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Identifying and Prioritizing the Components of Blended Learning in Elementary Schools

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Abstract

The general aim of the present research was to identify and prioritize the components of blended learning in elementary schools. This mixed-method research is of sequential exploratory type. In the qualitative stage, the content analysis method was used while in the quantitative stage, the descriptive survey was applied. Participants of the qualitative part were professors of educational sciences, fifteen of whom were selected for interview in a targeted manner. In vivo, coding was used for data analysis. Finally over 150 indicators and 6 main components (1- tools, 2- contents, 3- teaching method, 4-design, 5-evaluation, and 6- learning theories) were achieved. The research community of the quantitative part included all headmasters and head teachers, experts, and teachers of elementary schools in west Islamabad, in 2017-2018 academic year. Out of 650 individuals, 242 individual were selected through a stratified random sampling method with Morgan table. A questionnaire was designed and distributed based on the findings whose face validity was confirmed by the professors with the reliability of 0.87. For descriptive analysis, the central and dispersion parameters were used, and for inferential analysis, the Smirnov test, Friedman test were applied using SPSS & LISREL. In addition to confirming and explaining the components, the findings showed that the internal correlation between the six components of the blended learning education is positive and meaningful, meaning that the application and promotion of each component in a combination allows the application, enhancement and strengthening of the other components.

Keywords: blended learning, e-learning, elementary schools, traditional learning

Introduction

The overall growth of a child is one of the tasks of education, and it must take into account the creative, emotional, moral, and intellectual growth of the child (Carney, 2007, p. 32) and this growth is resulted by training. Education is the most powerful weapon by which we can change the world. When Nelson Mandela recorded this statement in history, he certainly did not know that after two decades, education would become the major concern of the world, and would force the World Bank to allocate the Global Development Report of 2018 to education and its crisis (Pakravan, 2017). Education and learning are the main functions of schools. Today, the most commonly educational methods used in schools are traditional face-to-face training, which are known as the prevalent education of most schools in the world and the history of education (Sangari, 2004, p. 29). Among these trainings, we can name the method of

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memorization and repetition, lecture, question and answer. Being cheap, stimulating the interest of creative thinking, the motivation for studying and research activity, the argumentation of students' power to comment, the effect on emotional level learning, elimination of shyness, social relation, self-assessment, self-esteem, satisfaction of curiosity, and strengthening the exploration and invention spirit are the benefits of this training method (Shabani, 2006, pp. 243-289).

By the advent of new communication tools, educational processes and systems have undergone some changes, and sometimes they have revolutionized the field because of the many capacities these tools have to support the learning process (Momeni Rad, 2013, p. 2). Despite these tools, traditional learning patterns and learning at different levels of education have become flush learning opportunities and have undergone fundamental changes in the form of virtual experiences (Khoshneshin Langroudi & Hasani Jafari, 2016, p. 36). Researchers such as Allen et al., (2004) as well as Shachar and Neumann (2003) argued that e-learning can be as effective as traditional face-to-face training or even more than it (Markova, Glazkova & Zaborova, 2017). Mason (2002) believed that: "early supporters of e-learning now reject the online learning against traditional face-to-face training"(Cited in McDonald, 2009, p.4).

Many scholars have confirmed the effectiveness and benefits of e-learning; however, they always consider the low level of learners' interaction and the limitations of virtual communication, lack of social skills development, neglecting the importance of sharing the feelings, experiencing and creating social belongings in learning as the challenges of using e-learning in educational systems. Therefore, the learning systems shifted from the independent approach of face-to-face learning system and the e-learning system to the blended approach (Shah Vali Kuh Shouri & Gholami, 2014, p.29). Lack of effective interaction and isolation are among the most important challenges of e-learning (Markova, Glazkova & Zaborova, 2017). Sloan (2002) also believed that the quantity and quality of communication and interaction can increase the understanding and satisfaction of learners (Markova, Glazkova & Zaborova, 2017). A number of writers and theorists (e.g. Astin, 1975/1977/1993; Bean, 1980/1982/1983/1985; Bean & Metzner, 1985; Berge, 1999; Hammer, 2001; Kearsley, 2000; Moore, 1989; Pascarella, 1980/1985; Pascarella & Terenzini, 1971/1977/1980; Spady, 1971; Sutton, 2001; Tinto, 1975/1982/1987/1988/1993/1997; and Wagner, 1994) argued that the interaction between students and teachers is an important factor in students' learning and is the main component in creating learning experiences (Kami, 2009, p. 39). Therefore, in order to reduce such constraints, scholars found the solution in providing the education in a blended form.

