behavior. In addition, educational leaders may use the findings to evaluate their school facilities and define where developments will have the most significant impact or planners may use the results to assist architects in the design and construction of new educational services.

Originality/value – This study builds a valuable contribution by focusing on pupil environmental psychology, e-learning, learning style and school design in elementary schools by enlightening the connection between them and students' manner.

Keywords E-learning, Environmental psychology, Learning style, Behavior of elementary students, School design

Paper type Research paper



1. Introduction

School principals, with a focus on academic achievement and test scores, continually evaluate curricula to increase learning opportunities and develop student performance and manner (Blom *et al.*, 2011). A predictor for the success of children in learning is behavioral involvement and has been proven in several studies in psychology and education (Kim *et al.*, 2018). School principals look for ways to improve academic achievement and enhance behavioral involvement (Harvey *et al.*, 2018). Psychology examines the interplay of environments with human influences, cognition and behavior (De Young, 2013). Environmental psychology research methods are used as a way to systematically understand the human cognitive structure. They discuss how to explain human requirements, including individual differences, in a particular way that is grounded in reality (Yoshida *et al.*, 2018). Those humans who are aesthetically absorbed into ordinary contexts and personal views have been demonstrated by findings in the field of environmental psychology. The human performance also receives positive effects from these traits, resulting in reduced stress (Joye, 2007). Several research measures have also been undertaken to enhance the quality of teaching in e-learning environments. The researchers noted among these studies that there is a fundamental need for improving students' learning performance in adaptive learning (Chang *et al.*, 2009). E-learning proposes using technologies of the internet to provide an extended set of science and practice enhancement solutions (O'Flaherty and Liddy, 2018; Ruiz *et al.*, 2006). Freeing the interaction between students and learners or teachers from the place and time limitations through the non-synchronous learning network is one of the severe profits of e-learning (Sun *et al.*, 2008). E-learning is a cognitive process designed to acquire knowledge (Raelin, 2018).

In addition, it can be somewhat difficult to define a style for learning. Style of learning is something unique that is created with the compounding of emotional, cognitive and psychological features. This style describes how the person communicates with its surroundings (Krätzig and Arbuthnott, 2006). Students' learning styles may be useful in many areas to improve teaching and learning. To gain these benefits, educators first learn about how learners learn. It will make them understand more. It can also help you gather or explain new content. Support for students can also be achieved by adapting the teaching style to their learning style (Klašnja-Milićević *et al.*, 2011). In addition, the learning environments design at each step from elementary to tertiary substantially requires the development of new spaces of learning, which are differently referred to as streets or learning communities. Meeting spaces and outdoor learning areas are interspersed with new and multiplex relationships (Dovey and Fisher, 2014). In this paper, environmental psychology, e-learning, learning style and school design are considered as critical factors in improving the performance and behavior of elementary students. The necessary handouts of this article are as mentioned below:

- Determining the impact of environmental psychology, e-learning, learning style and school design on the behavior of elementary students and identifying the related sub-indicators.
- Helping to a better understanding of environmental psychology as a tool for improvement of learning behavior, which can influence the performance and behavior of students.
- Presenting the complete framework and model, as well as assessing the model's fitness.

The rest of this paper is arranged as follows: hypothesis progress and review of the literature are discussed in Section 2. The methodology of the research is shown in Section 3.

The data analysis is illustrated in Section 4. Section 5 provides a rational description standing on the outcomes and review of the recent literature. The paper concludes by mentioning limitations and suggesting avenues for future study in Section 6.

2. Literature review

In this section, first, a summary of the fundamental study in the background of environmental psychology, e-learning, learning style, school design and behavior of elementary students is provided. Second, the conceptual framework and hypotheses are provided.

