Examination of influence of e-learning on academic success on the example of Bosnia and Herzegovina

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Abstract

The continuous development of information technologies has changed the way in which education is organized. Students are now more likely to choose e-learning in order to achieve better results during their studies. To examine the influence of e-learning application on academic success, the study inspected multidimensional relationships in e-learning. The research is directed towards improvement of students' academic success. The research was conducted on the territory of Bosnia and Herzegovina (BiH), and for that purpose a random sample was used. Data from students were collected through a questionnaire while hypotheses were proven with the help of the structural equation model (SEM). Results have shown that metacognitive strategies and computer self-efficacy have a direct significant influence on academic success, while the set goals do not directly influence academic success. In addition to that, this research has proved that online environment and social interactions with other participants play a significant role in the achievement of academic success. The results obtained in this research will help higher education institutions improve their e-learning strategies and implementation efforts. Furthermore, the used research model contributes to the improvement of understanding of e-learning, both in practice and in theory.

Keywords E-learning · Goal-setting · Metacognitive strategies · Computer self-efficacy · Academic success · Structural equation model

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1 Introduction

Development of information technologies and the Internet have changed the ways in which the system of education functions. E-learning is virtually available to anyone who has access to the Internet. Students are increasingly using e-learning in order to master certain materials and acquire new knowledge. The Internet as a medium of instruction provides a great amount of information available in the forms of online courses, tutorials, materials, etc., which are transferred to students rapidly (Chiu et al. 2013). Students can master online courses individually or by learning in groups. Development of e-courses enables faculties to promote them anywhere in the world by sharing knowledge. These are the bases for development of e-learning which enables students and other people who use this method of learning to improve their knowledge, skills and attitudes with the help of modern technologies (Larbi-Siaw and Owusu-Agyeman 2016). The concept of e-learning has an important role in higher education, and it is developing very fast since it is flexible and adaptable to the students' needs (Richardson 2017). E-learning can be applied anywhere and anytime (Eggermont et al. 2013) provided there is access to the Internet.

The Application of e-learning represents a challenge for students when it comes to acquiring new knowledge and mastering teaching courses. HEIs offer online courses as a part of the curriculum and students who master those courses get credits which help them complete their studies (Cohen and Baruth 2017). HEIs are now turning to the application of e-learning, which is perceived as an integral part of the strategy for long-term development of the mentioned institutions. Thanks to online courses and online studies, higher education institutions are now available to a larger number of potential students. That is the reason HEIs offer studying via platforms for e-learning, in addition to traditional modes of learning. On the other hand those platforms are available to full-time students (Anima Adzobu 2014) which may have a negative impact on the lectures in a way that student attend lectures less often because they have a possibility of acquiring the same knowledge via the e-learning platforms (Wilson and Cotgrave 2016). However, e-learning platforms for the full-time students should only serve as a support in studying rather than being the basis of learning (forming thus blended learning) (Ejubović and Puška 2019). Full-time students should be brought to a classroom, since the traditional modes of studying is the basis for knowledge acquisition.

Drawbacks of the application of e-learning are the fact that not all students have the same knowledge, skills and competencies needed for application of this method of learning. Some students are more comfortable using online environment and e-learning platforms, while others have difficulties using them (Cole et al. 2014). Furthermore, students differ when it comes to the previously acquired knowledge, personalities and learning styles, which may negatively reflect on academic success and successful completion of studies (Kauffman 2015). In order to continue using e-learning platforms, students ought to have positive effects coming from this method of learning and make progress in achieving better academic success. If e-learning platforms contribute to the achievement of better academic success of students, they will continue using this type of learning. However, if their success is affected in a negative way, students will use them less. Due to the abovementioned, it is necessary to investigate how affinities,

previous knowledge and competencies of students affect the use of e-learning platforms and academic achievement (Galy et al. 2011).