The term 'blended learning' is a profound term, whose meanings is different methods for different individuals (Langu, 2013, p. 471).Blended learning is the modern method of using technology in classroom, which is nowadays considered by many education professionals. Blended learning will facilitate the use of electronic systems such as computer, multimedia discs, electronic journals and virtual newsletters for better and easier learning (Rosemaki & Rockman, 2016; Quoted by Yazdi Zadeh Ravari, 2016, p. 4). Blended learning provides a durable learning by combining the face-to-face and virtual training, as well as teacher-based and student-based methods (Ahmadi & Nokhostin Roohi, 2014, p. 11). In this regard, some studies (Bartolomé, 2008; Ferreres, 2011; Gonzalez & Ospina, 2013) have been conducted in the field of training dynamics in virtual environments and blended learning, as well as challenges faced by teachers and students (Soler & Araya, 2017, p. 772).

Blended learning was introduced in 2000; but, it was officially introduced in 2003 by Marsh et al. as the second wave of virtual trainings, and so far, positive feedbacks of its performance has been presented in various studies (Bonk & Graham, 2004; Chu, 2009; Clayton Institute, 2014; Inosite Institute, 2011; Protekter, 2003; Tapora, 2011; Zimen & Gren, 2007)(Aghajani, 2014). The research findings of some researchers (Beaudry, 2011; Lefton, 2012; Richardson, 2010; Riddle, 2010; Rosen & Beck-Hill, 2012; Ruiling & Overbaugh, 2009) showed that the integration of blended learning environment and technology in classroom activities can be effective for many students (Prouty, 2014, p. 6).

For example, Yazdi Zadeh Ravari (2016) found that using blended learning can lead to the increasing level of pleasure, hope, pride, excitement of activity, excitement of consequence and reducing anger, anxiety and shame. Also, Tabatabaee (2016) found the beneficial effect of blended learning on improving the learning level of students in the Qur'an lesson. Shah Virin et al., (2016), and Ahmadpour Kasgari (2015) investigated on the advantage of both traditional and electronic learning methods in blended learning; and Van Lien et al., (2017) found the increasing level of motivation in blended learning environment in mathematical courses. Also, Avdi et al., (2014) referred to the improving learning performance of students and Ling et al., (2010) reported the satisfaction of students about group learning,

flexibility, motivation and participation in blended learning courses. Akuiunella and Sevilla (2008) found the proportionality of the blended learning approach with learning styles of learners, the students' positive attitudes toward it, and promotion of learning outcomes and Christensen (2003) pointed to the importance of blended learning in the promotion of learning performance and better performance in social speech and communication skills.

Graham (2006) stated that designing the blended learning curriculum is conducted in four levels, and it can be designed at four levels of Activity level, Course level, Program level and Institutional level. Bliuc, Goodyear and Ellis (2007) ; López-Pérez, as well asd Pérez-López and Rodríguez-Ariza (2011) also stated that the necessary decisions about specific features of the elements, the method of combining them and their correlation in designing levels, development and implementation of curriculum based on the blended learning should be carefully considered (Ajam, 2013, p. 19). Although many classrooms have some kind of technology, finding and adopting effective teaching strategies and understanding the blended learning as the best method of teaching and trying to present technology in the classroom are noteworthy. Investigating research literature: (Baudry, 2011; Bennett, 2012; Gathany, 2012; Leftun, 2012; Pass, 2008; Pass, 2008; Riddle, 2010; Royling & Orbavgh, 2009) shows that there is limited knowledge of blended learning as the best method of training and continuous professional development in technology integration (Provity, 2014, p. 7). Regarding the presented information and investigating the existing patterns of online and blended learning, it is observed that these patterns did not address all the elements involved in school education and focused more on the face-to-face positions of general education and there is not any presented comprehensive model including all effective aspects of blended learning in schools. Therefore, the overall purpose of this study was "to identify and prioritize the components of blended learning in elementary schools."