2.1 Related work

[Wang et al. \(2019\)](#) have developed a longitudinal plan to test the interrelationships between satisfaction with original psychological requirements at school (BPNSS), behavioral involvement, and scholar success. In this paper, measures of BPNSS and behavioral participation in the middle of four consecutive terms were completed by 627 primary school pupils from Grades 3-4 in China. The consequences illustrated that:

- BPNSS, treatment involving and scholar success mutually assisted each other in a direct way.
- Academic achievement is elevated by BPNSS indirectly through behavioral involvement and vice versa.

Also, [Weng et al. \(2019\)](#) have examined the impact of Taekwondo Aerobic multimedia materials on diverse learning styles that affects students' learning attitudes. Attitude and learning style were questionnaire measuring tools. The results obtained showed that students' learning attitudes are reinforced by adopting a multimedia-based teaching style. The negative impact of using a multimedia-based teaching style can impact the learning tendencies of pupils with different learning styles in aerobic taekwondo training.

Moreover, the relation between primary school pupils' current experience and learning implementations has been inspected by [Hsieh et al. \(2016\)](#). In this paper, conducted correction analysis, difference analysis and two-stage cluster examination are investigated. It showed a greater tendency to learning performances in students with high-flow experiences. Moreover, results proved that the higher grade pupils had notably preferable marks in both implementation and current skill than the pupils in a lower grade.

[Granito and Santana \(2016\)](#) have described the students' and instructors' viewpoints on how classroom space impacts education and learning. In this paper, there were four focus groups, namely, two groups of college students and two groups of college faculty. The results have presented three main themes:

- (1) the conditions theme, which showed all the issues in the rooms such as temperature, space and light;
- (2) the outcomes theme, which involves all the consequences of the places, such as engagement, concentration and student grades; and
- (3) the values theme, which demonstrates the extent classrooms impact.

Skill and behavior are key components of environmental literacy. The Summer Environmental Education Program (SEEP) has a great impact on these two components. The impact is assessed by Furthermore, [Erdogan \(2015\)](#). The results illustrated a considerable increase in students' environmental sensitivity, environmental knowledge,

environmental attitudes, intention and responsible environmental behaviors after interposition.

Also, [Ucus \(2015\)](#) has investigated the view of primary school trainers on game-based learning relevant to primary school courses. Semi-structured interviews collected research data and descriptive statistics analyzed them. Study findings illustrate the fact; primary school trainers believe that social studies course content; in-class free works, involving child literature, games and physical activities were proper to use game-based learning in classroom. In addition, game-based education has a positive and vital impression on the behavior of elementary students and performance.

As another research in this scope, [Mulqueeny et al. \(2015\)](#) have used an e-learning platform to elevate student involvement in middle-school mathematics. The outcomes illustrated that holding pupils' attention, developing deep learning and decreasing cognitive load guides to progressed participation, and eventually, better scholar results.

Furthermore, [Abou El-Seoud et al. \(2014\)](#) have investigated the relationship with e-learning and students' motivation in higher education. The results have shown that the use of interactive features of e-learning raises the motivation of the undergraduate students for the learning process.

[Dutt \(2012\)](#) has examined the relationship between school design and learning. Data were collected from semi-structured interviews, photographs and field notes. The results have shown that indoor/outdoor interfaces and the presence of gardens provided a sense of freedom, joy, social cohesiveness and aesthetic pleasure to the students about their physical learning environment.

[Kirm \(2009\)](#) were compared visual, auditory, and kinesthetic styles students with their aptitude to imagine their future, ideal second Lagrange (L2) self and motivated behavior. To gather data, a questionnaire was used. The statistical population included 974 Korean elementary school students. The most constant invoice to predict students' motivated treatment is their ideal L2 self that is illustrated by regression analysis. However, that learning style priority applies a considerable impact on pupils' motivated behavior.

[Tanner \(2009\)](#) have compared attainments of pupils with three school design rankings: moving and circulation, daylighting and opinions. Data were tested via decreased regression analysis, where the diversity between R^2 of the reduced regression was compared to the R^2 of complete regression. The results showed that the physical environment of the school has a positive and significant effect on students' results.