The general aim of this study is to examine in which way goal-setting, metacognitive strategies and computer self-efficacy influence academic success. Furthermore, the specific aim is to examine whether these competencies and learning strategies directly influence the achievement of better academic success, or indirectly through a medium of online environment and social interactions. Based on the abovementioned, this study provides new practical and theoretical bases for understanding the influence of e-learning platforms on academic success. The aim of the conducted research was to examine the ways in which students use e-learning platforms in Bosnia and Herzegovina (BIH). The obtained results shall help HEIs improve their e-learning platforms, so that students can use them to achieve better academic results. It is of key importance for HEIs to examine if these e-learning platforms enable students to achieve better results during their studies. Based on that, they can decide whether development strategies of their institution should be based on these platforms, or they should use some other platforms, or even abandon the application of e-learning altogether. In addition, the obtained results will review students' competencies and whether their strategies of e-learning positively reflect on their academic success. In that manner, HEIs can ascertain if students need training on the use of e-learning platforms first. The research conducted by Pellas and Kazanidis (2014) showed that students who are trained to use e-learning platforms achieve better results.

Based on everything listed above, we set the following research goals:

1. Study the significance of e-learning with students in BiH when it comes to achievement of academic success.
2. Find out in what way the computer self-efficacy, metacognitive strategies and set goals influence academic success.
3. Investigate if the set research mediators in the form of online environment and social interactions affect the improvement of academic success of students.
4. Suggest and test on a practical example a model which examines the set relations in e-learning.

Apart from the Introduction, this essay covers five more sections. The second section offers a theoretical description of the framework of research and provides the theoretical baseline of constructs in research and their mutual relationships. Based on that, research hypotheses are set and a research model created. The third section provides an explanation on the research methodology. First, it presents the basic research and explains in what way the research sample was created. In addition, it presents basic characteristics of students covered in this research and explains the way in which the used questionnaire was designed. The fourth section examines the research hypotheses and presents results of the research. First, it provides a test of the research model and then examines this model through the research hypotheses. The fifth section explains the research results and compares them to the previous research. After that, it provides a discussion on the obtained results and provides practical and theoretical implications of the conducted research. The final section sums up the most prominent research results and provides directions for future research.

2 Theoretical framework and research hypotheses

This chapter sets the research hypotheses through the review of the used literature. It suggests a conceptual research framework based on which a research model is to be created. When it comes to the research model, six constructs are used, three of which are independent: goal-setting, metacognitive strategies and computer self-efficacy, and three dependent: social interaction, online environment and academic success. This model examines the way in which independent constructs affect academic success. As for the constructs social interactions and online environment, here we examine their mediating role in academic success. Based on the set model, we shall provide new insights in how these constructs influence the application of e-learning on the example of students in Bosnia and Herzegovina.

2.1 Goal-setting

Goal-setting represents a process of setting specific tasks and strategies in order to master the set tasks (Peters 2012). Goal-setting establishes two separate facets of meaning: "there is something I want to pursue "and "I need to perform in certain ways to get there "(Cheng et al. 2018, p. 190). Goal-setting in e-learning is important because: it helps students focus on relevant sources; goals direct students to make more effort when studying, they help students overcome difficulties in learning and they help students achieve better results (Leigh Bruhn et al. 2017). The aim of goal-setting is to improve students' skills in application of e-learning, and to help students achieve better results in learning with the help of goal-setting (Burnette et al. 2013). Goal-setting involves functions necessary for efficient learning which leads to improvement of students' knowledge (Peters 2012). In order to achieve the set goals, students come into interaction through which they exchange knowledge and experience. This interaction may be among students, or between students and teachers (Poortvliet and Darnon 2010). That way and in interaction with other participants in e-learning students obtains necessary information which enables them to master certain materials more easily and in less time, and thus accomplish the set goals. Other than that, the environment in which students learn is crucial for achievement of better academic success. Due to that, the goals must be set in relation to the tasks to be achieved, learning environment and with faith in the learning process (Xia 2017). Based on the abovementioned, we set the following research hypothesis.

H1.   Set goals have a significantly positive effect on students' academic success when it comes to application of e-learning platforms.

as well as auxiliary hypotheses:

H1a.   Set goals through social interaction have a significantly positive effect on students' academic success.

H1b.   Set goals through online environment have a significantly positive effect on students' academic success.