And the questions we tried to answer were as follows:

1. What are the indicators of blended learning in elementary schools?
2. What are the components of blended learning in elementary schools?
3. How is the ranking of blended learning components?

Method

The general aim of this study was to identify and prioritize the components of blended learning in elementary schools. Therefore, this is a mixed research using sequential exploratory method, meaning that the first step uses qualitative approach and the next step uses quantitative approach.

Participants

The research community in quantitative section included all managers and head teachers, teachers and experts of elementary education working in 2017-2018 academic year in west Islamabad, that according to the statistics expert of the office they were, at the time of the research, 650 individuals of whom 531 individuals were teachers, 115 individual working at the post of managers and head teacher and 4 were experts. Using Krejcie and Morgan Table, 242 of them were selected as the statistical sample of the study using random sampling method.

Instruments

Based on the obtained information from the qualitative step, the blended learning questionnaire was designed by the researcher. The questionnaire was designed in two parts. In the first part, demographic information of statistical sample including gender, education level, age and service record, and in the second part of the questionnaire, 47 questions with Likert scale (very high option=5 points, high option=4 points, average option = 3 points, low option= 2 points, and very low option = 1 point) were included in the final analysis. The face and content validity was confirmed by 10 faculty members and subject specialists and the reliability of the questionnaire was calculated according to Table 1 using Cronbach's alpha method, which indicates the reliability of the measurement tool.

Table 1.
Cronbach's Alpha Value of Research Components

Main dimensions	Items	Cronbach's alpha
Tool	Q01-Q09	0.803
content	Q10-Q19	0.844
teaching method	Q20-Q27	0.818

Main dimensions	Items	Cronbach's alpha
Instructional Design	Q28-Q32	0.763
assessment	Q33-Q42	0.827
theory	Q43-Q47	0.835
Total	Q01-Q47	0.871

Procedure

As it was mentioned before, the study was conducted in both qualitative and quantitative steps as follows:

Qualitative step: The research section in this part with the qualitative content analysis method, included: a) designing the interview questions; b) selection of interviewees, qualitative participants of the qualitative section were 15 faculty members of Educational Sciences of Kermanshah University who were selected by a purposeful and voluntary method; c) recording the findings of the interview; and d) Analysis of qualitative data in the form of in vivo coding. The process of data analysis is in the way that the main concepts were extracted from the blended learning indicators by in vivo coding and were grouped in the form of main components.

Quantitative step: In the quantitative step of research, the researcher-made questionnaire was used to confirm and explain the components of blended learning and their internal correlation. Based on the obtained information from the first step, the blended learning questionnaire was designed by the researcher. The questionnaire was designed in two parts. All the participants were required to answer the questionnaire and then the results were analyzed.

For descriptive analysis, the central parameters (mean, median, & fashion) and dispersion parameters (standard deviation, variance & range) were used and for inferential analysis of Kolmogorov–Smirnov test, one Sample t-test and Friedman test and SPSS and LISREL software were used.

Findings

A. The Findings of the Qualitative Section

Research questions:

1) What are the indicators of blended learning in elementary schools?

2) What are the components of blended learning in elementary schools?

3) What is the ranking of the components of blended learning?

In this section, using comments and interviews with faculty members and subject specialists, the indicators of blended learning in elementary schools were identified by content analysis method. In the next step, by analyzing and using the final indicators obtained (over 150 indicators), the main components (6 components) were grouped with an in vivo coding method. In Table 2, the final components and the obtained indicators are presented separately:

Table 2.

