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Explaining the impact of blended learning on relevant factors in west Tehran Payame Noor University

Akram Ghanaee[a*] and Syed Ali Akbar Ahmadi[b]

[a]*M.A. in Information Technology Management, West Tehran Branch, Payam Noor University, Tehran, Iran*
[b]*Head of West Tehran Branch, Payam Noor University, Tehran, Iran*

C H R O N I C L E

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A B S T R A C T

By advances in information technology and considering the fast pace of innovation in targeted technologies, blended learning with the aim of satisfying the needs of blended learning is composed of online learning and face-to-face learning. The aim of the present paper is to study the impact of blended learning on the relevant factors through a mixed method. The study is considered fundamental in terms of research methodology. The present paper is carried out on students of West Tehran Payame Noor University, Iran through a questionnaire. According to the results, it is concluded from the perspective of students that although blended learning is formed of several factors such as face-to-face learning and virtual learning, this type of learning has significant impact on its constituent elements as well as on relevant factors related to this type of learning. Finally, the effectiveness of blended learning, virtual and face-to-face learning in accordance on their factors were determined and assessed which ultimately led to conclusions and recommendations to advance research objectives.

1. Introduction

By looking into the field of information technology, we understand that an accelerated dissemination of information technology in all areas of human life, especially in the area of education, learning, and research is visible. In this study, we aim to investigate the impact of information technology in advancing educational purposes in the context of blended learning. One thing that is focused on this type of learning is the relevant factors (Barrow et al., 2006). Relevant factors in blended learning influence the education policy, which is reflected in different factors of educational provisions. These factors are one of the major concerns of educational policy makers and is an essential step in advancing in learning and education process (Bitner & Zeithaml, 2003). Application of information technology in education and consequently learning leads learning environments into virtual learning and combination of virtual and traditional systems and consequently into blended learning. In fact, with changes in the types of learning, this type of learning helps to enhance and improve performance. However, what is important is that the combination of face-to-face and virtual learning is increasing formally and

* Corresponding author.
E-mail address: akramghanaee@gmail.com (A. Ghanaee)

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informally. In all developed countries, online learning is present in every field along with face-to-face learning. For example, 31% of students at the universities of America had taken at least one online course in the autumn of 2010 (Khechine et al., 2014; Bodden-White, 2015). In this survey, there were significantly positive and negative relationships between blended learning and its relevant factors that are influential in the learning performance through blended, virtual and face-to-face learnings.

2. Literature Review

Blended learning improves performance and the development of strategies (Bielawski & Metcalf, 2003). Blended learning in high-level trainings has some requirements as follows: (1) strategic requirements, (2) operational requirements, potential costs and available resources (Garrison & Kanuka, 2004; Fearon et al., 2011). Through blended learning the flexibility is increased and costs are reduced (Bower et al., 2015). Blended learning is at the core of educational technology in universities and forms the foundation of a student's learning. In fact, blended learning facilitates the learning process with its theories and methods in information technology. Moreover, resolving blended learning difficulties increases the quality of education (Huang et al., 2008). The key to blended learning is open view and focusing on educational experiences (Thone, 2003). By 121 students in the research, it can be seen that blended learning communicates between traditional learning and online learning (Makhdoom et al., 2013). The power of organizational values depends on organizational learning and strategies (Kenny, 2006). One can provide learning development model based on the available factors and create various models by relying on their results to help effective management (Hafman, 2014). The best way to succeed in education is to focus on blended learning, and this type of learning is most effective one in an educational environment (Deschacht & Goeman, 2015). The new generation of learning through online context in form of blended learning can effectively increase students' knowledge and provide satisfaction. To meet high-level needs, technologies means must be supported (Okaz, 2015). Feedback is important in learning strategy which is basically effective on blended learning outcomes of educational researches. In recognition of the audio and written feedbacks, audio feedbacks are fast; in addition, lack of change in the scores on the both methods can be mentioned (Dias & Diniz, 2014). Operational requirements must be prevailed on intelligent systems and information protection systems (Simon et al., 2015). In universities where blended learning method is used, strategic objectives are meant to be achieved and the development of professional studies with blended learning becomes more capable, and professors are more eager to use blended learning (Bradley et al., 2007). Institutions and professors should support blended learning to be included in their curriculum (Stockwell et al., 2015). Blended learning focuses on increasing the levels of cooperation between humans and technology and the satisfaction of students in this type of learning is more (Ling et al., 2015). In blended learning, the access to multiple resources is of great importance and investigating the types of learning and their suitability to the environment is mandatory. Interaction is one of the most strategic discussions in blended learning and the composition of technology and training alone cannot bring the quality. Learners should be comfortable with technology (Ghassemtabar &Fazelian, 2010). Blended learning enables new and multidimensional connections (personal and academic) in learning, which can be developed beyond time, space and limited courses (Saeedpour & Tabassi, 2010; Holt, 2011). Taking advantage of blended learning approach by which one can learn the benefits of both traditional training and online learning can be useful and effective in designing curricula (Salari & Karami, 2011). In the programs and plans in online learning system, the cost, time, resources and technology to upgrade hardware infrastructure and communications, and also priorities should be identified (Bagheri Majd et al., 2013).