2.2 Metacognitive strategies

Metacognitive strategies include consciousness, knowledge and cognitive control. Students with higher level metacognitive strategies can concentrate on studying more and eliminate inadequate learning strategies (Kirmizi 2014). Metacognitive strategies imply active strategies which enable inclusion of cognitive processes in learning (Kisac and Budak 2014). As such, they cover skills and control mechanisms of the learning processes in order to achieve the set goals. To be able to apply metacognitive strategies, one needs to know how to manage cognitive knowledge and learning processes efficiently. Metacognitive strategies relate to abilities of students to understand and develop awareness of their own cognitive processes so they can control them, all for the purpose of achieving better learning results (Biasutti and Frate 2018). When applying this strategy, it is necessary to set learning goals, plan tasks, keep track of ways in which learning material is understood, and evaluate the progress in learning (Apaydin and Hossary 2017). Cognitive abilities help a student understand online materials and accomplish better learning results. Application of metacognitive strategies in learning enables students to plan, control and evaluate the learning process which helps them achieve better results in studying and better results of learning in online environment (Rahimi and Katal 2012). Online environment of e-learning should be designed in a way that it ensures it promotes the application of metacognitive strategies (Kistner et al. 2010). When it comes to e-learning, a student works in online environment, therefore he/she must interact with other participants in order to use their cognitive abilities in a better way. With application of e-learning, students learn on their own and sometimes they need help mastering certain materials (Alexander 2001), which they get through interaction with other participants. They need to be more responsible and apply metacognitive strategies to achieve better results in e-learning (Karlen 2016). Based on that, we formulate the following hypothesis of this research:

H2.   Metacognitive strategies applied in e-learning have a significantly positive effect on students' academic success.

As well as the following auxiliary hypotheses:

H2a.   Application of metacognitive strategies through social interaction has a significantly positive effect on students' academic success.
H2b.   Application of metacognitive strategies in online environment has a significantly positive effect on students' academic success.

2.3 Computer self-efficacy

Computer self-efficacy is defined as an individual's perception of his/her abilities and confidence to use a computer for a task execution (Deryakulu et al. 2016). However, this does not relate to simple computer skills. In the context of application of e-learning, computer self-efficacy can be defined as the ability of students to use e-learning platforms to gain access to certain materials and achieve the desired learning results. Nowadays, it is very important that students master computer self-efficacy since most

of the academic work today is done using a computer (Odaci 2013). It has been proved that individuals who possess a high level of computer efficacy achieve better results when it comes to e-learning (Chien 2012), they spend more time using e-learning technologies and they are more engaged in the learning process (Sun and Rueda 2012), in comparison to students who possess lower levels of computer self-efficacy and use computers less, and who tend to avoid or give up on some more challenging tasks. In order to increase students' computer self-efficacy, it is necessary to train students to use e-learning platforms. Students who are more confident in their computer self-efficacy choose more challenging long-term study goals, and that helps them achieve better success in studying (Odaci 2013). For that reason, computer self-efficacy is crucial for achievement of success in e-learning, since higher level of computer self-efficacy assumes better chances for success in studying. Students who possess a higher level of computer self-efficacy are more comfortable working in the online environment and they achieve better results (Berkant 2016), as they gain access to materials on e-learning platforms and master them more easily. For them, online environment is more natural and they spend more time learning (Sun and Rueda 2012). In addition to that, they are more comfortable interacting with other participants on the e-learning platforms. Based on the abovementioned, we formulate the following research hypothesis.

H3.   Computer self-efficacy has a significantly positive effect on students' academic success when it comes to the application of e-learning.

As well as the following auxiliary hypotheses:

H3a.   Computer self-efficacy through social interaction has a significantly positive effect on students' academic success.
H3b.   Computer self-efficacy in online environment has a significantly positive effect on students' academic success.

2.4 Online environment

Key factors for success in e-learning are as follows: student, teacher, courses, technology, design of a platform and environment in which a student is working (Cidral et al. 2018). In order to realize goals and achieve better results in e-learning, it is necessary to conduct e-learning in an environment which stimulates active learning (Bakir 2014). Due to the prevalence of information technologies, students are feeling more and more comfortable in online environment (Parkes et al. 2015). Besides, the physical environment in which a student studies also influences success when it comes to application of e-learning. For that reason, the environment in which e-learning is being applied should not in any way interrupt and distract students, and it should be a comfortable space for studying so that students are able to find materials which would result in the best possible learning outcomes (Martinez-Lopez et al. 2017). To achieve the best results in e-learning, students should be focused on studying and should not open web portals, social media sites etc., which would interrupt their learning process. They should arrange their online and physical environment so that they are able to complete the set goals and tasks without any interruptions and distractions during the learning

process (Zhou et al. 2017). That is the only way to achieve academic success in e-learning. Based on the abovementioned, we formulate the following research hypothesis:

- H4: Online environment in which e-learning is being applied has a significantly positive effect on students' academic success.