Finally, [Wang et al. \(2006\)](#) have investigated the effects of formative valuation and learning style on student achievement in a web-based learning environment. Contributors were 455 students from 12 classes of 6 junior high schools. The results have shown that both learning styles and formative assessment plans meaningfully affect student achievement in web-based learning.

Considering the literature and reviews, [Table I](#) presents some of the studies that examined the relationship between the variables in this study.

2.2 Proposed model and hypothesis

In this section first explains the variables, and then the hypotheses are presented.

2.2.1 Environmental psychology. Environmental psychology is trying to comprehend how we respond and suit to our physical environments, chiefly when these environments provide us with unpleasant conditions. ([Valera and Vidal, 2017](#)). Environmental psychology concentrates on an extended diversity of environmental disposals and situations, such as factors that motivate (or demotivates) socializing, crowding, light and color, noise and housing quality ([Wells et al., 2016](#)). Helping to understand and alter environmental behavior

are the main aims of an environmental psychology study (Gatersleben, 2018). The most directly related areas to psychology in classroom design and learning environments are environmental, educational, human factors (engineering) and social psychology. Learning seems to be affected adversely by low light, extreme temperatures and loud noises—variables maintained within satisfactory ranges in most college classrooms. Other results, however, reflect the often complex, subtle and surprising interplay between the learner and the learning environment. Years of research on the impact of environmental variables on human thoughts, feelings and behaviors show that other variables often moderate the influences of environmental variables. Also, researchers concluded that environmental variables can impact learners indirectly and that the impact of different physical settings often depends on the nature of the task and the learner (Graetz, 2006). In this study, the sub-indicators considered for environmental psychology are lighting of environment, color of educational spaces, available playground and school size:

H1. Environmental psychology will affect the behavior of elementary students positively.

2.2.2 *E-learning*. The special influence of technology is on teaching and learning. As it enables better communication. It is also very useful for running the latest information, learning and teaching systems (Štrukelj *et al.*, 2019; Urh *et al.*, 2015). Some writers have not provided a clear description or a reference that is vague to other terms such as online courses or learning, web-based learning, web-based teaching, learning objects or distance learning (Pretorius *et al.*, 2019). As they have not found what technologies they have to use. They believe that term should be used synonymously (Moore *et al.*, 2011). Using technology of computer networks initially over an intranet or via internet to receive data and guidance for each person is called e-learning (Welsh *et al.*, 2003). Many studies have shown that effective use of e-learning could improve student motivation engagement and attendance. It should also enhance student class contribution, behavior and performance (Abou El-Seoud *et al.*, 2014). In this study, the sub-indicators considered as e-learning, are course design, quality of learning system, systems accessibility and ease to use.

H2. E-learning will positively affect the behavior of elementary students.

2.2.3 *Learning style*. “Learning style” proposes that each person varies regarding the instruction or study mode that mostly influence him (Shaw, 2012). Learning style is a group of personal characteristics. These attributes are imposed on us in terms of cognitive development. It makes teaching and learning different for various people. It may work for one person or may not work for another (Dunn *et al.*, 2002). Learning style application notions have turned to a famous tactic to develop college pupils’ education. It is also constant with the student circumstances profession’s aim of answering to individual

Variable	References
Environmental psychology	Fischer <i>et al.</i> (2019), Rossi (2018), Yael (2017), Granito and Santana (2016), Cassidy (2013), Graetz (2006)
E-learning	Chang <i>et al.</i> (2017), Harandi (2015), Goda <i>et al.</i> (2015), Abou El-Seoud <i>et al.</i> (2014), Liaw (2008)
Learning style	Huang <i>et al.</i> (2019), Ng and Yen (2017), Gavrilović <i>et al.</i> (2017), Pruet <i>et al.</i> (2016), Asci <i>et al.</i> (2016), Kazu (2009), Wang <i>et al.</i> (2006), Chou and Wang (2000)
School design	Dutt (2012), Tanner (2009), Schneider (2002)