2. Research Methodology

In this study, the main aim is knowledge development in blended learning through mixed research method (qualitative, quantitative) by collecting information from 113 students. On the other hand, we seek to improve the created model in all universities and then enhance the educational system by getting

inspired through this paper. By reviewing and analyzing through the structural equation, we are led to the research objectives and desired findings and ultimately results and suggestions.

2.1. Research Findings

In this section, we tried to avoid duplicate contents and possibly a new and valid resources that are most relevant to blended learning had been selected.

Table 1
Relevant topics about blended learning

Titles	References
The concept of technology training in public education	Allaghemandan (2002)
Communication pattern between educational institutions and work environment	Le (2008)
Blended learning	Mohammadpour et al. (2010)
Qualitative research methodology	Khechine et al. (2014)
Mixed methods as the third methodology movement	Mohammadpour et al. (2010)
Blended learning model to support Web technologies	Köse (2010)
Inquiries to learning: online education in the United States	Alen & Seaman (2010)
Special medical talents; facts of specific topics	Behmann et al. (2011)
The value of blended learning in the workplace and universities	Fearson et al. (2011)
A framework for evaluating high-level training: A review of a lecture	Gikandi et al. (2011)
e-learning strategy to increase access to music education	Digolo et al. (2011)
Online learning participation through perception: a social perspective	Zhou (2011)
Quality of learning in online training centers; qualitative study	Mahdiun et al. (2011)
Comparison of new educational approaches or traditional approach (advantages and disadvantages)	Jabbari Zahirabadi & Nami (2011)
Advantages and obstacles of blended learning in hematology course of Mashhad University	Manavifar & Jamali (2011)
Compacting video for use in MPEG	Mishra & Sawarkar (2012)
A review of innovative electronics systems	Mirzaee & Shabaniania (2013)
Blended learning: a way to enhance educational experiences	Poon (2013)
Assessing students' resistance against online learning through K-12 method	Peterson (2013)
Blended learning management software: a practical model of UTAT2	Raman & Don (2013)
Maximizing blended learning framework basis to limit the extent of environment	Suhail et al. (2014)
Blended learning foundation in University of Wesleyan	Garner & Oke (2014)
A model for blended learning: the effect of age and gender as a law	Khechine et al. (2014)
The results of learning management systems on the blended learning of high-level training	Dias & Deniz (2014)
Local learning for essential learning and communication models	Garth-James & Hollis (2014)
Development of blended learning model by virtual testing of students' knowledge	Klentien &Wannasawade (2016)
The design and implementation of blended learning system for training	Seyyedi & Yaghubi (2014)
Research trend in the field of e-learning with a meta-analysis approach	Alinejad (2014)
Social network analysis	Mardani & Molaee (2015)
The status of ethical paradigm in ethics	Mannian & Abbasi (2015)
Communication of Web services in e-learning for social sciences	Scott et al. (2016)
Synchronization of games for guided learning: A handmade case study	Clement et al. (2016)
Learning services for satisfaction: a description of the two projects	Müller et al. (2016)
Selecting a proper approach for training analysis in future	Rodríguez-Ardura & Meseguer-Artola (2015)
Security and needs of virtual classrooms	Ur Rehman & Khan (2016)
Recalling a preliminary discussion of technology development	Stickler & Shi (2016)
Analysis of learning for all sizes: academic achievement	Carpenter & Linton (2016)
beyond the classroom training: social investment in network systems	Gašević et al. (2016)