2.5 Social interactions

Social interactions represent the basic component of not only traditional but also e-learning (Lin et al. 2017). Students interact with other participants on e-learning platforms through various communication tools within them. In that manner, students exchange information and cooperate on task execution, which helps them master certain material and achieve better academic results. Research has shown that encouraging higher level of social interaction positively influences the intention to use e-learning, while students are motivated to use communication tools more, which further increases the social interaction among students (Cidral et al. 2018). In that way, social interaction becomes a significant tool for encouragement in using e-learning. In cases where work on e-learning platforms is characterized by the lack of social interaction, students become demotivated to use these platforms (Essam and Al-Ammary 2013). To motivate students to use e-learning platforms, it is necessary to equip the platforms with tools for social interaction. It has been proved that students' academic success improves through interaction with other students who have successfully completed a certain course (Rydell Altermatt 2011). That way student gets useful information from other students which help them achieve better academic results. Based on the abovementioned, we formulate the following research hypothesis:

H5. Social interactions on e-learning platforms have a significantly positive effect on academic success.

Based on the formulated hypotheses of this research, we have constructed a research model shown in Fig. 1.
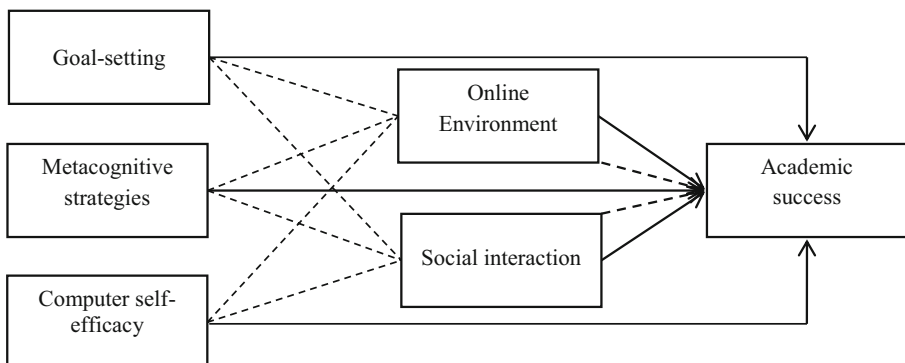

Fig. 1 Research model

It is necessary to emphasize that in this research, academic success means the ability of a student to master certain education courses and earn credits, achieving the best possible results.

3 Research methodology

In this section we presented the basic population, research sample and procedure of data collection. Furthermore, we presented the results of a non-response bias analysis of collected data and operationalization of the research constructs.

3.1 Data collection and respondents' profile

Research for the purpose of this study was conducted on the territory of BiH. The research included HEIs in BiH. The questionnaire was placed on the largest student portal in BiH – Sodomat. The questionnaire was active for 15 days. During this time, 414 students completed the survey. Data on students' characteristics are shown in Table 1.

For this research we used a questionnaire which was designed in the following way. Firstly, all types of study programs have been encompassed. Secondly, research constructors have been identified. Thirdly, based on the chosen constructs, we designed a questionnaire that relied on the questions used in previous research. Furthermore, the

Table 1 Characteristics of students

Characteristics of students		Frequency	Percent
Sex of respondents:	1. Male	209	50.5
	2. Female	205	49.5
Studying mode:	3. Full-time studies	356	86.0
	4. Distance studies	58	14.0
Year of studies:	1. First	181	43.7
	2. Second	77	18.6
	3. Third	94	22.7
	4. Fourth	47	11.4
	5. Fifth or higher	15	3.6
Age	1. Up to 20	159	38.4
	2. 21–23	171	41.3
	3. 24–27	34	8.2
	4. Over 27	50	12.1
Type of studies	1. Social science	201	48.6
	2. Natural science	20	4.8
	3. Technical science	177	42.7
	4. Other	16	3.9
Type of higher education institution	1. Public	276	66.7
	2. Private	138	33.3

questionnaire was forwarded to four experts in e-learning. Finally, based on suggestions from the experts, the questionnaire was modified and is uploaded to the portal Sodomat.