Table I.
Researches related to research variables

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academic requirements (Salter *et al.*, 2006). Recently, some researchers in the field of academic studies have paid more attention to different aspects of learning methods. The way that these methods can be considered in academic technology is in the center of attention, as well (Graf *et al.*, 2007). Education should be given by taking these variances into consideration in the educational and instructional processes. The individual brings some latent potencies produced by the genetic heritage; these latent potencies may be altered or developed by social acculturation in time. Also, to deliver the best way of learning to the individuals, the learning style should be determined by considering the differences such as personality, perception, ability and intelligence (Kazu, 2009). In this study, the sub-indicators considered for the learning style are visual learning, auditory skill development, kinesthetic learning and reading/writing style:

H3. Learning style will positively affect the behavior of elementary students.

2.2.4 School design. Since 1997, it has emphasized that school design learn, containing such rankings such as color, acoustics, light, views, movement, circulation, scale, location, learning neighborhoods, design and external learning (Bergman, 2016). Research studies on student action and physical learning places illustrate that the physical sites have impressions on pupils' actions. The way of student learning is influenced by the environments and spaces in which pupils spend most of their time (Ariani and Mirdad, 2016). Some studies show that inner architecture and inner aspects of learning places are able to assist pupils to focus on studying or prohibit them from focusing on learning (Yeung, Craven, and Kaur, 2014). Schneider (2002) rates physical spaces as likely to affect student behavior and performance. Designing productive learning environments is a critical case to support constructive learning and achievement. To motivate students, some factors such as teachers, materials and curricula play essential roles. Another factor that should be considered is school design and learning environment. School planners should pay more care to this psychological criterion instead of lessening their expenses. In this study, the sub-indicators considered for the school design are green areas, corridors and walls, movement in a school and patterns of movement and circulation:

H4. School design will positively affect the behavior of elementary students.

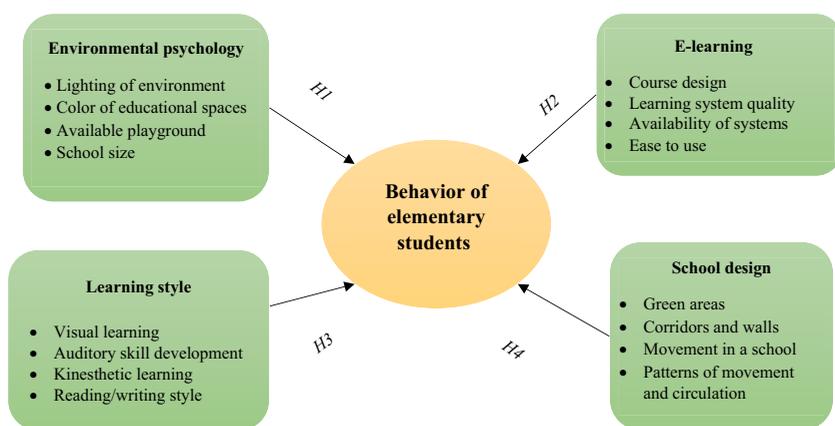
Therefore, the overall model is shown in [Figure 1](#).

3. Research methodology

We used a partial least squares and structural equation modeling (SEM) tool to fill out our analysis (Smart-PLS 3.2). SEM allows a concurrent evaluation of the constructional part (path model) and measurement component (factor model) in one model (Halawi and McCarthy, 2008). The continuation of this part defines the measurements and participants.

3.1 Measurements

The study applies a quantitative research design in which a researcher-made questionnaire is divided. A two-section questionnaire was developed. Section A of the questionnaire requested respondents' biographical information. Section B focused on determining the impact of environmental psychology, e-learning, learning style and school design on the behavior of elementary students. A five-point Likert scale anchored at 1 (strongly agree), 3 (neither agree nor disagree) and 5 (strongly disagree) was used to elicit responses regarding the perceptions of mentors.