The Obtained Indicators and Components of Blended Learning in Schools

Row	Components of blended learning	Indicators
1	**Tool**	Traditional Tools: Classroom - Blackboard - Textbook - Non-syllabus books - Teacher - Student - Library - Workshop - Laboratories - Models and Maquette - Newsletter - Work and Exercise Books - Brochures - Objects and Samples - Images - Chart - Diagram- Poster-Map - Tapes and Cassettes – Resources - Playing Equipment - Transparent Sheets. Electronic Tools: Computer and Computer Systems - Hardware - Internet and Network - Virtual Labs - Virtual Workshops - Virtual Library - Smart Board - Applications - Smart Classroom - Data Projectors - Courseware
2	**Content**	Traditional Content: Mathematical Books - Experimental Science Books - The Book of the Quran – Hedyehaye Asemani Book - The Book of Social Studies - Reading Activities - Writing Activities - Work and Technology - The Thinking and Research Book - Physical Education Leaflets and Activities. Electronic Content: Content and Material as Educational Courseware - Content and Material of Textbooks and Tutorials - Content of Teacher Guide Software - Content of Encyclopedia and Culture Software - Content of Test and Evaluation Software –Content of Workshop or Laboratory Simulation Software - Educational Components

Row	Components of blended learning	Indicators
3	**Teaching method**	Traditional Teaching Methods: Memorization and Repetition - Lecture - Questions and Answers - Drama - Role Play - Group Discussion - Laboratory - Field Trip New Teaching Methods: Synectics - Participation – Problem Solving - Exploration - At the Level of Mastery - Conceptual systems - Brainstorming- Collaborative – Exploration of Concepts-Pre-organizers - Direct Teaching - Indirect Teaching - Self-reliance-Teamwork - Social learning - Work Unit - Small groups - Educational Games - Seminar - Research method - Pretense -Metacognition-Learning-Self-control- Judgment of Performance-Independent study- Simulations- Several Mixed Sensations-Noncognitivism. E-learning Methods: Programmed Education - Computer Education - Individually Administered Instruction-Individually Guided Instruction - Network and Web-based Education - Video Conferencing
4	**Instructional design**	Traditional designs: Pattern of Glasser - Pattern of Helix - Pattern of Dick and Carey- Pattern of Megger -Pattern of Cook - Pattern of Addie -Pattern of Presenting Components - Pattern of Expansion - Pattern of Educational Events New Designs: Cognitive Flexibility Pattern – Problem Solving-Based Pattern - Situational Learning Pattern - Constructivist Learning Environments - Free Learning Environments Electronic Designs: Pattern of Electronic Learning Designing - AEASI Pattern, Networked Teacher Pattern, Networked Student Pattern, Pattern of Learning Ecology Designing
5	**Assessment**	Traditional Assessments: detailed test - Multiple choice objective tests – True and False objective tests - Paper folders - Collaborative Classroom Assessments - Self-examination - Entrance Assessment of Learner- Formative Assessment - Final and Functional Assessment - Assignment and Project Assessment - Peer Assessment Electronic Evaluations: Electronic open reply Tests - Electronic Multiple Choice Objective Tests - Electronic True and False objective tests - Electronic Folders - Collaborative Virtual Environment Assessment - Virtual Self-assessment - Electronic Entrance Assessment - Formative Virtual Assessment - Final and Functional Virtual Assessment - Assessment Based on Electronic Assignment and Project - Peer Assessment in virtual environment
6	**Learning Theories**	Behaviorism (Operant Conditioning, Program Learning, Teaching Machine, Classical Conditioning, Watson's Theory, Instrumental Conditioning, Drive-Stimulus Reduction Theory) - Cognitivism (Gestalt Theory, Cognitive Field, Formative Epistemology, Exploratory Learning, Meaningful Learning, Humanism) - Structuralism (Psychological approach, Social Constructivism) - Connectivism.

B) Findings of Quantitative Section:
1) Demographic Information

In Table 3, the demographic information of the statistical sample is presented.