3.2 Measurements

The questionnaire used for the purposes of this research consisted of two parts. The first part of the questionnaire analyzed the characteristics of students, such as: sex, mode of studying, year of studies, age, type of studies and type of higher education institution. The second part of the questionnaire measured the constructs of research such as: Goal-setting, Metacognitive strategies, Computer self-efficacy, Online environment, Social interaction and Academic success.

The goal-setting construct is aimed at examining how goals are established, whether students set both short-term and long-term goals, and finally whether they ever interrupt e-learning before the goals are met. For measurement of this construct we used claims from the following research: Martinez-Lopez et al. (2017) and Kirmizi (2014). The metacognitive strategies construct aimed at showing if students use various e-materials in order to understand what is being learned, and whether they find similar materials in cases when certain e-material is difficult to master. For measurement of this construct we used claims from the following research: Kirmizi (2014) and Chiu et al. (2013). The goal of the computer self-efficacy construct was to investigate if students are self-confident about their knowledge and skills when it comes to computers, and if they can effectively use the Internet to find the right information, if they obtain the right information quickly and if they can tell the difference between useful and non-useful information during e-learning. For measurement of this construct we used claims from the following research: Hsia et al. (2014), Ratten (2013). The online environment construct aimed at examining if e-learning is used in a comfortable environment, if it is a place where studying could be most efficient and a place without many distractions. For measurement of this construct we used claims from the following research: Martinez-Lopez et al. (2017) and Chen (2014). The goal of the social interaction construct was to examine if e-learning platforms are excellent for communication with other participants, if such communication is helpful for learning and if students are comfortable interacting with other students and whether the participation in discussions helps students in learning. For measurement of this construct we used claims from the following research: Cohen and Baruth (2017) and Chen (2014). The academic success construct was used to show if students get better grades when using e-learning, if they pass more exams and if their independent work as well as group work are better after e-learning. For measurement of this construct we used claims from the following research: Liu (2016) and El-Seoud et al. (2014).

4 Results

For the purpose of testing a model and hypotheses we used the Confirmatory factor analysis (CFA) and structural equation model (SEM). Scale validity and reliability was tested with Cronbach's Alpha (CA) indicator, while discriminant validity was measured with the help of the Average variance extracted (AVE) indicator, and discriminant

validity of structural model construction was measured with square root of AVE. Furthermore, we tested the relationship between research constructs with the help of Pearson correlation coefficient. Statistical analysis was conducted using statistical softwares AMOS 20 and SPSS 20.

4.1 Scale validity and reliability

Before we use the SEM analysis to test the model, we need to carry out the CFA analysis. The purpose of the CFA analysis is to examine unidimensionality of the research constructs. Results of the CFA analysis are shown in Table 2. Based on the results obtained from the CFA analysis, it can be concluded that the constructs are well defined and that all claims have good factor loadings, and on top of that, all indicator values are within the recommended limits (Chi-square = 560.40; GFI = 0.89; AGFI = 0.85, NFI = 0.95; NNFI = 0.96; CFI = 0.97; RMSR = 0.073; $p = 0.000$) so it can be concluded that the established model has acceptable unidimensionality and convergent validity (Hsia et al. 2014).

Results of the descriptive analysis (Table 2) show that the respondents mostly agree with the claims related to computer self-efficacy, while they are least likely to agree with the claims related to goal-setting, which represents the mean. The greatest dispersion in respondents' answers is shown in relation to the goal-setting construct, while the smallest dispersion is shown in answers relating to the metacognitive strategies construct, which is shown by the values of standard deviation. All items used in the questionnaire have been encompassed in Table 2.

Internal consistency of scales was measured with the CA indicator. Results obtained using the CA indicator show that there is a good internal consistency of measuring scales, given that the values of this indicator are in the range from .747 to .891 (Table 2), which is above the critical value of .70 for this indicator. (Puška et al. 2018). The Composite reliability (CR) values range from .76 to .88 (Table 3), which is above the critical value of .70 for this indicator, proving that all constructs are reliable. The AVE values range from .52 to .65 (Table 3) which is above the critical value of .50 for this indicator, thus proving that constructs have a good discriminant validity. The lowest value of the square root of AVE is .720 which is above the absolute values of correlation analysis, which means that the requirement of discriminant validity of a model construction has been met (Hsia et al. 2014).