The study population consists of PNU students, and stratified random sampling was used to determine the sample. The sample size is calculated by using Cochran formula. In addition, for the data analysis, the multivariate analysis method of the structural equation is used. Structural equations as a statistical

model, study the relationships between covert and overt variables (Hooman, 2014). According to Table 1 and reviewing conducted studies, the most important factors that blended learning affects them positively or negatively can be seen in Fig. 1.

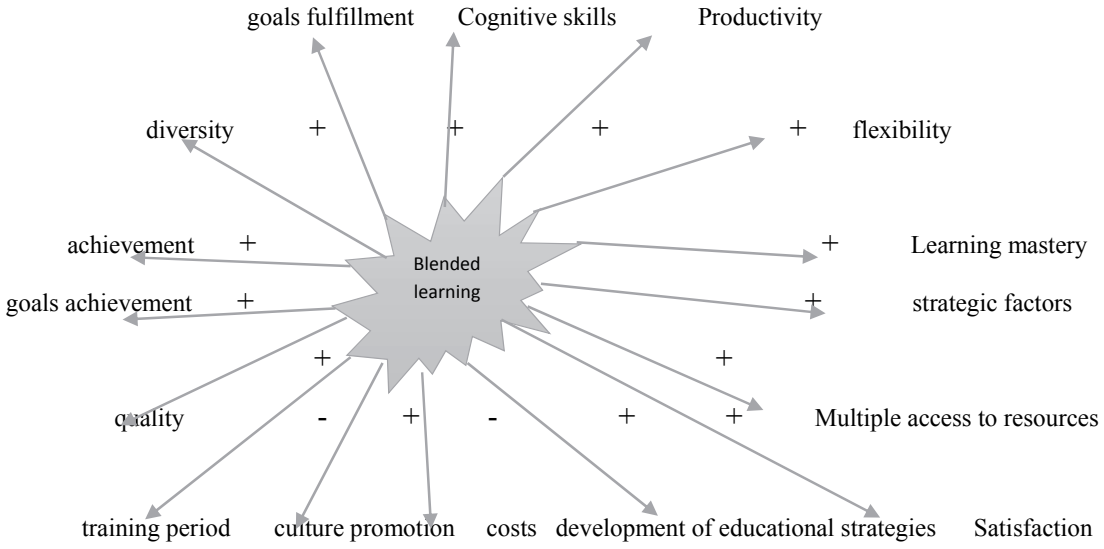


Fig. 1. The impact of blended learning on its relevant factors

By recognition of these factors, our research process will go ahead more effectively and comprehensively and this knowledge fulfills the development of attitudes in this field. These factors are the most important factors that blended learning affect them, and the impacts of these factors on other factors will generate a host of cycles, which is far away from the scope of our discussion.