Table 3.
Demographic information of the statistical sample

Row		Manager	Head Teacher	Teacher	Expert	Total (percentage)	
Sex	Male (percentage)	4%	10%	22%	1%	37%	
	Female (percentage)	3%	2%	58%	-	63%	
Education	Associate's degree and lower	-	-	5%	-	5%	
	Bachelor's degree	5%	10%	69%	1%	85%	
	Master's Degree and higher	2%	2%	6%	-	10%	
Service Record	10 years and lower	-	-	8%	-	8%	100%
	10-20 years	2%	2%	27%	-	31%	
	20 years and higher	5%	10%	45%	1%	61%	
Age	35 years and lower	-	-	8%	-	8%	
	35-45 years	2%	2%	27%	-	31%	
	45 years and higher	5%	10%	45%	1%	61%	

According to the information in Table 3, 63% of the statistical sample is female and 37% is male. Likewise, the highest frequency of educational degree is related to the Bachelor's degree with 85% and the

highest frequency related to age and service record is related to 45 years and higher and 20 years of service and higher with 61%.

Descriptive Analysis of Research Variables

For descriptive analysis of the research variables, the central parameters (mean, median & mode) and dispersion parameters (standard deviation, variance & range) are used according to the Table 4.

Table 4.
Descriptive Analysis of Research Variables

Variables	Number	Mean	Median	Mode	Standard Deviation	Variance	Range	Minimum	Maximum
Tool	242	3.642	3.333	3.333	0.776	0.603	4.000	1.000	5.000
Content	242	3.410	3.333	4.000	0.860	0.739	4.000	1.000	5.000
Teaching method	242	3.471	3.667	4.000	0.847	0.717	4.000	1.000	5.000
Instructional design	242	3.675	3.667	4.000	0.804	0.647	4.000	1.000	5.000
Assessment	242	3.590	3.333	4.000	0.830	0.689	4.000	1.000	5.000
Theory	242	3.586	4.000	4.000	0.827	0.683	4.000	1.000	5.000

Normality Test of the Data

In this study, the Kolmogorov-Smirnov test was used in order to test the normality of the data. If the data distribution is normal, inferential statistical tests can be used. To verify the normality of data, the assumption of zero is based on the fact that the data distribution is normal. This test is tested at a 5% error level. If a significant value is obtained greater than or equal to the error level of 0.05, there is no reason to rule out the zero assumption. So the data distribution will be normal. To test the normality of data, statistical assumptions are adjusted as follows:

H_0: The distribution of data related to the variables is normal;

H_1: The distribution of data related to the variables is not normal.

The test result of the normality of data is presented in Table 5.

Table 5.
The Normality Test of Research Variables

	Tool	Content	Teaching Method	Instructional Design	Assessment	Learning Theory
Number N	242	242	242	242	242	242
Mean	3.642	3.410	3.471	3.675	3.590	3.586
Standard Deviation	0.776	0.860	0.847	0.804	0.830	0.827
Statistic ks	3.268	3.648	3.719	3.625	3.199	4.510
Significance Sig.	0.083	0.152	0.189	0.160	0.084	0.093

According to the results of Kolmogorov-Smirnov test, in all cases, the significant value was found to be greater than the error level (0.05). Therefore, there is no reason to reject the zero assumption and data distribution is normal.

Confirmatory Factor Analysis

The confirmatory factor analysis investigates the relationship between the items (questions of questionnaire) and the structures. In fact, until it is not proved that the questions of questionnaire have well measured the latent variables, the research hypotheses based on the data of the questionnaire cannot be used. Therefore, in order to prove that the data are accurately measured, the confirmatory factor analysis is used. The power of the relationship between the factor (latent variable) and the observed variable is shown by the factor loading. The factor loading is a value between zero and one. If the factor loading is less than 0.2, the relationship is considered weak and neglected. The factor loading between 0.2 and 0.6 is acceptable, and if it is greater than 0.6, it is very desirable (Kline, 1998). The minimum acceptable factor loading in some sources and references is mentioned 0.2, but the main criterion for judging statistics is t. If the test statistic meaning t is greater than the critical value of $t_{0.05}$, that is 1/96, then the

observed factor loading is significant (Azar & Momeni, 2004).

Confirmatory Factor Analysis of Research Variables

The results of the factor analysis of the research variables are presented in figure 1. For measuring 6 main factors (latent variables) and 47 questions (observed variables) were used. Each of these variables is represented by the Q_{01} to Q_{47} indices. The observed factor loading in all cases is greater than 0.3, which shows that the correlation between latent variables (dimensions of each of the main structures) with observed variables is acceptable. After identifying the correlation of variables, significance test should be performed.