When observing relations between the constructs, the correlation analysis value shows that the greatest connection is between Metacognitive strategies and Academic success (r = .509), while Goal-setting and Academic success (r = .347) are the least connected constructs. However, the correlation analysis values show there is a significant connection among all constructs at the level of significance of .01.

4.2 Structural relationships

Table 4 shows results of the SEM analysis for the established model. Based on the obtained model indicator values, it can be concluded that the model is reliable (Chi-square = 562.01; GFI = 0.89; AGFI = 0.85, NFI = 0.95; NNFI = 0.96; CFI = 0.97; RMSR = 0.073; $p = 0.000$) (Hsia et al. 2014). Further in the text we summarize results of the hypothesis tests.

Table 2 Scale validity and descriptive

Scale	Item description	Loading	Mean	S.D.	CA
Goal-setting	I set goals before me start with e-learning.	.65	3.67	.90	.763
	I set clear short-term and long-term goals of e-learning.	.80	3.21	1.07	
	I do not interrupt e-learning until I have achieved the set goals.	.78	3.06	1.10	
Metacognitive strategies	I use various online materials in order to understand a certain term.	.68	3.97	.82	.776
	I paraphrase and summarize online materials to improve the comprehension.	.68	3.79	.88	
	When a certain online material is too difficult, I find similar materials in different forms.	.50	3.83	.83	
Computer self-efficacy	I use the Internet effectively to find the needed information for e-learning.	.67	4.19	.84	.880
	I am self-confident about my knowledge and skills when it comes to e-learning.	.77	4.00	.89	
	I quickly obtain information in e-learning.	.75	3.99	.92	
	I can tell the difference between useful and non-useful information in e-learning quickly.	.66	3.95	.87	
Online Environment	I study in comfortable online environment.	.78	3.69	.99	.747
	I study effectively in online environment.	.82	3.57	.99	
	I conduct e-learning in a place without many distractions.	.57	3.60	1.03	
Social interaction	E-learning platform is excellent for communication with other users.	.55	3.78	.84	.865
	Communication with other e-learning users helps me learn.	.79	3.61	.89	
	I feel comfortable communicating with other e-learning users.	.74	3.55	.86	
	Participating in online discussions is helpful when it comes to e-learning.	.72	3.44	.94	
Academic success	I have better grades when I use e-learning.	.84	3.38	.94	.891
	I pass more exams when I use e-learning.	.80	3.37	.96	
	My independent work is more diverse and better after e-learning.	.70	3.69	.90	
	My group work is more diverse and better after e-learning.	.70	3.58	.90	

Hypothesis 1 There is no significantly positive relation between goal-setting and academic success (path = .00; $p = .476$) therefore this hypothesis is rejected. These results indicate that goal-setting has no impact on improvement of academic success. Hypothesis 1a shows that social interactions have a role of a mediator between goal-setting and academic success, and the results obtained indicate that there is a significantly positive relation between these constructs (path = .07; $p = .002$), therefore this auxiliary research hypothesis is supported. Hypothesis 1b shows that online environment has a role of a mediator between goal-setting and academic success, and the

Table 3 Composite reliability correlation and average variance extracted

Construct	CR	AVE	A	B	C	D	E	F
A. Goal-setting	.80	.57	*.756*					
B. Metacognitive strategies	.78	.55	.365**	*.739*				
C. Computer self-efficacy	.88	.65	.380**	.466**	*.806*			
D. Online Environment	.76	.52	.440**	.461**	.453**	*.720*		
E. Social interaction	.87	.63	.417**	.422**	.301**	.365**	*.794*	
F. Academic success	.88	.64	.347**	.509**	.436**	.473**	.442**	*.798*

Note: **Significance at 0.01 level, CR Composite reliability; AVE Average-variance-extracted; the square root of AVE is typed in bold italics along the diagonal

obtained results show that there is a significantly positive relation between these research constructs (path = .06; p = .009), so this auxiliary research hypothesis is supported.