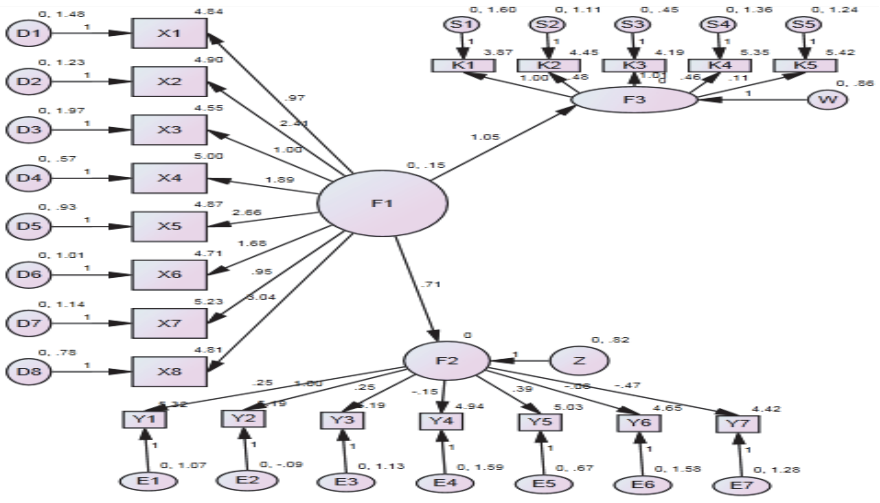
3. The results

3.1 Qualitative findings

According to distributed questionnaires among students, it can be stated that in blended learning that the ease of use for students was estimated at optimum levels. The mean scores was satisfactory in blended learning. Overall satisfaction of students to blended learning has been reached. Quality of blended learning was at a satisfactory level. The effective communication between students and professors was at a satisfactory level in blended learning. A significant percentage of students was satisfied by spending on blended learning. Students' knowledge has increased by blended learning. In the online part of blended learning, providing audio lessons for students were estimated at a satisfactory level and not great. In the online part of blended learning, providing audio and video lessons were estimated at a satisfactory level and not great; of course, the satisfaction level was more than the audio-only lessons. Due to the fact that blended learning is a combination of two types of learning, their strengths and weaknesses will be covered.

3.2 Quantitative findings

According to the questionnaire, the effects of blended learning as an independent variable (F1), on (F2) and (F3), which are respectively, online learning and face-to-face learning (the dependent variables) are measured.



Chi-square = 427.538 Degrees of freedom = 168 Probability level = .000
Number of distinct parameters to be estimated: 62

Fig. 2. The results of different factors on blended learning

The following result were obtained by investigating the cases by using the Software AMOS:

In Fig. 2, X1: ease of blended learning from the perspective of students, X2: improvement scores through blended learning, X3: students' satisfaction of blended learning, X4: blended learning quality from the perspective of students, X5: effective communication between students and professors, X6: reduced costs in blended learning, X7: improved student social interaction through blended learning, Y1: the ease of using online learning, Y2: satisfactory scores in online learning, Y3: satisfaction of spent money on online learning, Y4: student satisfaction with audio courses of online learning, Y5: student satisfaction with audio-video courses of online learning, Y6: improvement of student social interaction through online learning, Y7: ease of communication with professors, K1: ease of use in face-to-face learning, K2: satisfaction scores in face-to-face learning, K3 : satisfaction of spent money on face-to-face learning, K4: improved social interaction in face-to-face learning, K5: ease of communication with other students in this type of learning.

According to Fig. 2, based on the answers to the questions, the effect of blended learning on face-to-face learning (1.05) is higher than online learning (0.71). Students' knowledge has increased through blended learning (3.04) and they are satisfied with their grades (2.41) and effective communication between students and professors (2.66) showed a good rate of satisfaction. The lowest impact of blended learning was on student social interaction (0.95), ease of learning from the perspective of students (0.97), respectively. In addition, online learning had a negative effect on students' social interactions (-0.8), ease of communication with professors (-0.47) and audio learning (-0.15). The highest satisfaction in online learning was on students' grades (1.0). The lowest level of impact in face-to-face learning was communication with professors (0.11). The highest satisfaction in face-to-face learning was on costs (1.01) and ease of use (1.0), respectively.

According to Fig. 2, Chi-square goodness of fit is equal to 427.538. Furthermore, the degree of freedom is equal to 168; as the satisfactory amount is up to 230. The probability level is 0.0 which is totally satisfactory because it is less than 0.5.

Table 2 presents estimates of regression weights, respectively, Provide an estimate of the amount of deviation f1……>f2 to f3……>k5 shown.