In order to investigate the significance of the relationship between variables, t-value statistic is used. Since significance is checked at the error level of 0.05, if the t-value test statistic is greater than the critical value of 1.96, then the relation is significant. Based on the results of the measurement indicators of each of the used scales at the 5% confidence level, the t-value is greater than 1.96, which indicates that the observed correlations are significant (Figure 2).

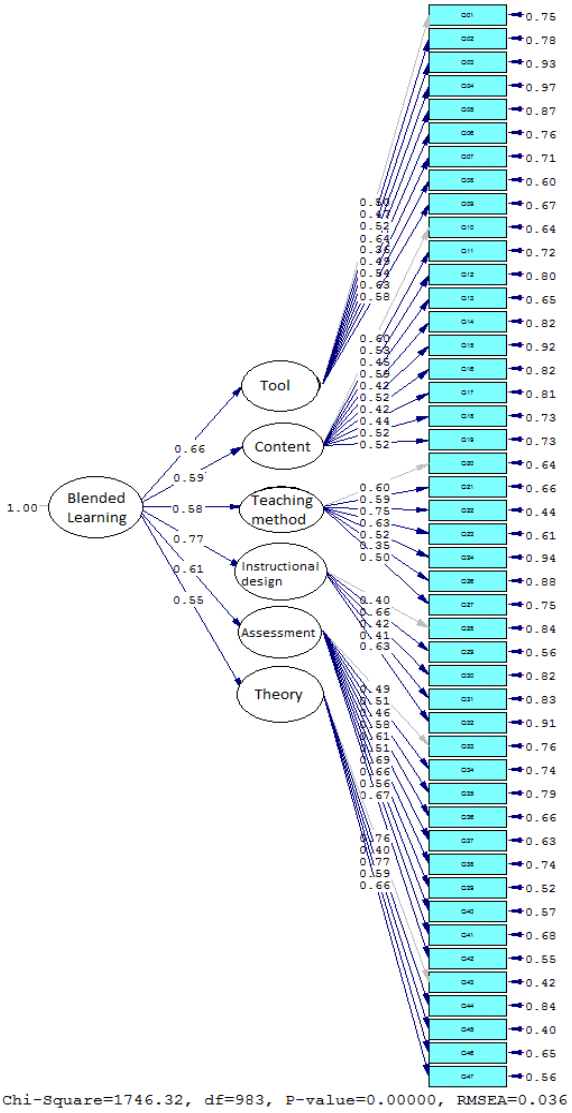

Figure 1.
Standard Factor Loading of Independent Variables

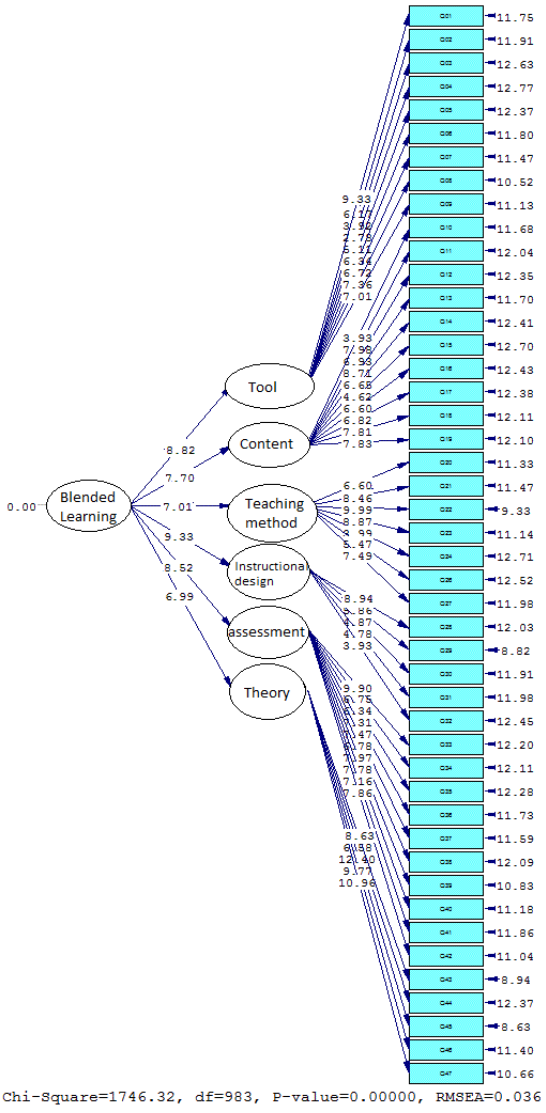

Figure 2.
T-value Statistic of Independent Variables

In Table 6, the results of the confirmatory factor analysis and status of components are presented.

Table 6.
Investigating the Status of Research Components

Research Variables	Factor Loading	T Statistic	Significance Value	Status
Tool	0.66	8.82	0.000	Confirmed
Content	0.59	7.70	0.000	Confirmed
Teaching method	0.58	7.01	0.000	Confirmed
Instructional design	0.77	9.33	0.000	Confirmed
Assessment	0.61	8.52	0.000	Confirmed
Theory	0.55	6.99	0.000	Confirmed

Goodness of Fit of the Model

The above structural model is saturated in three steps. Fit indexes show desirable values. The value of normal X^2 is also obtained to be 1.776, which is within the acceptable range of 1 to 5. Therefore, the structural model has a favorable fit.

$$\frac{X^2}{df} = \frac{1746.32}{983} = 1.776$$

Also, since the RMSEA fit index is obtained 0.036, which is less than 0.05, the model has a good fit. Other goodness of fit indexes are also within the acceptable range (Table, 7).

Table 7.
Goodness of Fit Indexes of the Structural Model of the Main Research Hypothesis

Fit index	SRMR	RMSEA	GFI	AGFI	NFI	NNFI	IFI
Acceptable values	<0.05	<0.1	>0.9	>0.9	>0.9	>0.9	0 – 1
Calculated values	0.037	0.036	0.96	0.92	0.96	0.93	0.96

Investigating the Status of Research Variables

In order to investigate the status of the variables, one sample t-test was used. The opinions of the respondents about the importance of each of the factors and studied dimensions were studied using a one sample t-test. In this test, the null-hypothesis (H_0) is based on the fact that the variable under consideration is not in a desirable situation and the alternative hypothesis (H_1) is the test claim. Since the data are collected with a 5-point Likert scale, the mean number 3, midpoint of the Likert spectrum is considered. Therefore, the statistical expression of the research hypotheses is as follows:

H_0: $\mu \leq 3$null-hypothesis: The investigated factor is not in a desirable status.

H_1: $\mu > 3$Alternative hypothesis (test claim): The investigated factor is in a desirable status.

Since this study was conducted at a confidence level of 95%, so if in the mean calculation of each dimension, the p-value 1 is less than the 5% error level, then the null-hypothesis is rejected and therefore the test claim will be confirmed. It is obvious that in this condition, the t-test statistic will be greater than the critical value of $t_{0.05}$, meaning 1.96. Likewise, both confidence intervals will be positive. The results of the calculated one sample t-test are as follows. The summary of the results of the one sample t-test is presented based on the mean of the respondents' opinion in Table 8.

Table 8.
One Sample T-test Results for the Research Variables

Research Variables	Mean	T-Value	P-Value	confidence intervals 95%	
				Lower Bound	Upper Bound
Tool	3.642	7.544	0.000	0.235	0.400
Content	3.410	8.787	0.000	0.318	0.502
Teaching Method	3.471	10.246	0.000	0.380	0.561
Instructional Design	3.675	10.858	0.000	0.388	0.559
Assessment	3.590	9.779	0.000	0.352	0.529
Theory	3.586	9.079	0.000	0.498	0.674

The mean of the respondents' opinions in the tool dimension was 3.642, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 that is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 7. 544, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence it can be said that the tool is important.

The mean of the respondents' opinions in the content dimension was 3.41, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 that is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 8.787, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence it can be said that the content is important.

Also, the mean of the respondents' opinions in the teaching method dimension was 3.471, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 which is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 10.246, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence it can be said that the teaching method is important.