Hypothesis H2 indicates there is a significantly positive relation between metacognitive strategies and academic success (path = .28; p = .000) which makes this hypothesis accepted. This way it was proved that metacognitive strategies influence the improvement of students' academic success when it comes to application of e-learning. Hypothesis H2a shows that social interactions have a role of a mediator when it comes to influence of metacognitive strategies on academic success, which proves there is a significantly positive connection between these research constructs (path = .07; p = .005), and therefore this auxiliary research hypothesis is supported. Hypothesis H2b shows that online environment has a role of a mediator when it comes to influence of metacognitive strategies on academic success, which proves that there is a

Table 4 Model results

Hypothesis	Path Estimates	p value	Results
Direct Paths			
H1. Goal-setting → Academic success	.00	.476	Rejected
H2. Metacognitive strategies → Academic success	.28	.000	Supported
H3. Computer self-efficacy → Academic success	.14	.010	Supported
H4. Online Environment → Academic success	.22	.001	Supported
H5. Social interaction → Academic success	.21	.000	Supported
Indirect Paths			
H1a. Goal-setting → Social interaction → Academic success	.07	.002	Supported
H1b. Goal-setting → Online Environment → Academic success	.06	.009	Supported
H2a. Metacognitive strategies → Social interaction → Academic success	.07	.005	Supported
H2b. Metacognitive strategies → Online Environment → Academic success	.06	.012	Supported
H3a. Computer self-efficacy → Social interaction → Academic success	.00	.876	Rejected
H3b. Computer self-efficacy → Online Environment → Academic success	.05	.015	Supported

significantly positive relation between the research constructs (path = .06, p = .012). In that way, this auxiliary research hypothesis is supported.

Hypothesis H3 shows there is a significantly positive relationship between computer self-efficacy and academic success (path = .14; p = .010) therefore this hypothesis is supported. Obtained results indicate that a higher level of computer self-efficacy is crucial for the achievement of better academic success. Hypothesis H3a shows that social interactions do not act as mediators between computer self-efficacy and academic success (path = .00, p = .876), which is why this hypothesis is rejected. Hypothesis H3b. shows that online environment does play a role of a mediator between computer self-efficacy and academic success, which proves that there is a significantly positive relationship between these constructs (path = .05; p = .015), and in that way this research hypothesis is proven.

Hypothesis 4 demonstrates there is a significantly positive relationship between online environment and academic success (path = .22, p = .001) thus this hypothesis is supported. Based on the results obtained from the research, it can be concluded that online environment is a crucial factor when it comes to improvement of academic success. Students must feel more comfortable in online environment when applying e-learning in order to have better academic success. Hypothesis 5 shows that there is a positive relationship between social interactions and academic success (path = .21, p = .000) therefore this research hypothesis is supported. The obtained results indicate that students' interaction with other students and teachers is crucial for achievement of academic success. Through social interactions, students obtain necessary information that help them master certain materials more easily and achieve better results during their studies.

5 Discussion

This research has tested the role of goal-setting, metacognitive strategies and computer self-efficacy on academic success of students when it comes to the application of e-learning. Results have shown that metacognitive strategies and computer self-efficacy are crucial for improvement of students' academic success. However, goal-setting has proven not to be an influential factor in the improvement of academic success. In addition, this research has proved that there is an influence of online environment and social interactions as mediators on achievement of academic success.

Academic success is the key factor which determines whether students will use certain learning services. Students will use those learning services which enable them to master and acquire certain knowledge in the fastest and optimal way. E-learning helps students achieve better academic results (Lumadi 2013). That is why a very important aspect of this research was to examine in what ways goal-setting, metacognitive strategies and computer skills influence achievement of academic success when it comes to application of e-learning.

Results obtained from this research have proved that set goals do not have a significant direct influence on achievement of academic success in e-learning. Here we have not confirmed the results obtained from the research conducted by authors Burnette et al. (2013) and Peters (2012) which indicate that the set goals influence improvement of academic success only when students participate in mutual social

interactions and once the online environment has become more natural to them. In that manner social interactions and online environment play a role of a full mediator when it comes to influence of the set goals on academic success. Taking part in online environment and social interactions, students start to believe more in setting the learning goals themselves. Students in Bosnia and Herzegovina are faced with e-learning only when they start studying in HEIs, since our education system in primary and secondary school is dominated by traditional learning where e-learning is not practiced. For those reasons students start believing in their goals only when they start interacting with other students and find out how e-learning helps in achieving their academic success.