Table 2
Standardized Regression Weights: (Group number 1 - Default model)

Relationship			Estimate	Relationship			Estimate
F2	<---	F1	.290	K2	<---	F3	.416
F3	<---	F1	.399	X7	<---	F1	.323
X3	<---	F1	.265	X8	<---	F1	.798
X2	<---	F1	.643	Y3	<---	F2	.215
X1	<---	F1	.293	Y4	<---	F2	-.114
X4	<---	F1	.695	Y5	<---	F2	.413
X5	<---	F1	.728	Y6	<---	F2	-.062
X6	<---	F1	.540	Y7	<---	F2	-.364
Y2	<---	F2	1.054	K3	<---	F3	.837
Y1	<---	F2	.218	K4	<---	F3	.373
K1	<---	F3	.626	K5	<---	F3	.098

Table 3 also displays the amount of projected values for variables of X1-X7, where the S.E., C.R. and P demonstrate the standard estimated, critical value and significant level, respectively.

Table 3
Intercepts: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label		Estimate	S.E.	C.R.	P	Label
X3	4.548	.266	17.116	***	par_20	X7	5.226	.206	25.383	***	par_30
X2	4.903	.264	18.588	***	par_21	X8	4.806	.268	17.929	***	par_31
X1	4.839	.232	20.828	***	par_22	Y3	5.194	.199	26.095	***	par_32
X4	5.000	.191	26.150	***	par_23	Y4	4.935	.232	21.313	***	par_33
X5	4.871	.257	18.944	***	par_24	Y5	5.032	.164	30.712	***	par_34
X6	4.710	.218	21.558	***	par_25	Y6	4.645	.230	20.217	***	par_35
Y2	5.194	.163	31.779	***	par_26	Y7	4.419	.221	19.969	***	par_36
Y1	5.323	.193	27.525	***	par_27	K3	4.194	.224	18.686	***	par_37
K1	3.871	.296	13.078	***	par_28	K4	5.355	.230	23.306	***	par_38
K2	4.452	.212	21.029	***	par_29	K5	5.424	.207	26.168	***	par_39

4. Conclusion

Many factors are effective in blended learning and naturally blended learning is also effective on many factors. If these factors are in place, they will have significant impacts on improving the quality of this type of learning. Blended learning is an effective strategy which can combine real and virtual methods. A factor that may be overlooked is affecting employees and managers as a moderating variable. Managers can influence relations and thus improve and strengthen the learning process and this depends on the skills and wisdom of management in this regard. Face-to-face learning has been successful in many areas despite initial impression; and as it was supposed to be voted on optimal performance, it did not happen. Without doubt, we would think that face-to-face learning would be more successful because it benefits greater communication between professors and students, but according to the survey, it was found that this type of learning has little impact on improving social interactions of students and their grades; while in online learning, students grades were better. The interactions with the professors in this type of learning is not satisfactory, even though the presence of students is expected to provide easy interactions with professors. In this type of learning, students have been satisfied from the ease and cost reduction, which seems unlikely. Therefore, it seems the ease and the cost were advantages of this type of learning. Students are not satisfied with social interactions, costs, online learning, audio and video learning. Although the students' satisfaction with audio and video learning is more than audio-only learning. As observed earlier, more improvement could be seen by blended learning, and students were more satisfied. Because each of the relevant gaps will be covered

by the other types of learning. Professors were also satisfied with blended learning in most cases, the highest were in terms of students' grades, overall satisfaction (which is very important) and an increase in the quality of blended learning. It had only negative impact on improving social interactions of professors which can be caused by numerous factors and it is debatable.

5. Suggestions

According to the obtained results, we have concluded that blended learning improved the relevant factors of education. Managers, policy makers, planners, and professors can enjoy blended learning to improve the educational process and improve the quality of educational services and boost productivity. The use of blended learning improves efficiency and productivity and thereby students can benefit a better quality of educational level. Blended learning combines a variety of learning methods to strengthen and improve positive factors and weakens negative factors. This type of learning is also applicable to other universities, because according to the above points, it can be considered in education policy and be used and exploited formally and informally in educational centers.

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