The mean of the respondents' opinions in the instructional design dimension was 3.675, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 that is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 10.858, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence it can be said that the instructional design is important.

Moreover, the mean of respondents' opinions in the assessment dimension was 3.590, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 that is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 9.779, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence, it can be said that the assessment is important.

The mean of the respondents' opinions in the theory dimension was 3.586, which is greater than the midpoint of the Likert spectrum. The p-value is also obtained to be 0.000 that is smaller than the error level of 0.05. Therefore, the observed mean value is significant. The value of t statistic is obtained to be 9.079, which is greater than the critical value of 1.96. Likewise, both the upper and lower bounds of the confidence interval are greater than zero (positive) and the test claim is validated. According to each of these statistical findings, with 95% confidence, it can be said that the theory is important.

Ranking of the Status of the Research Variables

In order to rank the status of research variables, the Friedman test was used. This test is equivalent to the parametric method of two factor variance analysis, in which k treatment is randomly allocated to n blocks. The Friedman test results are presented in table 9 to determine the priority of the variables.

Table 9.

The Ranking of the Secondary Variables

Main Dimensions	Friedman Rank	Importance Rank
Tool	5.750	2
Content	5.390	4
Teaching Method	5.140	5
Instructional Design	5.794	1
Assessment	5.655	3
Theory	5.090	6

Instructional design with the Friedman rank of 5.794 has the best status. Tool with a score of 5.750 has the second rank of importance. Assessment with 5.655 score is in the third place of importance rank. In order to investigate the significance of the difference in the importance rank of the factors, the Z test statistic was used. A very small p-value and about 0.000 was estimated. So the results are reliable.

Discussion and Conclusion

The pressure on institutions and educational systems require them to expand and adapt according to the needs. The past experience of educational systems has shown that none of the face-to-face training and virtual training methods alone can achieve the desirable quality and high-level learning goals in the educational system. Therefore, considering the application of blended learning in all dimensions and using the benefits of both face-to-face and e-learning to facilitate the learning process and achieving the efficiency, quality and high levels of learning is an inevitable necessity.

In the present study, the components and indices of blended learning in elementary schools were identified. In other studies, some of the dimensions and characteristics of blended learning are investigated sparsely, but not all elements of blended learning in schools have been addressed. Accordingly, by investigating the documents and references and interviewing faculty members and specialists on the subject, the indexes and components of the blended learning were identified. The final components were as follows: tools, content, teaching method, instructional design, evaluation and learning theories. In order to confirm and relate the components, a questionnaire was distributed among managers and head teachers, teachers and elementary education experts. The analysis of the statistical data showed that the internal correlation of components was positive and significant, meaning that the application and reinforcement of a component in a combined way can promote and strengthen other component in school education and learning.

Researchers (Beaudry, 2011; Lefton, 2012; Richardson, 2010; Riddle, 2010; Rosen & Beckhill, 2012; as well as Ruiling & Overbaugh, 2009) believed that the blended learning environment and technology integration in classroom activities can be effective for many students. These results are consistent with the findings of this study.

Among the other studies consistent with the present research, we can refer to the research conducted by Van Lein et al., (2017) who found the increasing level of motivation in a blended learning environment; the one conducted by Yazdi Zadeh Ravari (2016) concluding the increasing level of pleasure, hope, pride, activity excitement , consequent excitement of and reduction of anger, anxiety and shame as a result od blended learning; the one by Tabatabaei (2016) who found the promotion of students' learning; by Shah Virin et al., (2016) and Ahmadpour Kasgari (2015), working on the benefits of both traditional and electronic training methods in blended learning; by Avdi et al., (2014) with a research finding on improving student learning performance; the one by Ling et al., (2010), with the research finding on students' satisfaction of group learning, flexibility, motivation and participation in blended learning courses; by Akuiunella and Sevilla (2008) who found the coordination of blended learning approach with the learning style of learners, the positive opinion of learners toward it and the promotion of the learning outcomes; and by Christensen (2003) referring to the improvement of learning performance and better performance in the social speech and communication skills.

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