Behavior of elementary students

Figure 1.
Model of research

IBM SPSS 22 statistical software was utilized to analyze the data. To test the model via recourse to Smart PLS software, the partial least squares (PLS) technique was extended. This way includes a statistical modeling-based method via constructional equations providing the concurrent survey of a community of equations by assessing the notions and the connections between them (structural model), endowed with valence to aim concepts not directly able to be seen (Do Paço, Ferreira, Raposo, Rodrigues and Dinis, 2015).

3.2 Participants

The data collection was conducted by teachers of the schools in Kunming of China. The statistical community may be large or small in terms of the number of people or items to be observed. To save on human resources, cost, time and other administrative considerations, a sample of community members can be selected and studied instead of studying all members of society. A non-probability purposive sampling method was conducted to choose representative respondents. Data were gathered in three weeks in February 2018. According to Morgan's table, for the mathematical society with an infinite number, 384 questionnaires were distributed among users. Of the 400 teachers involved, 370 prepared augmented questionnaires, which can be used for analysis of data, in addition to that creating a credible answer rate of 92 per cent. Among the 370 respondents, 42 per cent were male and 58 per cent were female. Most of the respondents were in age range of 30 to 35 (68 per cent), while 15 per cent were aged below 30 and 17 per cent were aged above 35.

4. Analysis and results

In this section describes the reliability and validity of measurements and structural models and results.

4.1 Reliability and validity of measurements

By using PLS, the model of measurement was assessed by inspecting the individual loadings and weights of each item, Cronbach's alpha (CA), composite reliability (CR), average variance extracted (AVE), AVE square root and diacritical reliability through cross-loading (Roostika, 2012). Table II demonstrates the model of measurement outcomes. It also indicates the validity of instructions, which specify the influence of them on the treatment of primary pupils. The average variance extracted (AVE) is more than 0.50 threshold value, it

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means that the instructions crossed the convergent validity standing on [Fornell and Larcker \(1981\)](#). The composite reliability values are shown in [Table I](#). They indicate that the amounts vary from 0.845-0.917. Where they all trespassed the specified amount of 0.70. In addition, the amount of Cronbach's alpha varies from 0.770 to 0.895 exceeding the specified amount of 0.70 ([Al-Rahmi et al., 2015](#)).

As shown in [Table III](#), the square root of AVE of each instruction in the model is more than the correlated instructions in the shaft of diacritical reliability using Fornell–Larcker criterion.

4.2 Structural model and results

As illustrated in [Figure 2](#), to analyze and discover the way coefficients in the suggested model, Smart PLS software has been used. Assessment of quality of proper on mean about PLS structural model first needs us to inspect the assessment of each internal variable route structure and is assessed as related Latent variable R^2 value (S.-Y. [Kim and Kim, 2013](#)). According to [Cohen \(1977\)](#), R^2 amount's impact degree is divided into high (above 0.26), medium (0.13-0.26) and low (0.02-0.13) ([Wetzels, Odekerken-Schröder and Van Oppen, 2009](#)). Standing on this document, the appointed research module's quality of proper in studied model pleases all thresholds.

Also, the supposition experiment was performed via partial least squares regression analysis using smart PLS software ([Wang and Shih, 2014](#)). We used the t -statistic for the standardized path factors to assess if each supposition was supported. After analyzing the importance of T-value for each way factors, the significance of the path coefficients ($\beta 1$ to $\beta 4$), can be assessed. The relating T-values are shown in [Table IV](#).

However, the absence of a universal numerical function and the resultful absence of universal quality-of-fit measures has been supposed to be a PLS path modeling drawback. As an answer to this shortage, [Tenenhaus, Vinzi, Chatelin, and Lauro \(2005\)](#) suggested the quality-of-fit index (GoF) that takes both the measurement and structural models' actions into account. The GoF can be computed with AVE and R square of the structural model, and