The results have shown that metacognitive strategies directly influence students' achievement of academic success when it comes to the application of e-learning, which confirms the results of the research conducted by authors Rahimi and Katal (2012). Furthermore, the results have shown that social interactions and online environment have a mediating role when it comes to the influence of metacognitive strategies on academic success. In that manner it has been confirmed that e-learning platforms applied in BIH promote development of students' metacognitive abilities, so they better understand certain materials on these platforms. If students have difficulties understanding certain materials, they will find similar ones that are more comprehensive; besides, social interaction with other participants in e-learning is helpful, too.

In order to understand certain material, besides metacognitive abilities, students need to master certain computer skills, as well. Results of the research have shown that computer self-efficacy helps students achieve better academic success in e-learning. In that manner we confirmed the results of the research conducted by Chien (2012) which indicate that computer self-efficacy helps in achievement of better academic results. Students with a higher level of computer self-efficacy shall be more confident when applying e-learning and they shall engage more into solving more difficult tasks. Therefore, they will spend more time applying e-learning than those students who have a lower level of computer self-efficacy. Results of the conducted research have proved that social interactions do not act as mediators between computer self-efficacy and academic success. Students with a higher level of computer self-efficacy are proven to have less interaction with other participants because they are more self-confident and therefore they choose to find the materials that help them master certain materials on their own. This research has proved that online environment has a role of a mediator between computer self-efficacy and academic success. In that sense, it was proved that students who have a higher level of computer self-efficacy feel more comfortable in online environment during e-learning, so that online environment has a significant role in achievement of academic success.

The results have also shown that social interactions between participants in e-learning contribute to achievement of better academic results, which confirms the results obtained from the research conducted by Rydell Altermatt (2011). The results have indicated that online environment, too, has a significant role in achievement of academic success, which confirms the results obtained from the research conducted by Zhou et al. (2017) stating that online environment has to be as comfortable as possible in order to achieve better results.

When observing the overall effect of the independent constructs: goal-setting, metacognitive strategies and computer self-efficacy through the dependent constructs:

online environment and social interactions on academic success, it has been proved (Table 5) that metacognitive strategies with social interactions have the greatest overall effect on academic success. The following construct: goal-setting using the online environment has the least overall effect on academic success. This research has shown that students who wish to achieve better academic results have to use metacognitive abilities which they will enhance by means of interactions with other participants on e-learning platforms. These claims should be addressed in some further research.

Results obtained from this research will help HEIs improve their e-learning platforms. To begin with, they will create their e-learning platforms so that they stimulate students' metacognitive abilities. Furthermore, prior to using these platforms, students will go through a training which will enhance their computer self-efficacy. Finally, these platforms must support interactions among the participants. If all these recommendations are applied, students will use e-learning platforms more and thus achieve better academic results, while HEIs will become more competitive thanks to increased use of their e-learning platforms. Consequently, studying at a certain HEI will become available to a larger number of students, no matter where they are located.

6 Conclusion

Results obtained from this research have confirmed that metacognitive strategies and computer self-efficacy have a direct, significantly positive effect on achievement of academic success. The goal-setting construct has a direct influence on academic success only through mediators, social interactions and online environment. Results of this research and the set conceptual model have enhanced practical knowledge on e-learning. In addition, these results have set the theoretical basis for understanding of e-learning further. In this manner it has been proved that e-learning is crucial for achievement of better academic success of students.

What needs to be done in the future research is improve this model to eliminate its shortcomings. First, it is necessary to examine what other constructs that are not included in this research directly influence enhancement of academic success of students. Next step is to determine other constructs that may have a role of mediators when it comes to achievement of better academic success. However, the increase in the number of constructs means that the research itself will be more complicated. For that reason, the future research should first examine the influence of other constructs and

Table 5 Total effect on Academic success

		Goal-setting	Metacognitive strategies	Computer self-efficacy
Direct effect	Academic success	.00	.28	.14
Indirect effect	Social interaction	.07	.07	.00
	Total effect	.07	.35	.14
Direct effect	Academic success	.00	.28	.14
Indirect effect	Online Environment	.06	.06	.05
	Total effect	.06	.34	.19

then create a model which would include the most significant construct plus the most significant constructs from this research.

The conducted model in this research has provided practical and theoretical assumptions for enhancement of knowledge on e-learning which needs to be corroborated in future research. Furthermore, the used model, which has proved itself on a practical example, contributes to improvement of e-learning platforms. This research will help HEIs take the application of e-learning to the next level and increase their competitiveness.

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