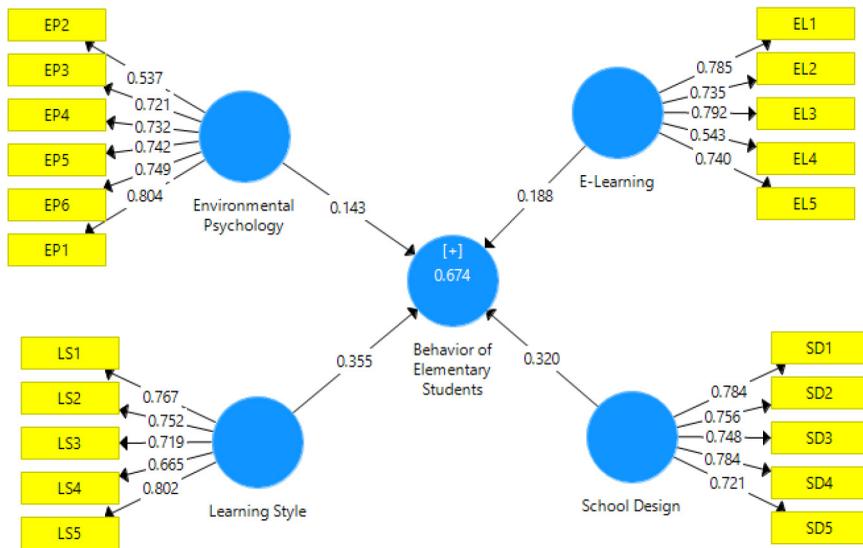
Table II.
The measurement model

Variable	AVE	CR	CA
Environmental psychology	0.517	0.864	0.812
E-Learning	0.525	0.845	0.770
Learning style	0.551	0.860	0.810
School design	0.576	0.872	0.819
Behavior of elementary student	0.502	0.917	0.895

Table III.
Square root of AVE (bold at diagonal) and correlation coefficients

Variable	EP	EL	LS	SD	BES
EP	0.719				
EL	0.561	0.725			
LS	0.452	0.434	0.743		
SD	0.385	0.326	0.599	0.759	
BES	0.533	0.527	0.575	0.270	0.708

Notes: EP: Environmental psychology; EL: E-Learning; LS: Learning style; SD: School design; BES: Behavior of elementary student



Behavior of elementary students

Figure 2. Path coefficients and R^2 values obtained from the smart PLS program

it is suggested that the amount is over 0.36 (Wetzels *et al.*, 2009; Yang, Lee, and Zo, 2017). Following Henseler and Sarstedt (2013) formula, our research model attains a GoF value of 0.79; therefore, the model is valid.

5. Discussions and implications

First, as shown in Table V, the relationship between the environmental psychology and behavior of elementary students was discovered to be important in this study ($\beta = 0.14$ and $T = 2.30$, $p < 0.05$, respectively). Additionally, e-learning was relevant to the behavior of elementary students ($\beta = 0.18$ and $T = 3.86$, $p < 0.001$, respectively). Moreover, the learning style was significantly correlated with behavior of elementary students ($\beta = 0.35$ and $T = 6.37$, $p < 0.001$). Finally, the relationship between the school design and behavior of elementary students was comprehended to be vital in this research ($\beta = 0.32$ and $T = 5.55$, $p < 0.001$, respectively).

Based on the results of the path coefficient and the p -value, the effect of dependent variables on the independent variables is compared. The higher the path coefficient and p -value, the greater the impact of the dependent variable on the independent variable. In our study, learning style with the highest path coefficient has a more significant effect on the behavior of elementary students. After that, among the four factors in this study, the school design was ranked second with a path coefficient of 0.32. The results of our research showed that the e-learning variable has less effect than the previous two variables (learning style and school design) and between four factors were ranked three. Finally, based on the data of this study, the psychology of environment has obtained the fourth rank with the lowest path coefficient, which indicates the little impact of this variable on the behavior of elementary students.

From an experimental point of view, the statistical outcomes back the key role of the factors below: environmental psychology, e-learning, learning style and school design on the behavior of elementary students. So, features relevant to these invoices have to be in the center of the attention of any school. In addition, from an experimental point of view, the

Questions	T-value
EP1: The brightness of the environment affects the concentration of elementary students	19.74***
EP2: The color of educational spaces has an impact on reducing elementary students' stress	9.85***
EP3: The playground in the learning environment enhances morale	13.01***
EP4: School size has a direct relationship with elementary student behavior	14.78***
EP5: The use of multifunctional spaces affects elementary students' behavior more economically and effectively	14.52***
EP6: Planning based on communication psychologically and ease of use, will affect elementary student behavior	14.96***
<i>Environmental psychology → Behavior of elementary student</i>	
EL1: The content of e-courses should be designed to appeal to elementary students	2.30*
EL2: Achieving more quality teaching materials has influenced elementary student behavior	24.15***
EL3: System availability and access to new sources of satisfaction make elementary students	17.58***
EL4: Ease of use reduces cost and time, and thus, increases efficiency	26.19***
EL5: E-learning creates motivation and interest in elementary students	9.28***
EL5: E-learning creates motivation and interest in elementary students	21.62***
<i>E-learning → Behavior of elementary student</i>	
LS1: Visual learning has a better impact on elementary student learning	3.86***
LS2: Depending on the elementary students' listening skills, their behavior can change	27.02***
LS3: Kinesthetic learning is more critical in elementary students	23.07***
LS4: Attention to the reading and writing style of elementary students affects their learning	19.06***
LS5: Identifying a student's learning style affects his or her performance	11.45***
LS5: Identifying a student's learning style affects his or her performance	51.03***
<i>Learning style → Behavior of elementary student</i>	
SD1: Creating a green space has an impact on elementary student learning	6.37***
SD2: Corridors and walls should be painted according to elementary students' styles	28.66***
SD3: Students love activities that are fun, engaging, and competitive	25.62***
SD4: The educational environment must be in harmony with the age and education of elementary students	25.68***
SD5: Colors, shapes and playground designs encourage children to interact with the environment and learn more	30.37***
SD5: Colors, shapes and playground designs encourage children to interact with the environment and learn more	20.31***
<i>School design → Behavior of elementary student</i>	
	5.55***

Table IV.
Questionnaire items
and *t*-values obtained

Notes: * $p < 0.05$; *** $p < 0.001$

Table V.
PLS Structural model
results

Paths	Path coefficients	T-value	Confirm or reject the hypothesis
H1. Environmental psychology → Behavior of elementary student	0.14	2.30*	Confirm
H2. E-Learning → Behavior of elementary student	0.18	3.86***	Confirm
H3. Learning style → Behavior of elementary student	0.35	6.37***	Confirm
H4. School design → Behavior of elementary student	0.32	5.55***	Confirm

Notes: * $p < 0.05$; *** $p < 0.001$

outcomes of this research have received clues about the basic features that have to be in the center of attention for managers. For instance, school design and learning styles seem to be a key mechanism chipping in improving action and learning behavior. In addition, outcomes of this research have experimental concepts for the authentic, everyday world of schools and

classrooms. In recent years, psychologists have recognized the significant effects of the environment, especially architectural spaces, on improving and enhancing physical, mental and social abilities of students. It is the task of designers to keep this effect in mind when designing student's spaces. One of the main factors in creating a favorable architectural work is recognizing the characteristics, features and expectations of the project's users and trying to respond to their physical and psychological needs. In designing student's spaces such as schools and educational institutions, understanding the behavior and reactions of student to various environmental factors, recognizing their motivational and motivational factors, can be a good source of inspiration for architects in the design of indoor and outdoor spaces, color selection, lighting and furniture used in spaces, etc.

The results of this research have significant implications for the environmental psychology of elementary school. The design process must be the focus of schools' environmental change so that teachers and learners might experience motivational and perspective-changing benefits beyond the specific problem-solving. Also, environmental development in schools should be locally driven, user-led and entrenched in pedagogy. Moreover, the use of images and sound can help to make learning more internalized, which can affect students' creativity. The results of this study have important implications for learning style of elementary school science courses, as well as for research into the benefits of e-learning. Future research should take into account learning style as an essential variable so that the study can be completed. Also, given that students have varied backgrounds, aptitudes, and knowledge, teachers who can use diverse instructional strategies are more effective than those who use single teaching strategies. Furthermore, it seems that the improvement of e-learning strategy designs for different learning styles may be enhanced by providing educational technology creators with access to information and training in the broadest possible range of teaching methods.

Schools are the only places that students spend most of their time, so learning space, place and time are very worthy. School design and technology are powerful instruments that can affect conscious and subconscious minds of students. School planners and policymakers must consider the educational requirements of students such as suitable facilities and physical designs, information and communications technologies, and correct learning spaces. Based on this research, there are some factors that make the right school environment. Schools should offer useful indoor and outdoor qualities to inspire their students. Learning in appropriate physical spaces and proper educational spaces inspires a sense of pride and growth. While school designs require some investment, these costs can make creativity, talent and growth in society. Learning environments should join new technologies and connect learning process to the outside world. To this end, design features of learning space are essential, and schools with useful environmental and educational spaces can provide impressive benefits in student performance.

6. Conclusions, future work and limitations

In this study, a new model is provided for determining the effect of factors affecting the behavior of elementary students. Data were collected from 400 teachers in the elementary schools of Tabriz. The gotten information from the questionnaires is analyzed using the Smart PLS 3.2 program. These findings also provide important implications for managers. The outcomes in this research illustrated the effect of environmental psychology on the behavior of elementary students. Environmental psychology includes the sub-indicators of lighting of environment, the color of educational spaces, available playgrounds and school size. The finding is consistent with previous research findings (Cassidy, 2013; Graetz, 2006; Granito and Santana, 2016; Rossi, 2018; Yael, 2017). In addition, we were concluded that

intention to e-learning could also have an important role in elevating action and behavior of elementary students. E-learning includes the sub-indicators of course design, quality of learning system, accessibility of systems and ease to use. The finding is consistent with previous research findings (Behnoodi and Peyman, 2014; Maleki and Sanisales, 2015; Sarikhani *et al.*, 2016), which have shown that taking benefit of a range of ICT in the teaching and learning process can be useful in behavior students. In addition, the learning style has an affirmative and vital impact on behavior of elementary students. Learning style includes the sub-indicators of visual learning, auditory skill development, kinesthetic learning and reading/writing style. The results have shown learning style significantly affect behavior of elementary students. It suggests that learning styles should be taken into account in the design of elementary students learning environments. The finding is consistent with previous research findings (Chou and Wang, 2000; Huang *et al.*, 2019; Kazu, 2009; Rasmussen and Davidson-Shivers, 1998; Wang *et al.*, 2006). Finally, school has a positive and important impact on behavior of elementary students. School design includes the sub-indicators green areas, corridors and walls, movement in a school and patterns of flow and circulation. The finding is consistent with previous research findings (Dutt, 2012; Tanner, 2009). Studies could also examine the effects of learning style (accommodating, diverging, converging and assimilating styles) in behavior of students. Study behavior and learning styles are particularly important for student performance. Complex interrelationships exist among student learning experiences and study behavior for influencing academic success in elementary education. Recent data that student perception of the learning experience predicts study behavior. In fact, study behavior characteristics and learning styles are expected to be common determinants of success in a specific learning environment. Moreover, suggestions for future research include examining the students reading and writing skills in addition to behavior and examining the impact of factors, others in performance and behavior of students.

As in most research studies using survey methodology, this study has its weaknesses. First, it is the use of a convenient sample. We assessed teachers from schools that welcomed our project. Future research would be enhanced by including participants from different parts of Iran and teachers from more diverse settings (e.g. urban, rural). Second, the information was cross-sectional. They were not longitudinal or practical. So, no causal outcomes can be possessed. Cross-sectional data does not permit analyses to go beyond reports of associations or connections. More information requires to be gathered, and more progressive procuring tools are needed to get a better point of view on this problem.

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